EGG-WM-9683
Revision 6
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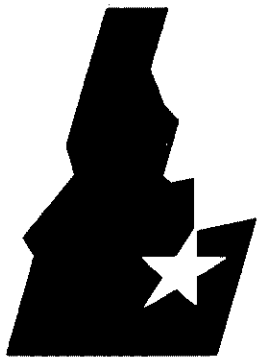

Idaho National Engineering Laboratory

Managed by the U.S. Department of Energy

Health and Safety Plan for Characterization and Removal of Underground Structures at Test Area North at the Idaho National Engineering Laboratory

L. J. Peterson-Wright

EG&G Idaho

Work performed under DOE Contract No. DE-AC07-76ID01570

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Health and Safety Plan for Underground Storage Tanks at Test Area North at the Idaho National Engineering Laboratory

EGG-WM-9683
Revision 6

Approved by (see Note)

T. J. Meyer, Manager Waste Area Group 1	Date

Reviewed by

R. E. Simonds, Facility Manager Test Area North	Date
Dr. P. N. Creighton Occupational Medical Program	Date
J. P. Shea, Chair Environmental Restoration Independent Review Committee	Date

Note: Original signatures appear on DRR Nos. ER-1234, ER-1270, ER-1303, and ER-1369.

ABSTRACT

This health and safety plan (HSP) establishes the procedures and general guidelines for worker and public safety to be used by EG&G Idaho, Inc. (EG&G Idaho) during the characterization and removal of underground structures at Test Area North (TAN) at the Idaho National Engineering Laboratory (INEL). The HSP will be made available and is intended to apply to EG&G Idaho employees, subcontractors to EG&G Idaho, and employees of other firms working under the technical direction of EG&G Idaho at the task site. This HSP complies with U.S. Environmental Protection Agency, Occupational Safety and Health Administration, 29 CFR 1910.120, and EG&G Idaho guidance. It contains information about the hazards involved in performing the tasks, and the specific actions and equipment that will be used to protect persons working at the site.

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ACRONYMS

ACGIH	American Conference of Government Industrial Hygienists
ALARA	as low as reasonably achievable
ANP	Aircraft Nuclear Propulsion
ARDC	Administrative Record and Document Control
CFA	Central Facilities Area
CTF	Containment Test Facility
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy Idaho Operations Office
EAD	Emergency Action Director
EG&G Idaho	EG&G Idaho, Inc.
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
ER&WM	Environmental Restoration and Waste Management Department
F&M	Facilities and Maintenance
FTL	field team leader
HSO	health and safety officer
HSP	health and safety plan
IDLH	immediately dangerous to life or health
IET	Initial Engine Test
IH	industrial hygienist
INEL	Idaho National Engineering Laboratory
LOFT	Loss-of-Fluid Test
NIOSH	National Institute of Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PDs	program directives
PEL	permissible exposure limit
PPE	personal protective equipment
PSG	Program Support Group
RCT	radiological control technician
REL	recommended exposure limit
RWP	radiological work permit
SNAPTRAN	Space Nuclear Auxiliary Power Transient Program
SWP	Safe Work Permit

TAN	Test Area North
TLD	Thermoluminescent Dosimeter
TLV	Threshold Limit Value
TSF	Test Support Facility
USCG	U.S. Coast Guard
UST	underground storage tank
WCC	Warning Communication Center
WRRTF	Water Reactor Research Test Facility

Health and Safety Plan for Characterization and Removal of Underground Structures at Test Area North at the Idaho National Engineering Laboratory

1. INTRODUCTION

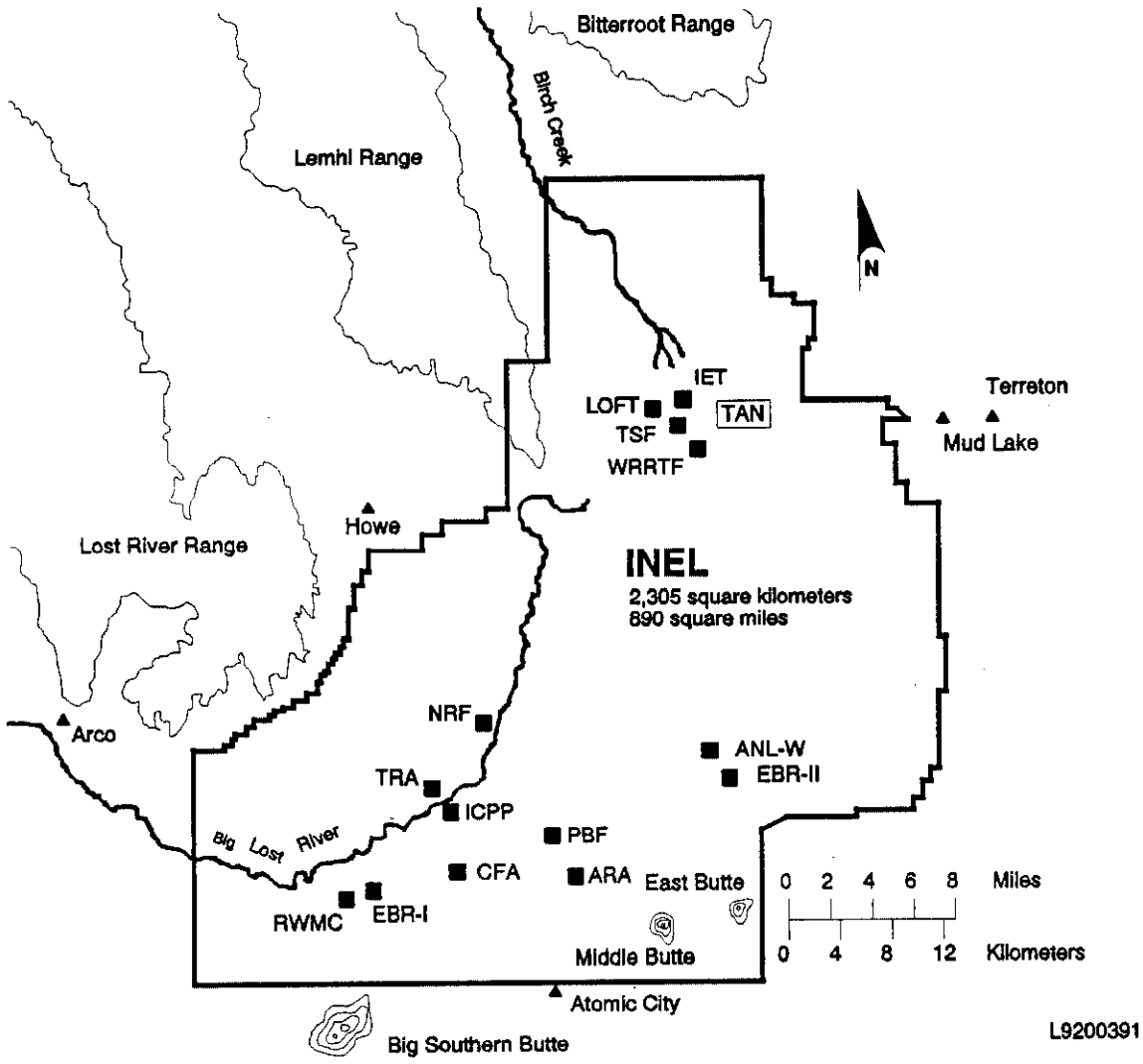
This health and safety plan (HSP) establishes the procedures and requirements that will be used to minimize health and safety risks to persons working at the task site. This HSP has been prepared to meet the requirements of the Occupational Safety and Health Administration (OSHA) standard, 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response." It has been prepared in recognition of and is consistent with the National Institute of Occupational Safety and Health (NIOSH)/OSHA/U.S. Coast Guard (USCG)/U.S. Environmental Protection Agency (EPA) *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities* (NIOSH 1985), the EG&G Idaho *Company Procedures Manual* (EG&G 1993a), the EG&G Idaho *Safety Manual* (EG&G 1993b), the EG&G Idaho *Industrial Hygiene Manual* (EG&G 1993c), and the EG&G Idaho *Radiological Control Manual* (EG&G Idaho 1993d).

This HSP will govern all work at the task site by employees of EG&G Idaho, subcontractors to EG&G Idaho, and employees of other companies or Department of Energy (DOE) laboratories. Persons not normally assigned to work at the task site, such as representatives of DOE, the State of Idaho, OSHA, and EPA will be considered nonworkers and will fall under the definition of occasional site workers as stated in OSHA 29 CFR 1910.120.

