

CHAPTER 5

ESTABLISHING PETROLEUM TESTING FACILITIES IN THE THEATER

Section I. Deployment of Petroleum Testing Facilities

PREPARATION FOR SHIPMENT

When petroleum testing facilities are prepared for shipment, the type of laboratory, its mission or purpose, and the mode of transportation need to be considered. Coordination of the major steps during the notification sequence (N + hour) should be set up by the laboratory's NCOIC. It should be based on the laboratory resources and the time factor in which these steps must be completed. The time factor may vary from 24 to 72 hours, depending on the mission and local SOP. Specific to the laboratory is the coordination of resources necessary to prepare the interior and exterior of the laboratory for movement in the specified time. Particular attention must be paid to the correct handling of the supplies used in a laboratory, many of which are classified as hazardous materials. Requirements for shipping hazardous materials by rail, road, water and nonmilitary aircraft are found in CFR 40 and 49, BOE Tariff Number 6000-B, and DOT regulations. For information on shipping hazardous materials by military aircraft, refer to TM 38-250. The laboratory NCOIC will use the appropriate reference for the mode of transportation to prepare the hazardous materials for shipment. Quantities per container (or package) of hazardous materials and types of packing material may change with each type of transportation.

SHIPPING DOCUMENTS

DD Form 1387-2 (Special Handling Data/Certification) is required for hazardous material shipped by military aircraft. Use this form for

all shipments of hazardous laboratory material. See TM 38-250 for form preparation instructions and IAETA for commercial air and some military air hubs. This form helps personnel to rapidly identify, neutralize, and dispose of hazardous material in case of an accident. Refer to the local SOP and BOE 6000-B to prepare shipping papers according to TM 38-250. When a laboratory is shipped by air during tactical or contingency operations, a waiver is necessary. Waivers to packaging requirements must be requested according to TM 38-250.

REQUEST CHANNELS AND FORMAT

A request to ship by military aircraft should be submitted through channels to HQ, USAF, when Air Force aircraft are involved. For Army aircraft, shipment waivers are requested from:

Headquarters
Department of the Army
ATTN: DAPE-HRS
Washington, DC 20310-0001

The request must contain the following:

- The reason the shipment must be made.
- The reason other modes of transportation cannot be used.
- A statement that noncompatible items have been packed to prevent propagation of detonation or contamination (in case one item detonates or leaks). This does not apply to conditions present in aircraft crash. The statement should also include a brief description of tests or other basis on which such safety conclusions rest, and additional safety controls which must be exercised by the carrier.

- An estimate of propagation of detonation or contamination to be expected if the aircraft crashes.
- Date of movement, route, type of aircraft required (channel or special), specific cargo load configuration required (if requested) and a POC at origin and destination.

REQUEST APPROVAL

The office that has operational control of the aircraft, in coordination with safety personnel and other staff agencies, evaluates each request for waiver. If it approves the waiver, it will forward copies of the approved request to the requester and to the command having operational control of the aircraft. It will also advise the shipper, person, or office to be contacted at the origin base. The office requesting the waiver, on receipt of approval, arranges for the handling of the shipments at origin, in transit, and at destination bases.

Section II. Petroleum Laboratory Area Requirements

GENERAL

Some critical factors to consider in establishing petroleum laboratory operations include site selection and setup, assembly, and disassembly of the laboratory. Other areas of concern are environmental considerations, fire prevention, destruction of equipment to prevent enemy use, and defense in an NBC environment. Information on individual items of equipment and maintenance procedures can be found in the appropriate TMs.

ENVIRONMENTAL CONSIDERATIONS

We need to keep our commitment in protecting the environment. The following areas must be considered prior to occupancy of an area.

- Flora and Fauna Protection. Destruction of flora and fauna for bases and for minimum health and welfare and safety is permitted. Destruction and clearing of large areas, in excess of approximately 100 acres, must be approved through the operational chain-of-command with final approving authority resting with the joint operational commander. The affect on the environment should be weighed against the military advantage to be gained. The method for clearing operations must be coordinated and approved through the engineer and medical channels.
- Basing and conducting operations in the vicinity of archeological and historical buildings

and areas should be minimized to protect such areas from war and war related damage.