This HSP will be reviewed and revised by the health and safety officer (HSO) in conjunction with the field team leader (FTL) and other health and safety professionals as necessary to ensure its effectiveness and suitability. All reviews and revisions of this HSP will follow the requirements of Environmental Restoration (ER) program directives (PDs) 4.1, 4.4, and 4.8.

1.1 INEL Site Description

The Idaho National Engineering Laboratory (INEL) encompasses 2,305 km^2 (890 mi^2) and is located approximately 32 km (20 mi) west of Idaho Falls, Idaho (see Figure 1). The U.S. Atomic Energy Commission established the National Reactor Testing Station in 1949 as a site for building and testing a variety of nuclear facilities. The INEL has also been a storage facility of transuranic radionuclides and low-level radioactive waste since 1952. At present, the INEL supports engineering and operations efforts of DOE and other Federal agencies in areas of nuclear safety research, reactor development, reactor operations and training, nuclear defense materials production, waste management technology development, and energy technology and conservation programs. The DOE Idaho Operations Office (DOE-ID) has responsibility for the INEL, and designates authority to operate the INEL to government contractors. The largest primary contractor for DOE-ID at the INEL is EG&G Idaho, Inc. (EG&G Idaho), which provides management and operations services to the majority of the INEL facilities.



ARA	Auxiliary Reactor Area
ANL-W	Argonne National Laboratory-West
CFA	Central Facilities Area
EBR-I	Experimental Breeder Reactor I
EBR-II	Experimental Breeder Reactor II
ICCP	Idaho Chemical Processing Plant
IET	Initial Engine Test
LOFT	Loss-of-Fluid Test Facility
NRF	Naval Reactor Facility
PBF	Power Burst Facility
RWMC	Radioactive Waste Management Facility
TAN	Test Area North
TRA	Test Reactor Area
TSF	Test Support Facility
WRRTF	Water Reactor Research Test Facility

Figure 1. Map of the INEL showing locations of major facilities.

1.2 Test Area North (TAN) description

Test Area North (TAN) is located on the INEL site at the north end, approximately 27 miles northeast from Central Facilities Area (CFA). The area was originally established in the 1950s to support the U.S. Air Force and Atomic Energy Commission Aircraft Nuclear Propulsion Program. TAN is broken down into four areas: the Initial Engine Test (IET) Facility, the Containment Test Facility (CTF), the Technical Support Facility (TSF), and the Water Reactor Research Facility (WRRTF).

The IET is located at the north end of TAN, 28 miles north of CFA. The IET includes building and structures that were constructed in the early 1950s for the Aircraft Nuclear Propulsion (ANP) program. After that program ended in 1961, the IET was used for the Space Nuclear Auxiliary Power Transient Program (SNAPTRAN) through 1967, and then for the Hallam Decontamination and Decommissioning project for two years in the 1970s. Presently, the facility is inactive. A plot plan of TAN/IET is presented in Figure 2.

The CTF is located at the west end of TAN about 29 miles north of CFA. The area includes the CTF, a containment and service building (reactor facility), an aircraft hangar, the CTF reactor control and equipment building, and numerous support facilities. A plot plan of TAN/CTF is presented in Figure 3.

The TSF is located about 27 miles northeast of CFA. TSF is centrally located within TAN and covers an area that is approximately 670 x 457 m (2,200 x 1,500 ft) and is surrounded by a security fence. The buildings were constructed in the early 1950s. These buildings and utilities have been modified over the years to fit the changing needs of the INEL. The TSF serves as the main administration, assembly, and maintenance section for TAN. A plot plan of TAN/TSF is presented in Figure 4.

WRRTF is located 1.6 miles southeast of TSF. It includes the Semiscale (TAN-646) Blowdown Facility (TAN-640) and Two-Phase Flow Loop (TAN-640). A plot plan of TAN/WRRTF is presented in Figure 5.

1.2.1 LOFT-07 Task Site

The Loss-of-Fluid Test (LOFT) Facility, LOFT-07, is the site of a 5,000-gal tar-coated carbon steel underground storage tank (UST), also know as Test Area North (TAN)/LOFT-1701 or TAN-119. The tank was used to store fire suppressant foam for the control and equipment building (TAN-630) at the LOFT facility. The tank is located about 20 ft north of TAN-630 and was abandoned in place. The top of the tank is 6 ft belowgrade. The tank is 6 ft in width by 25 ft long and weighs approximately 5,520 lb when empty. The stored fire suppressant foam is a biodegradable, protein (blood) based compound. At present, the tank is full.

1.2.2 TSF-11 Task Site

The Technical Support Facility (TSF)-11 clarifier pits are located approximately 3 ft east of TAN-604. The three TSF clarifier pits are concrete settling basins, with a total estimated

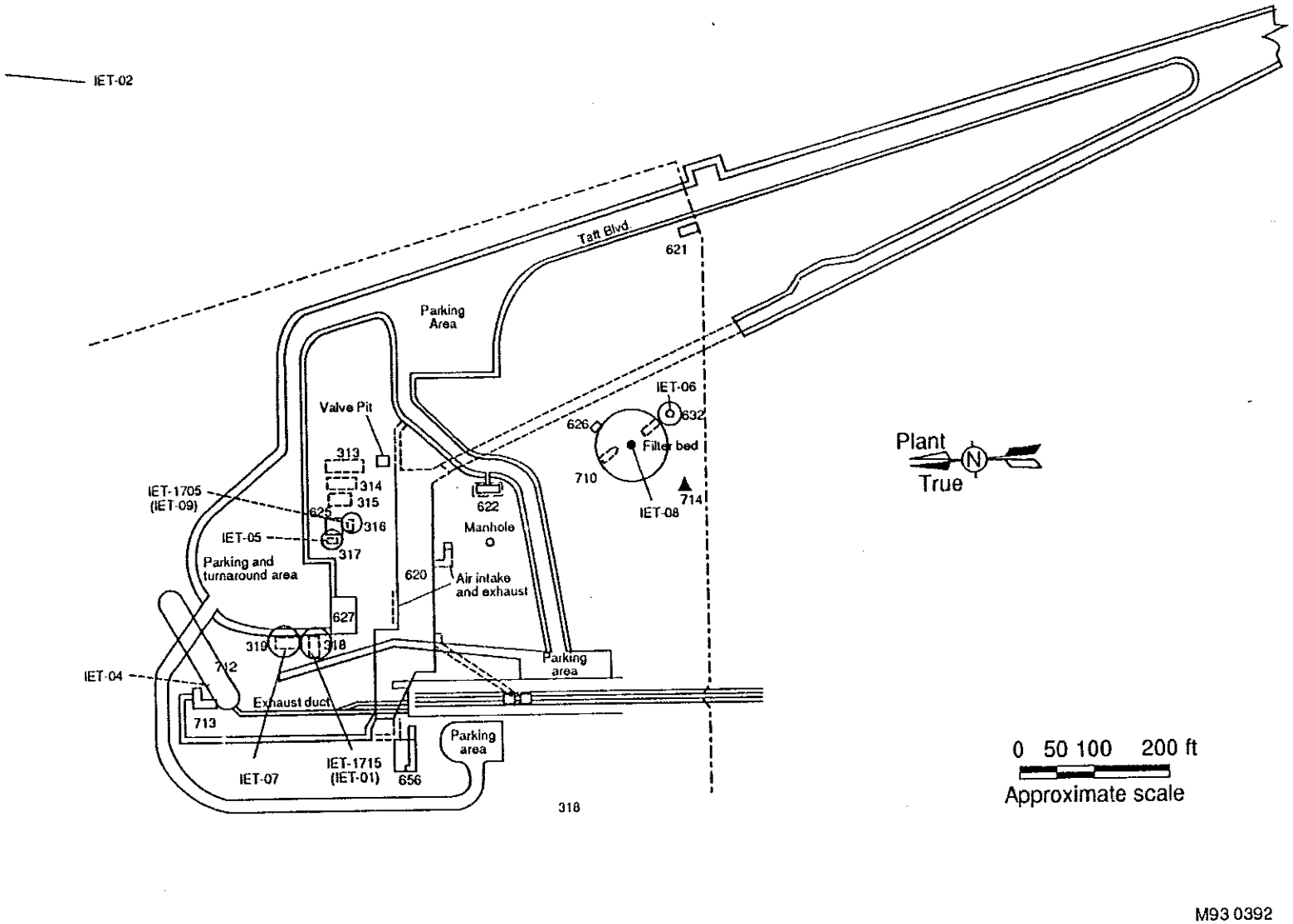


Figure 2. Plot plan of TAN/IET.

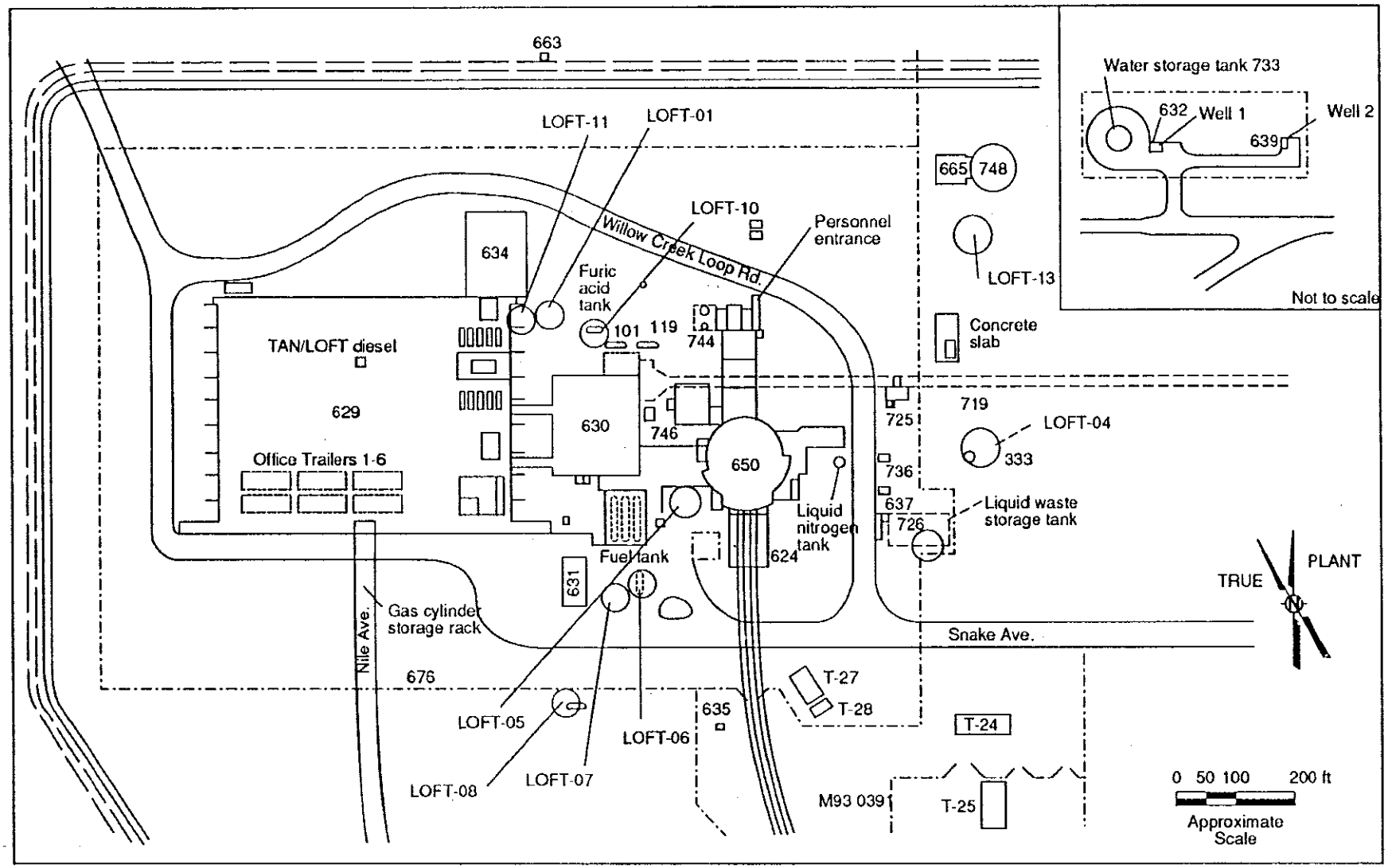


Figure 3. Plot plan of TAN/CTF.

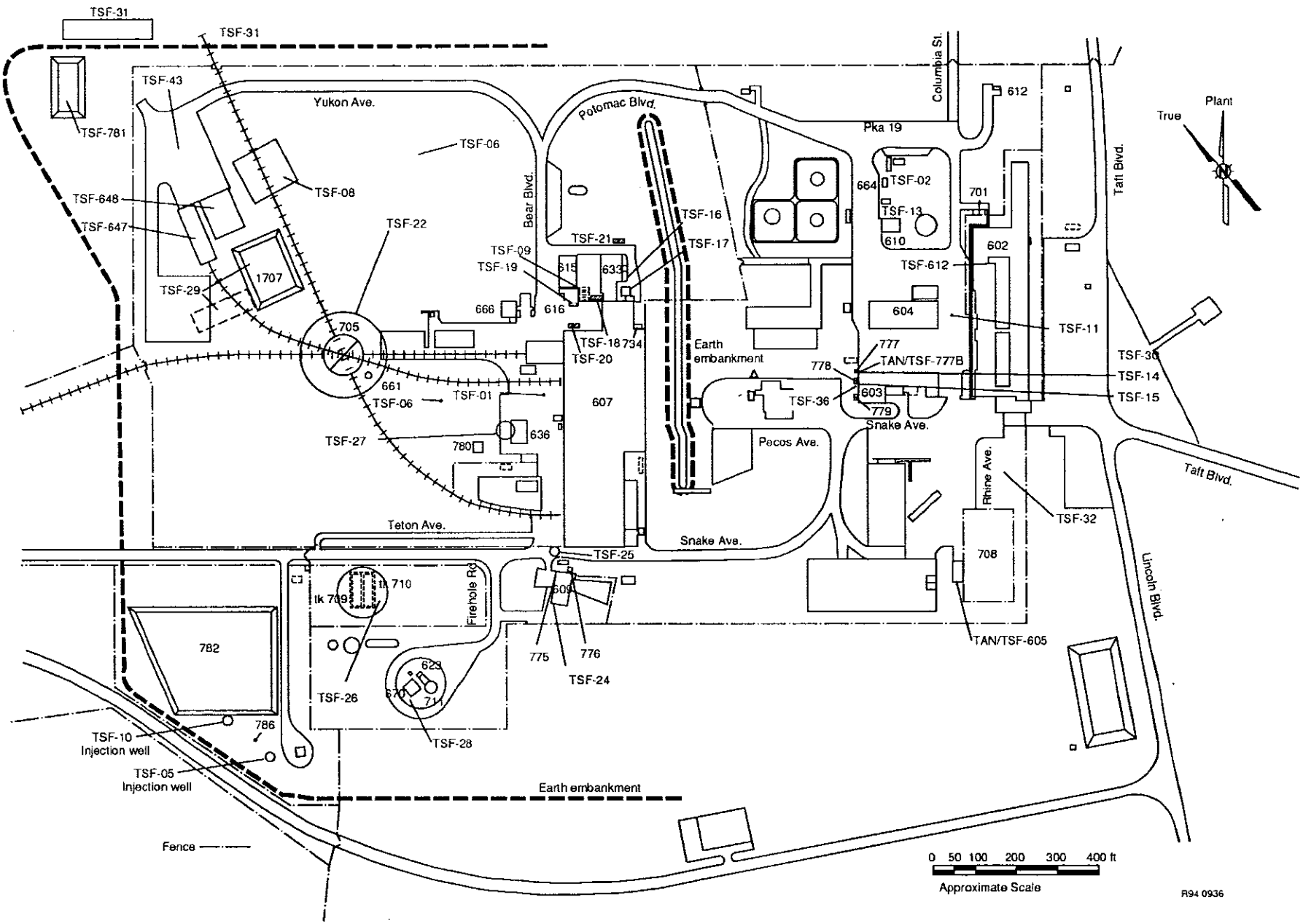


Figure 4. Plot plan of TAN/TSF.