Environmental protection measures must be implemented during operations and after departure from a site. The purpose of this record keeping is to document US stewardship of land and facilities during the contingency. This will preclude unsubstantiated claims against the US Government, and false detrimental publicity against the US armed forces.

- Unless it is detrimental to the success of the mission and operational effectiveness, all bases and installations (permanent and temporary) shall be operated IAW the governing environmental standards as determined by the DOD.

- When practicable, the initial environmental conditions of any location occupied by US forces as a base, will be documented. This documentation will include a description and condition of water sources, soil, flora, archeological/historical facilities, air quality, and other environmental considerations. This documentation will be forwarded through engineer channels to the component service engineer.

- Prior to departure and abandonment of a base, the current description and conditions of water sources, soil, flora, archeological/historical facilities, air quality and other environmental conditions will be documented. Also, users of the base during US occupancy will submit locations

of latrines, hazardous waste sites, landfills, maintenance activities, POL storage, and other possible environmentally hazardous activities through engineer channels to component service engineers.

- Initial and closeout base environmental conditions will be maintained at component service HQ for five years after conclusion of the contingency unless further directions are issued.

LABORATORY SITE SELECTION

Choosing a good laboratory site is critical to the safety and security of all personnel. Some of the physical characteristics to look for in selecting areas for all petroleum laboratories are:

- The site should be firm, reasonably level with well drained terrain, and relatively free of surface rocks and large stones.
- Avoid low areas because of the danger of vapors collecting in them.
- The selected site should be at least 500 feet away from other areas of operation
- Choose a site near a stream, pond, or other established water source when possible, to provide a source for the laboratory's water system and as an aid in fire control.
- The selected site should be located near or on an access road.
- The site should provide adequate cover and concealment, or camouflage nets may be used.
- The site should be easily defended.
- Site should require the least amount of engineer support.

PETROLEUM BASE LABORATORY REQUIREMENTS

Since the Petroleum Base Laboratory is being replaced by the Modular Petroleum Base Laboratory, site requirements and preparations will not be discussed in this manual.

MODULAR BASE LABORATORY REQUIREMENTS

Area requirements for the proposed modular base petroleum laboratory will be sufficient to position two trailers, side by side. Each trailer is

approximately 38 feet long by 8 feet wide. The selected site must also include space for generators, a sample storage area, a waste disposal area and administrative parking.

MOBILE LABORATORY REQUIREMENTS

The site for a mobile laboratory should be large enough to maneuver a trailer approximately 38 feet long and 8 feet wide. Areas for the trailer-mounted, 60-kilowatt generator; sample storage; waste disposal area; chemical overpack storage; and administrative vehicle parking must also be considered in the selected area.

- Initial Preparation, Equipment Inspection, and Test Equipment Operations. TM 10-6640-215-13 contains operator, unit and direct support maintenance instructions for the mobile laboratory. Refer to TM 10-6640-215-23P for list of spare and repair parts; special tools; special tests, measurement and diagnostic equipment (TMDE); and other special support equipment required for the performance of unit and direct support maintenance of the mobile laboratory.

- Operational Capability. Full operational capability of the mobile laboratory can be achieved within 12 to 16 hours from the time the laboratory arrives on site. This time is required for utility hookup, unpacking of test equipment, mixing of solutions, and bringing equipment and baths to operating temperatures.

- Sustainability. The mobile laboratory has a series of overpack boxes which contain the necessary replacement chemicals, glassware, and expendable supplies to provide for 60 to 90 days of sustainability without resupply. The increased sustainability allows for the time lag in the unde-

veloped theater that occurs while regular supply lines are being established. The BII (Basic Issue Items) List and Expendable/Durable Item List are found in TM 10-6640-215-13. The actual lengths of days depend on the work load experienced, the types of products tested, and the mission of the unit to which the laboratory is assigned.