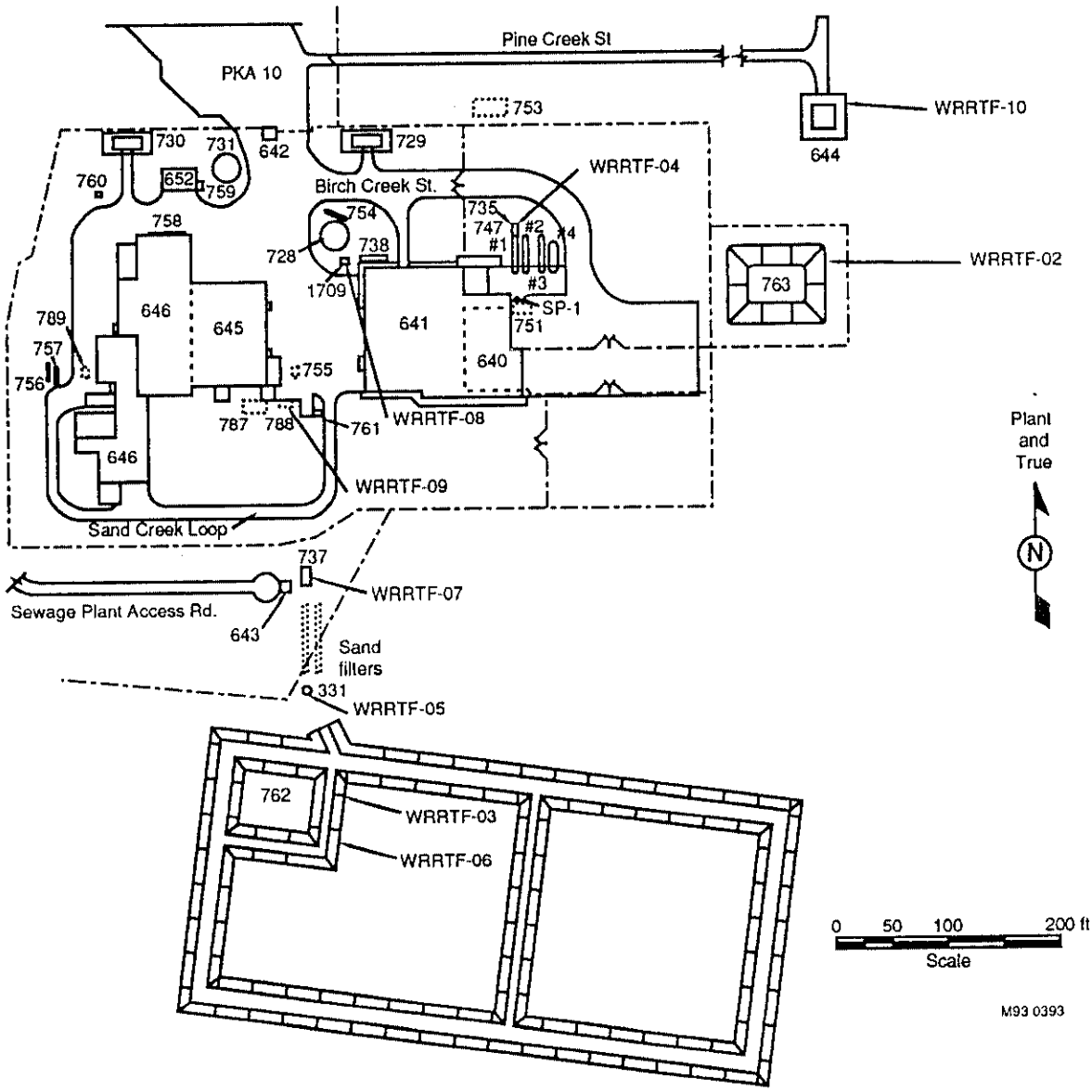


Figure 5. Plot plan of TAN/WRRTF.

capacity of 1,000-gal. Each individual settling basin is approximately 2.5 ft wide × 2.5 ft long × 6 ft high. The three settling basins are located at ground surface and are encased in a concrete structure with exterior dimensions of 4 ft wide × 10 ft long × 7 ft high. Wastewaters from paint thinners and paint strippers were washed down a service sink located in the Paint Shop Room in TAN-604. Flows with relatively high suspended solids were introduced at one end and the solids settled along the length of the flow. Flow with relatively low suspended solids was released through trough type overflow weirs to the TAN sewage treatment plant from 1957 to 1985.

1.2.3 TSF-36 Task Site

TSF-36 is a french drain located approximately 20 ft west of TAN-603. The drain is a 36-in.-diameter concrete conduit placed vertically in the ground and rises approximately 1 ft above ground level. The drain is connected to a flashtank located at the northwest end of TAN-603, approximately 15 to 30 ft east of TSF-36. The flashtank, in turn, is connected to a condensate return sump in the floor of the boiler room in TAN-603. The french drain reportedly received boiler water produced during normal boiler operation. In 1961, a leak developed in the evaporator system located in building TAN-616. The evaporator was used to concentrate radioactive liquids from the TSF-09 V-tanks. The evaporator lines are also part of the steam condensate return system inside the TAN-603 building; these lines were also leaking. The leak in the evaporator system in TAN-616 allowed radioactivity to enter the steam condensate line. Approximately 1 gal of radioactively contaminated water was released from the leaking steam condensate lines to the condensate return sump in TAN-603. From the sump, the liquid was pumped to the flashtank and released to TSF-36 through the drain valve. Approximately 3 ft of soil were placed in the drain following the release.

In May 1993, the radiological control technicians (RCTs) at TAN collected a soil sample from a "hot" spot located approximately 3 ft below grade. Cesium (Cs)-137 at 6.48 pCi/g was detected in the sample. In August 1993, the drain was sampled again. The samplers reported that the soil sampled from 6 in. to 12 in. below the ground surface within the well was moist and oily in appearance and had a strong petroleum odor. A headspace analysis, using a Photovac Microtip MP-1000 photoionization detector (PID) with an 11.7-eV lamp, calibrated to 100 ppm isobutylene[a], of a warmed portion of the sample indicated 800 ppm total volatile organic vapors

In the laboratory analysis of the samples collected, methylene chloride, acetone, toluene, and 2-butanone were the only VOCs detected in the soil samples as well as in associated laboratory method blanks. Chrysene and pyrene were the only two listed SVOCs detected; an additional twenty tentatively identified compounds were present. The estimated concentrations of the TICs, all compounds commonly associated with petroleum contamination, ranged from 3,900 µg/kg to 240,000 µg/kg. Concentrations of some metals in the samples were elevated slightly over TAN background levels. These metals are copper (179 mg/kg to 319 mg/kg); mercury (0.21 mg/kg to 0.74 mg/kg); nickel (70 mg/kg to 177 mg/kg); lead (39 mg/kg to 66 mg/kg) and zinc (173 mg/kg to

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a. *Summary Report: Assessment of Subsurface Soils from Shallow Injection Wells at the Idaho National Engineering Laboratory, Draft,* EGG-ESQ-11263, June 1994.

342 mg/kg). The gross alpha activity ranged from 2.35 ± 0.60 pCi/g to 3.09 ± 0.68 pCi/g and gross beta from 13.62 ± 1.80 pCi/g to 26.59 ± 3.31 pCi/g). The Cs-137 activity ranged from 5.437 ± 0.375 pCi/g to 5.885 ± 0.407 pCi/g.

1.3 Scope of Work

The specific tasks to be covered under this HSP are as follows:

Task 1. Removal, treatment, and disposal of remaining tank or structure contents. The sludge and liquid remaining in the tanks will be removed using a peristaltic pump or shovel. The materials will be containerized and treated in accordance with the appropriate waste treatment plan to render the waste nonhazardous (radioactivity retained) as defined in 40 Code of Federal Regulations (CFR) 261.

Task 2. Excavate soils and cut and cap pipes as necessary. The soils surrounding the tanks or structures will be removed using heavy equipment to expose attached piping and allow clearance to attach rigging for lifting. The piping will be cut, capped, and removed in such a way that any residual contamination is captured in a container.

Task 3. Remove, demolish, and dispose of the tank or structure. The tanks or structures will be removed from the excavation sites using a crane and transferred by flatbed to a staging area for demolition, disposal, or recycling.

Task 4. Perform soil/waste sampling and/or field screening.

Task 5. Restore site. The excavation will be filled with noncontaminated stockpiled soil using a front-end loader and the fill will be compacted.

This HSP covers health and safety concerns associated with the above tasks. Tasks that do not specifically support the tank removal effort and do not have similar health and safety concerns as addressed in this HSP are not supported by this HSP.

2. TASK SITE RESPONSIBILITIES

2.1 Task Site Personnel

The organizational structure for this task reflects the resources and expertise required to perform the task, while minimizing risks to worker health and safety. Names of the individuals who will be filling the key roles at the task site and lines of responsibility and communication are shown on the organizational chart for the task (Figure 6). The following subsections outline responsibilities of key site personnel.

2.1.1 ER&WM Manager

The EG&G Idaho Environmental Restoration and Waste Management (ER&WM) department manager has ultimate responsibility for the technical quality of all projects and safety of personnel during field activities performed by or for ER&WM. The ER&WM manager provides technical coordination and interfaces with the DOE-ID Environmental Support Office. The ER&WM manager ensures the following:

- All activities are conducted in accordance with DOE, EPA, and State of Idaho requirements and agreements
- Program budgets and schedules are monitored and approved
- The availability of necessary personnel, equipment, subcontractors, and services
- Direction is provided for developing tasks, evaluating findings, developing conclusions and recommendations, and producing reports.

2.1.2 Project Manager

The project manager ensures that all activities conducted during the project are in compliance with the *Management Plans for the EG&G Idaho Environmental Restoration Program* (EG&G Idaho 1993e) and all applicable OSHA, EPA, DOE, U.S. Department of Transportation, and State of Idaho requirements. All tasks also must comply with the *Quality Program Plan for the Environmental Restoration Program* (QPP-149) (EG&G Idaho 1993f), the quality assurance project plan, this HSP, program directives, and the sampling and analysis plan (Meyer 1994). The project manager coordinates all field, laboratory, and modeling activities.

2.1.3 Field Team Leader

The Field Team Leader (FTL) is the individual representing ER&WM at the task site, with ultimate responsibility for the safe and successful completion of the project. The FTL manages field operations and executes the work plan. The FTL enforces site control and documents task site activities. The FTL conducts daily safety briefings at the start of the shift. All health and safety issues at the task site must be brought to the attention of the FTL.

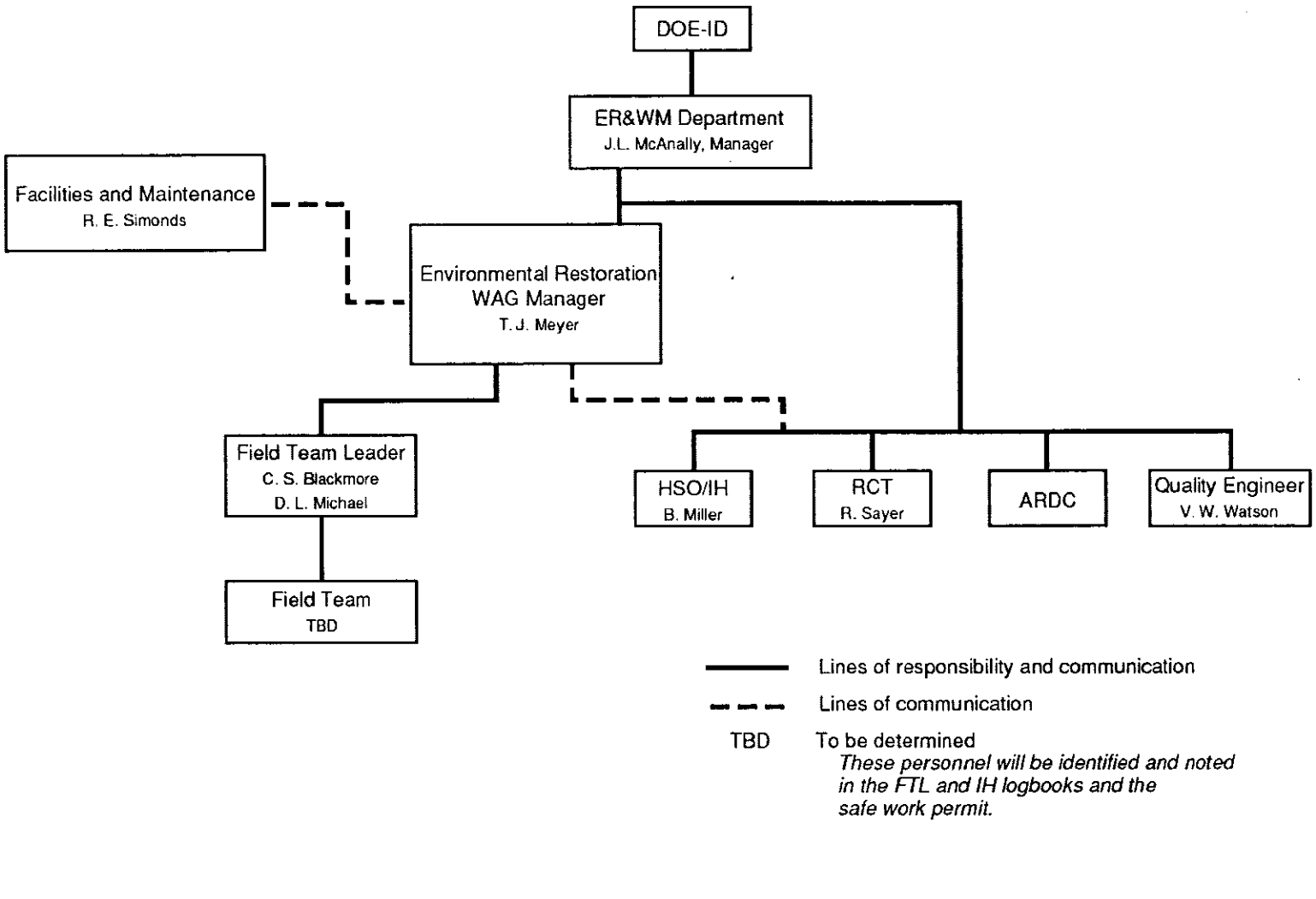

Figure 6. Field organization chart.

If the field team leader leaves the task site, an alternate individual will be appointed to act as the FTL. The person acting as the FTL on the task site must meet all FTL training requirements, as outlined in Section 3. The identity of the acting FTL will be conveyed to task site personnel and the facility representative (when appropriate), and will be recorded in the FTL logbook.

2.1.4 Task Site Personnel

All task site personnel, including EG&G Idaho and subcontractor personnel, are responsible for understanding and complying with requirements of this HSP. Task site personnel will be briefed by the FTL at the start of each shift. Task site personnel should identify potentially unsafe situations or conditions to the FTL or HSO for corrective action. *If unsafe conditions develop, task site personnel are authorized to stop work and notify the FTL or HSO of the unsafe condition.*

2.1.5 Nonworkers

All persons on the task site that are not a part of the field team at the project site are considered nonworkers for the purposes of this project. A person will be considered to be "onsite" when they are present in or beyond the designated support zone. Nonworkers will be deemed occasional site workers according to 29 CFR 1910.120, and must meet minimum training requirements for such workers as described in the OSHA standard and any additional task-specific training that is specified in Section 3.

All nonworkers, including EG&G Idaho employees from other departments, representatives of DOE, and State or Federal regulatory agencies, may not proceed beyond the support zone without receiving a safety briefing, wearing the appropriate protective equipment, and providing proof of meeting the training requirements specified in Section 3 of this HSP. Nonworkers will be escorted by a fully trained task site representative (such as the FTL, HSO, or designated alternate) at all times while on the site.

2.1.6 Other Site Visitors

A casual visitor to the task site is a person who does not have a specific task to perform or other official business to conduct at the site. Casual visitors are not permitted on the task site.

2.1.7 Health and Safety Officer

The HSO is the primary contact for health and safety issues. The HSO advises the FTL on all aspects of health and safety, and is authorized to stop work at the site if any operation threatens a worker or the general public. The HSO has other specific responsibilities as stated in other sections of this HSP. The HSO is supported by the safety engineer, IH, RCT, radiological engineer, and facility representative, as necessary.

If it is necessary for the HSO to leave the site, an alternate individual will be appointed by the HSO to fulfill this role, and the identity of the acting HSO will be recorded in the FTL logbook.

2.1.8 Industrial Hygienist

The IH is the primary source of information regarding nonradiological hazardous and toxic agents at the task site. The IH assesses the potential for worker exposures to hazardous agents in accordance with Company procedures and the EG&G Idaho *Industrial Hygiene Manual* (EG&G Idaho 1993c). The IH recommends appropriate hazard controls for protection of task site personnel, reviews the effectiveness of monitoring and personal protective equipment (PPE) required by this HSP, and recommends changes as appropriate. Following an evacuation, the IH will assist in determining whether conditions at the task site are safe for reentry. Employees showing health effects resulting from possible exposure to hazardous agents will be referred to the Occupational Medical Program by the IH. The IH may have other duties at the task site as specified in other sections of this HSP or in Company procedures and manuals.

2.1.9 Safety Engineer

The safety engineer reviews work packages, observes site activity, advises the FTL on required safety equipment, and recommends solutions to industrial safety issues that arise at the task site. The safety engineer also may perform air sampling to evaluate the presence of combustible mixtures of gases and toxic or low-oxygen atmospheres. The safety engineer may have other duties at the task site as specified in other sections of this HSP or in Company procedures and manuals.