AIRMOBILE LABORATORY REQUIREMENTS

The site for the airmobile laboratory should be large enough for a shelter 12 feet long by 7 feet wide. Include additional space for a trailer-mounted, 15 kw generator; overpack and sample storage; waste disposal area; and administrative vehicle parking.

- Initial Preparation, Equipment Inspection, and Test Operation. Initial preparation, equipment inspection, and test equipment operation is described in TM 5-6640-216-13&P. Full operational capability of the airmobile laboratory can be achieved within four to six hours of arrival at the site.
- Sustainability. As with the mobile laboratory, the airmobile laboratory includes overpack boxes which provide a 60 to 90-day sustainability factor. See SC 6640-97-CL-E01 for the content list.

GROUND FUELS TEST KIT REQUIREMENTS

The ground fuels test kit can be set up and operated in a space as small as 6 feet by 4 feet.

The test kit should be set up in a tent or shelter in order to protect test equipment from wind, dust, rain, or snow.

TEST KIT REQUIREMENTS

Except for the ground fuels test kit mentioned above, the remaining kits do not require any specific shelter for operation. The following kits are portable and housed in suitcase-type cases. See Chapter 4 for additional information on available test kits.

- The aviation fuel contamination test kit can be set up in 10 minutes. The kit is designed to transport enough expendable supplies to run 50 tests without replenishment.
- The Aqua-Glo test kit can be operated immediately. Supplies are sufficient to run 50 tests.
- The sampling and gauging kit can be operated immediately. There are approximately 120 days worth of expendable supplies included in the kit.
- The captured fuels test kit has immediate operational capability. Since it does not use any expendable supplies, its use is uninterrupted.

Section III. NBC Environment

NBC THREAT CONSIDERATIONS

Petroleum testing facilities are found throughout the theater of operations. It is probable that they will face some enemy activity either in the form of conventional or NBC weapons. NBC agents used by the enemy will depend on terrain, weather, location of other enemy units, and the desired effect. These weapons may be delivered

by air, land, or sea and by indirect or direct fire. Laboratory facilities must be able to withstand an NBC-contaminated environment. Efforts to reduce the vulnerability of sites to NBC attack play a major role in improving survivability.

NUCLEAR EFFECTS

Understanding the effects of a nuclear blast is important in planning your defense against it. It can cause equipment damage as well as injury to personnel. The effects of a nuclear explosion include the following.

- The air blast can overturn or crush equipment and hurl debris.
- Thermal radiation can ignite combustible materials.
- Nuclear radiation can affect personnel, both after the explosion and through residual radiation.
- EMP can damage electrical equipment because it induces voltage in excess of normal operating levels.

PREPARATION OF SITE

Standard defense procedures in preparing a site for occupancy are listed below.

- Camouflage your position and equipment.
- Disperse equipment and areas of operation.
- Store chemicals properly. Store incompatible chemicals away from each other.
- Use containers to store equipment and supplies, if possible. Also, cover the equipment and supplies.
- Use terrain features to shield operations.
- Make sure first aid supplies are on hand.
- Construct fighting positions that have overhead cover.
- Follow communications security and operations security procedures.
- Make sure the operating area is free of debris.

LABORATORY NBC PROTECTION PROCEDURES

To further protect laboratory equipment and facilities from an NBC attack, some additional procedures are listed below.

- The test kits can be set up in a tent. The tent can be hardened by putting sandbags around the center pole and placing sandbags and dirt as far up the sides as possible.

- The airmobile and mobile laboratories are good shelters as long as doors, windows, vents, and cable access ports are closed. The earth is a good shielding material. Use natural terrain features to reduce blast effects. Wires and cable runs should be kept as short and straight as possible and, where practical, the cables and wires should be kept on the ground. Elevating them may increase the EMP-generated voltages and currents. Cover ground wires and cables with at least 1 inch of dirt to protect them against EMP. Power generators should be protected by piling sandbags or other suitable material around them. Entry and exit procedures should be established to limit the spread of contamination should it occur.