2.1.10 Radiological Control Technician

The RCT is the primary source of information and guidance on radiological hazards. The RCT will be present at the task site during any task operations when a radiological hazard to operations personnel may exist or is anticipated. Responsibilities of the RCT include radiological surveying of the task site, equipment, and samples; providing guidance for radiological decontamination of equipment and personnel; and accompanying the affected personnel to the nearest INEL medical facility for evaluation if significant radiological contamination occurs. The RCT must notify the FTL of any radiological occurrence that must be reported as directed by the EG&G Idaho *Safety Manual*, Section 3. The RCT may have other duties at the task site as specified in other sections of this HSP or in Company procedures and manuals.

2.1.11 Radiological Engineer

The radiological engineer is the primary source of information and guidance relative to the evaluation and control of radioactive hazards at the task site. The radiological engineer makes recommendations to minimize health and safety risks of task operations personnel if a radiological hazard exists or occurs at the task site. Responsibilities of the radiological engineer include performing radiation exposure estimates and as low as reasonably achievable (ALARA) evaluations; identifying the type(s) of radiological monitoring equipment necessary for the task; advising the FTL and RCT of changes in monitoring or PPE, and advising on task site evacuation and reentry. The radiological engineer may also have other duties to perform as specified in other sections of this HSP or in Company procedures and manuals.

2.1.12 Occupational Medical Program

The INEL Occupational Medical Program provides medical surveillance for personnel assigned as hazardous waste site workers according to the OSHA standard. The Occupational Medical Program is also responsible for evaluating personnel injured or exposed to hazardous materials at the task site. See Section 4 for details of the medical surveillance program.

2.1.13 Facility Tenant Manager

The facility tenant manager is responsible for maintaining their assigned facility, and must be cognizant of work being conducted in the facility. The facility tenant manager may be required to sign safe work permits and radiological work permits that govern work performed at the facility.

2.1.14 Facility Representative

The facility landlord is responsible for the safety of personnel and the safe completion of all project activities conducted within their area. Therefore, the facility landlord (or their representative) will be kept informed of all activities performed in the area. Where applicable, the facility landlord (or representative) and FTL will agree upon a schedule for reporting task progress and plans for work. The facility landlord (or representative) may serve as advisor to task operations personnel with regard to the area operations.

2.1.15 Environmental Engineer

The environmental engineer oversees, monitors, and advises EG&G Idaho organizations performing field activities at the INEL. Responsibilities include ensuring compliance with DOE orders, EPA regulations, and other regulations concerning effects of activities on the environment.

2.1.16 Quality Engineer

The quality engineer provides guidance on task site quality issues when requested. The quality engineer observes task site activities and verifies that task operations comply with quality requirements pertaining to these activities. The quality engineer identifies activities that do not comply or have the potential to not comply with quality requirements and suggests corrective actions.

2.2 Recordkeeping Requirements

2.2.1 Industrial Hygiene and Radiological Monitoring Records

The IH will record air monitoring and personal sampling data on Form EG&G-737, "Industrial Hygiene Monitoring Data Form." Industrial hygiene monitoring data are treated as limited access information and are maintained by the IH in accordance with Company Procedure 11.14, "Calibration of Industrial Hygiene Instruments." (EG&G Idaho 1993c). The RCT will keep a logbook of all radiological monitoring, daily operational activities, and instrument

calibrations. Radiological monitoring records are maintained according to Section 7 of the EG&G Idaho *Radiological Control Manual* (EG&G Idaho 1993d)

2.2.2 FTL Logbook

The FTL will keep a record of daily task site events in the FTL logbook. The FTL is also responsible for maintaining an accurate record of all personnel (workers *and* nonworkers) who are onsite each day in the FTL logbook. The FTL logbook must be obtained from Administrative Record and Document Control (ARDC) and submitted to ARDC along with other documents at the project's end.

2.2.3 Administrative Record and Document Control Office

The Administrative Record and Document Control Office (ARDC) is responsible for organizing and maintaining data and reports generated by ER&WM field activities. ARDC maintains a supply of all controlled documents and provides a documented system for the control and release of controlled documents, reports, and records. Copies of the *Management Plans for the Environmental Restoration Program,* this HSP, QPP-149, the quality project plan, and other documents pertaining to this task are maintained in the project file by ARDC. All project records and logbooks, except IH and RCT logbooks, must be forwarded to ARDC within 30 days after completion of field activities.

2.2.4 Injury/Illness Recordkeeping

Injuries and illnesses associated with this task/project shall be investigated and reported in accordance with Section 3 of the EG&G Idaho *Safety Manual.*

3. PERSONNEL TRAINING

All task site personnel will receive training as specified by OSHA 29 CFR 1910.120 and Company Procedure 1.11, "Identification of Training Requirements." (EG&G Idaho 1993a). Radiation worker training will comply with Section 6 of the EG&G Idaho *Radiological Control Manual* (EG&G Idaho 1993d). Table 1 summarizes training requirements for task site personnel. Specific training requirements for each worker may vary depending on the hazards associated with the job assignment.

Proof of completion of all required training courses (including refresher training) must be maintained on the site at all times. Form EG&G-2580, "Health and Safety Permit Card," is acceptable proof of training. A copy of the certificate issued by the institution where the training was received is also acceptable proof of training.

Prior to beginning work at the task site, a project safety orientation will be conducted by the FTL and JSS. The orientation will consist of a complete review of this HSP and attachments, with time for discussion and questions. At this time, personnel training will be checked and verified to be current and complete for all required training shown in Table 1. Upon completing the safety orientation, personnel will sign the training acknowledgement form (Section 12 of this HSP) to indicate that they have received the briefing and understand the HSP. A daily briefing of the task(s) to be performed that day will be provided by the FTL, HSO, RCT, and JSS (as applicable); during the briefing the tasks are to be outlined, hazards identified, hazard controls and work zones established, and personal protective equipment requirements discussed. After the completion of this briefing, worker's health and safety questions concerning tasks will be addressed and work control documents read and signed [e.g., Safe Work Permit(s), Radiological Work Permit(s), Hot Work Permit(s)].

Table 1. Required training for task site personnel.

Task/Position	FTL	HSO	Removal Crew	Nonworkers
Topic	Required	Required	Required	Required
Task site orientation	X	X	X	X
Decontamination[a]	X	X	X	X[b]
Hazard communication[a]	X	X	X	X
Site control and warning devices[a]	X	X	X	X
Emergency action plan for task site[a]	X	X	X	X
Hazardous waste operator	X	X	X	—
Hazardous waste operator— 24 hours field experience	X	X	X	—
Hazardous waste site supervisor	X	X	—	—
Hearing conservation	—	—	X[c]	X[c]
Radiation worker qualification	X[c]	—	X[c]	X[c]
Medic First[d]	—	—	—	—
Respirator qualification and fit test	—	—	X[e]	X[e]
Hazardous waste operator— occasional worker[f]	—	—	—	X

a. Will be included in task site orientation.

b. If entering contaminated ares.

c. As appropriate.

d. Two Medic First qualified individuals must be present during site activities.

e. If entering areas requiring respirator use.

f. Includes 24 hours of classroom instruction and 8 hours of on-the-job training.

4. OCCUPATIONAL MEDICINE PROGRAM AND MEDICAL SURVEILLANCE

Task site personnel shall participate in the INEL Occupational Medical Program per the requirements of OSHA 29 CFR 1910.120, which requires medical surveillance examinations prior to assignment, annually, and after termination of hazardous waste duties. This includes employees who are or who may be exposed to hazardous substances at or above published exposure limits, without regard to respirator use, for 30 or more days per year, as well as those who wear a respirator for 30 or more days per year. Employees who must use a respirator in their job or who are required to take training to use a respirator to perform their duties under this plan must be medically evaluated for respirator use at least annually. Job-related information must be provided to the Occupational Medical Program for each hazardous material worker via completion of Form EG&G-735, "Notification of Employee Exposure and Personal Protective Equipment Use to the INEL Occupational Medical Program." This information must be submitted to the Occupational Medical Program before work begins. Information to the Occupational Medical Program must be supplemented or updated annually using this same form, as long as the employee is required to maintain hazardous waste/hazardous material worker medical clearance.

The Occupational Medical Program is responsible for evaluating the physical ability of a worker to perform the task assigned, and provides medical clearance to the worker for the work to be performed. The Occupational Medical Program may impose restrictions on the employee by limiting the amount or type of work performed.

Areas addressed by the Occupational Medical Program for hazardous waste site workers include:

- Current comprehensive medical examinations in an INEL medical facility for full-time employees
- Records and reports from employees' private physicians, as required by the site occupational medical director
- Medical evaluation by the Occupational Medical Program on return to work following an absence in excess of one work week (40 consecutive work hours) resulting from illness or injury
- Medical evaluation in the event that a supervisor questions the ability of an employee to work
- Medical evaluation in the event that an employee questions their own ability to work.

The information provided on the forms and by employee examination are used to determine the following for each employee:

- Ability to perform relevant occupational tasks

- Ability to work in protective equipment and heat stress environments

- Ability to use respiratory protection

  NOTE: If the Occupational Medical Program does not have sufficient information at the time of request for clearance for respirator training, the employee's supervisor will be notified and clearance will be withheld until the needed information is provided and any additional examination or testing is completed.

- Entry into substance-specific medical surveillance programs.

Results of the following tests shall be made available to the Occupational Medical Program when any abnormal radiological exposure is noted or a radiological contamination incident occurs:

- Whole body count (baseline, annual, and on actual or suspected radiological contamination incident)

- Bioassay (baseline, as required to assess internal radiation dose, and on actual or suspected radiological contamination incident).

4.1 Subcontractor Workers

Medical data from the worker's private physician, collected pursuant to hazardous material worker qualification of a subcontractor worker, shall be made available to the Occupational Medical Program upon request. Also, subcontractor workers' past radiation exposure histories must be submitted to the Operational Dosimetry Unit of EG&G Idaho, per Chapter 2 of the EG&G *Radiological Control Manual* (EG&G Idaho 1993d).

4.2 Injuries on the Task Site

It is the policy of the Occupational Medical Program to examine all workers, including subcontractors, if the workers are injured on the job, if they are experiencing symptoms consistent with exposure to a hazardous material, or if there is reason to believe that they have been exposed to toxic substances or physical agents in excess of allowable limits.

In the event of a known or suspected injury or illness due to exposure to a hazardous substance or physical agent, the worker(s) shall be transported to the nearest medical facility for evaluation, with as much information as possible regarding the suspected cause of injury or illness. As much of the following information as is available will accompany the individual to the medical facility:

- Name, job title, work location, and supervisor's name and phone number

- Substances or physical agents (known or suspected); material safety data sheet (MSDS) if available

- Date of employee's first exposure to the substance or physical agent
- Locations, dates, and results of exposure monitoring
- Personal Protective Equipment (PPE) in use during this task (for example, respirator and cartridge)
- Number of days per month PPE has been in use
- Anticipated future exposure to the substance or agent.

Further medical evaluation will be in accordance with the symptoms, hazard involved, exposure level, and specific medical surveillance requirements.

4.3 Substance-Specific Medical Surveillance

No substance-specific medical surveillance requirements apply to personnel working at the task site.

5. SAFE WORK PRACTICES

5.1 General Safe Work Practices

The following are general safe work practices that will be followed at the task site:

- Do not wear contact lenses in designated eye-hazard areas unless they are essential to correct a vision defect not correctable by prescription safety glasses. Additional restrictions may apply per the EG&G Idaho *Safety Manual,* Section 16.

- Absolutely no eating, drinking, chewing gum or tobacco, smoking, applying cosmetics, or any other practice that increases the probability of hand-to-mouth transfer and ingestion of materials except in designated areas.

- Report all broken skin or open wounds to the FTL. The Occupational Medical Program will determine if the wound presents a significant risk of internal chemical or radiological exposure. The Occupational Medical Program evaluation will consider how the wound is bandaged and will recommend PPE to be worn by the injured employee. Personnel with unprotected wounds shall not be permitted to enter contamination areas, nor shall they handle contaminated or potentially contaminated materials at the site.

- Avoid direct contact with potentially contaminated substances. Do not walk through spills or other areas of contamination. Avoid kneeling, leaning, or sitting on equipment or ground that may be contaminated.

- Be alert for dangerous situations, strong or irritating odors, airborne dusts or vapors, and broken containers. Report all potentially dangerous situations to the FTL or HSO.

- Prevent releases of hazardous materials, including those used at the task site. If a spill occurs, contain it (if possible), and report it to the FTL (and facility representative, where applicable). Steps must then be taken to clean it up in accordance with the appropriate procedure, which may mean activating the emergency preparedness procedures for the area. Guidelines for spill cleanup found in Appendix III of the EG&G Idaho *Company Procedures Manual,* Section 11.6, may be useful. Appropriate spill kits, or other containment and absorbent materials will be maintained at the work site. See Section 10 of this HSP for more details on the spill response plan for the task site.

- Avoid splashing during decontamination.

- Keep all ignition sources at least 50 ft from explosive or flammable environments and use nonsparking, explosion-proof equipment if advised to do so by a safety professional.

- Be familiar with the physical characteristics of the task site, including, but not limited to:
  - Wind direction
  - Accessibility of fellow workers, equipment, and vehicles
  - Communications at the task site and with other nearby facilities
  - Areas of known or suspected contamination
  - Major roads and means of access to and from the task site
  - Nearest water sources and fire fighting equipment
  - Warning devices and alarms
  - Capabilities and location of nearest emergency assistance.
- If you are working in the exclusion zone, work in teams according to the "buddy system" (see Section 5.3 of this HSP).
- Proceed directly to a survey station upon leaving a radiological contamination zone. Care should be taken not to touch the face, mouth, and eyes before a survey has been performed.

5.2 ALARA Principles

Personnel working at the task site must strive to keep radiation exposure as low as reasonably achievable (ALARA) through the following practices:

- Adhere to all written radiological requirements and verbal guidance
- Be aware of personal radiation exposure history
- Work within ALARA guidelines and make suggestions as needed
- Minimize the production of all radiological waste
- Minimize personal radiation exposure by adhering to these basic protection techniques:
  - **Time**—Exposure is minimized as time is minimized
  - **Distance**—Maintain a maximum distance from the radiation source

- **Shielding**—Use any solid material (such as lead, steel, or concrete) as a shield

- **Limits**—Radiation exposure limits are contained in the EG&G *Radiological Control Manual*, Chapter 2 (EG&G Idaho 1993d).

5.3 The Buddy System

The buddy system will be used at the task site to ensure that each worker's mental and physical well-being is monitored during the course of the day. Task site personnel will be assigned a "buddy" by the FTL to work with and regularly check on during the day. A record of the buddy assignments will be maintained by the FTL, and updated as necessary. Workers need to be able to see or hear and effectively communicate with their buddy at all times when in the exclusion zone. Everyone should watch for signs and symptoms of illness or injury in their assigned "buddy."

6. SITE CONTROL AND SECURITY

The site (controlled area) includes the entire exclusion area to be established by the site safety officer. The safe work practices and other measures described in this plan apply to the entire site, unless explicitly limited. The site may be enlarged or contracted as the project evolves in accordance with safe and prudent practice. Normal security will be maintained around the site at all times once work gets underway. The existing fences and gates will serve as the primary security barrier. Access to the site will be restricted to personnel who have received appropriate orientation and/or training and who have a business purpose for being onsite. Vehicles will be routed around the exclusion zone (described below). In the event that area-wide toxic or flammable dangers cannot be prevented by suspending or altering project operations and using engineering controls, activities on the site will be limited or suspended as necessary to protect employees and project personnel.

To reduce the spread of hazardous materials by workers from potentially contaminated areas to clean areas, three work zones may be established and clearly marked at each work site based on the known or suspected degree of hazard (see Figures 7 and 8). The three work zones are the exclusion zone, contamination reduction zone, and support zone. The establishment of the work zones will help ensure that (a) personnel are properly protected against the hazards present where they are working, (b) work activities and contamination are confined to the appropriate areas, and (c) personnel can be located and evacuated in an emergency. Site entry will be strictly controlled to minimize the number of individuals onsite, consistent with effective operations. Unnecessary personnel will be excluded and visitors will be required to have prior approval from the FTL before being allowed access to the investigation sites.

6.1 Exclusion Zone

An exclusion zone will be created around specific project activities that involve potential for exposure to hazardous materials or that require protection from onsite traffic for the safety of the work crews. These activities include excavating, drilling, stockpiling contaminated dirt, backfilling, or handling contaminants in any form. Exclusion zones will be large enough to accommodate PPE, equipment, maneuvering room (especially in light of site traffic), and stockpiling and management of contaminated materials. There may be several exclusion zones at the task site at one time. All exclusion zones will be clearly delineated with traffic cones and tape. Access to the exclusion zone will be limited to personnel who have received the 29 CFR 1910.120 hazardous waste operators training (described in Section 3 of this plan). The FTL will ensure limited access to the exclusion zone and will ensure that the required PPE is used. Only essential personnel will be permitted into the exclusion zone.