- The base laboratory follows the same NBC defense measures as the airmobile and mobile laboratories. A concrete building makes a better shelter than a wooden structure. Proper storage of chemicals, with incompatible groups stored as far apart as possible, will reduce the fire hazard in the area.

NBC DEFENSE FUNDAMENTALS

The three fundamentals of NBC defense are avoidance, protection, and decontamination. These can be applied to laboratory systems in the following manner.

- Contamination avoidance. Avoidance addresses individual and/or unit measures taken to avoid or minimize NBC attacks and reduce the effects of NBC hazards. FM 3-3 and FM 3-100 provide information on NBC avoidance measures. Avoidance techniques are accomplished by the use of cover, concealment, and dispersion. Good techniques will not only reduce detection by enemy forces, but they will also reduce the effects of thermal radiation. By taking advantage of any existing natural and manmade terrain features (for example, caves, ditches, ravines, culverts and tunnels) contamination can often be avoided.

- Protection. Protection consists of actions used to counter enemy firepower and maintain the health and morale of soldiers. Protection applies when contamination cannot be avoided. Positions should be hardened, all loose equipment should be immobilized by anchoring or tying it down, vital equipment should be protected or shielded, and proper MOPP levels should be employed. Fuel samples should be kept in a trench or pit with some type of covering. Shock-sensitive equipment should be shielded by cushioning it with padding material.

- Decontamination. Decontamination is the reduction or elimination of the contamination hazard. Decontamination is used to reduce or eliminate a hazardous contaminant. The NBC element of the unit to which the laboratory is assigned should be contacted for more up-to-date information on defense techniques and procedures.

NBC OPERATIONS

Operating procedures for laboratory facilities are discussed in Chapter 10. Laboratory NBC procedures should be coordinated with the NBC elements of the unit to which the laboratory is assigned to ensure information and techniques are current and comprehensive. For information on the NBC environment, refer to FMs 3-3, 3-4, 3-5, and 3-100. Laboratory facilities must be able to withstand an NBC-contaminated environment.

NUCLEAR ATTACK

Personnel need to know what to do during and after a nuclear attack. Soldiers should be trained to act without hesitation. Their initial actions must be automatic and instinctive.

During a Nuclear Attack. As a rule, a nuclear attack will be a surprise, that may also involve several attacks. Time to take protective action will be minimal in this situation. Soldiers should do the following:

- Troops must immediately drop face down.
- Close their eyes.

- Protect exposed skin as much as possible, by putting hands and arms under or near the body and keeping the helmet on.

- Remain face down until the second blast wind has passed.

- After the wind has passed, follow the unit NBC SOP.

- Be aware of a fallout hazard if the laboratory is downwind from the blast.

NUCWARN. If a nuclear attack is made on enemy positions by our forces, a NUCWARN message may be sent to nearby units. If you receive a NUCWARN message, follow these steps:

- Cease all testing.
- Move all hazardous and flammable chemicals from the laboratory to the storage room or place them in a container.

- Cover exposed equipment if time permits.
- Take personal weapons and evacuate the laboratory.

- Close all doors.
- Go to the prepared positions and wait for the explosion.
- Refer to the NBC SOP for more information.

After a Nuclear Attack. Protection must not stop when the attack ends. Soldiers should do the following:

- Stay calm.
- Check personnel for injuries and render self-aid/buddy-aid according to instructions in FM 21-11.

- Check the area for radiation and reduce the hazard with basic soldier skills decontamination.

- Check weapons and equipment damage.
- Use soapy water and brushes to wash the equipment and the outside of the laboratory.

- Mark the area of water runoff as "contaminated."

- Review the NBC SOP for other actions.

BIOLOGICAL ATTACK

Personnel must be aware of the actions to take before, during and after a biological attack.

Before a Biological Attack. Preparations for a biological attack can be accomplished long before the attack happens. Personal health maintenance, which includes up-to-date immunizations, good hygiene, area sanitation and physical conditioning will reduce the effects of the attack.

During a Biological Attack. There are no immediate methods of detecting a biological attack. When high probability indicators of a biological attack exist, immediate actions include:

- Put on the protective mask.
- Button up clothing for complete protection against living biological agent

After a Biological Attack. Because there are no devices to indicate when a biological hazard no longer exists, soldiers should do the following:

- Continue to wear the protective mask until authorized to remove it.
- Check personnel for symptoms of poisoning.
- Administer antidotes if needed.
- Check the area for contamination.
- Move personnel and equipment to a decontamination site, if one is available.
- Personally decontaminate equipment according to priority, if a site is not accessible.
- Mark the area of water runoff as "contaminated."
 - Perform preventive maintenance checks and services on all equipment.
 - Repair damage, if possible.
 - Report status of equipment and personnel to higher headquarters.
 - When possible, move the laboratory and personnel out of the contaminated area to continue operations.

CHEMICAL ATTACK

Personnel must be aware of the actions to take during and after a chemical attack.

During a Chemical Attack. Personnel must act quickly and without hesitation. If a chemical round explodes or an alarm signal is given, they should do the following.

- Cease testing.
- Don appropriate level MOPP.
- Identify the agent.
- Stay alert for more strikes.
- Refer to unit NBC SOP for additional procedures.

CHEMWARN. If a CHEMWARN is received, personnel should cover all exposed equipment, in the time allowed, before going to their covered positions.

After a Chemical Attack. Personnel actions following a chemical attack, are the same as those stated above for a biological attack.

OPERATIONS IN A CONTAMINATED ENVIRONMENT

If persistent chemical agents have been used or nuclear fallout or residual radiation is present, the area will remain contaminated after the attack has ended. Contact higher HQ to see if the mission should continue. If the unit must continue to test, decontaminate the inside of the laboratory, if needed. The outside of the laboratory should also be decontaminated, as much as possible. Set up a decontamination point near the entrance of the laboratory so personnel can decontaminate themselves before entering. The only hazard in the laboratory will probably be a vapor hazard. Protective masks should be worn at all times. Gloves should also be worn, when necessary. The laboratory officer or NCO in charge will determine what tests need to be done. Keep higher HQ informed of the status of the laboratory testing. The

laboratory should be continuously monitored for contamination.

LABORATORY SOP

The laboratory SOP must have an annex for NBC defense responsibilities and procedures. For helpful information in preparing the annex, see FMs 3-3, 3-4, 3-5, 3-100, and 25-50. Coordinate the annex with the NBC officer and NCO of the unit. Update the SOP to show any changes in policy. Make sure the annex covers the following areas:

- Alarms and warnings of NBC attack.
 - Means of identification of personnel in MOPP 4.
 - Method of communication to use while in MOPP 4.
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- Actions for personnel to take in the laboratory before, during, and after an NBC attack.
 - Maintenance and storage of NBC supplies and equipment.
 - Positioning and protection of vehicles, supplies and equipment.
 - Priorities of decontamination.
 - Decontamination procedures.
 - Operations in a contaminated environment.
 - NBC 1 report.
 - Procedures for special environments (arctic and jungle).

TRAINING

Training before an NBC attack is the means for survival. It is especially important for a biological attack, since there are no devices to indicate when a biological hazard is present. Good personal health habits, up-to-date immunizations, good

area sanitation, and good physical conditioning are essential to survivability in the NBC environment. It is essential that laboratory personnel become proficient in those tasks outlined in FM 21-2.

DESTRUCTION OF ARMY LABORATORIES

Destruction of Army material is sometimes necessary to prevent enemy use. Only the commanding officer can order demolition. Once it is decided, destruction should be as complete as possible. However, the safety of personnel comes first and the degree of destruction should not jeopardize lives. Unless they are disabled, consideration should be given to transporting the mobile laboratory to a center for decontamination. Detailed procedures for destruction of the petroleum base laboratory are listed in TM 5-6640-214-14. Additional procedures for destruction of equipment can be found in TM 750-244-3.