6.2 Contamination Reduction Zone

The contamination reduction zone is a transition area that surrounds the exclusion zone, and is located between the exclusion zone and the support zone. A designated portion of this zone, called a decontamination corridor, will serve as a decontamination area for equipment and a PPE

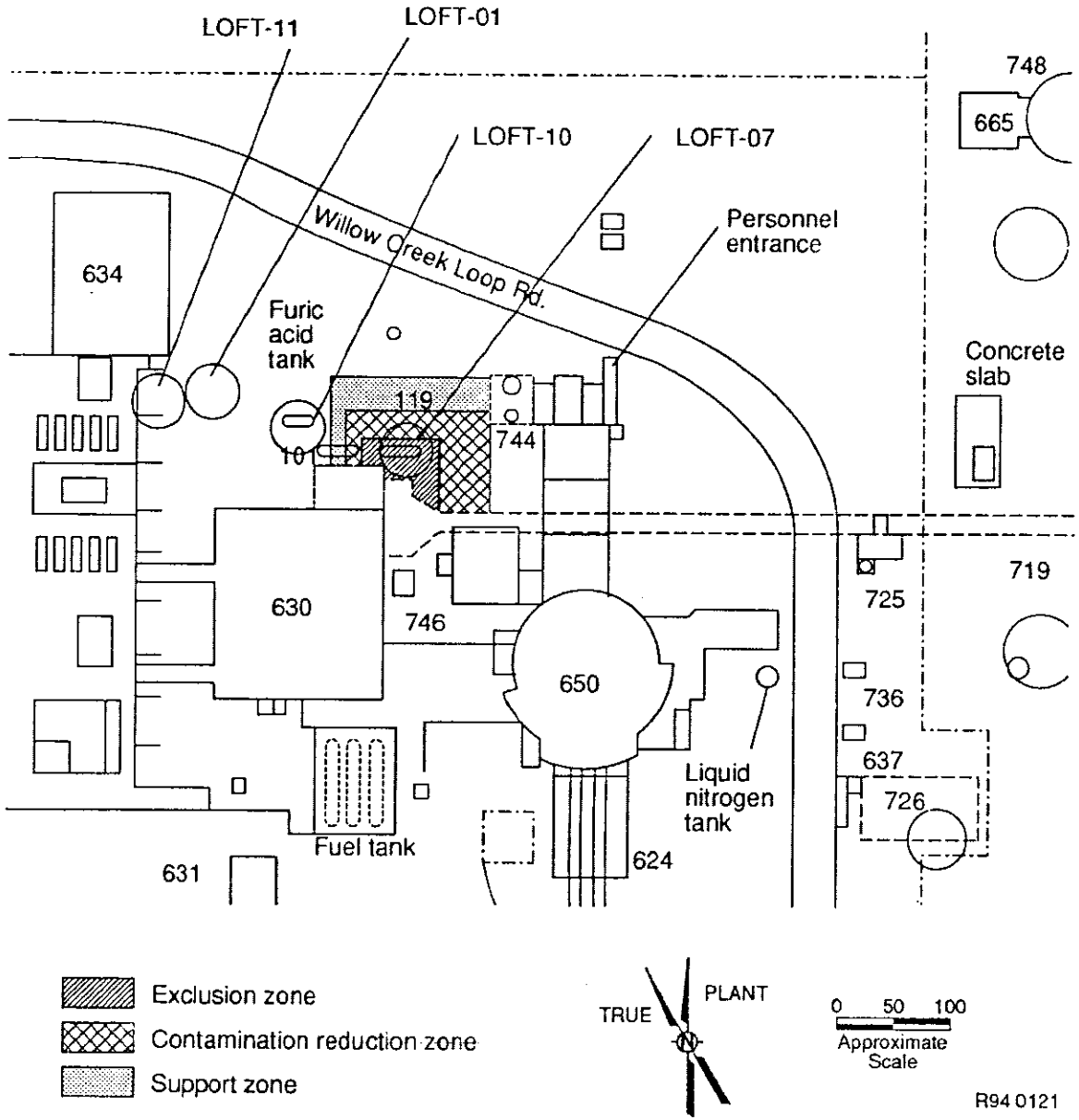

Figure 7. Diagram of LOFT facility, showing zones of exclusion, contamination reduction, and support.

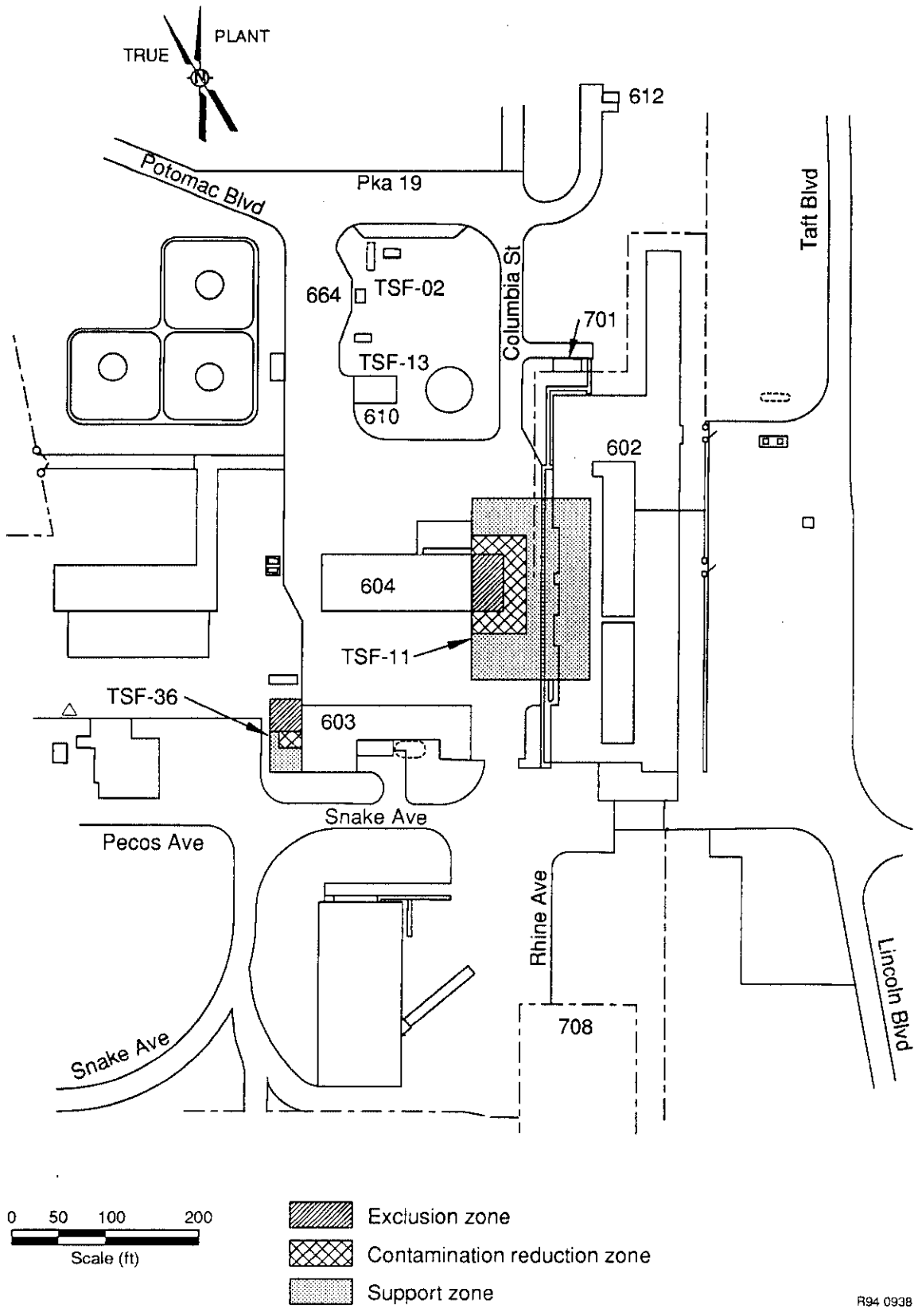

Figure 8. Diagram of TSF facility, showing the zones of exclusion, contamination reduction, and support.

removal area for task operations personnel. The contamination reduction zone may serve as a staging area for equipment and temporary rest area for workers. Because of the potential for contamination, PPE and sample packaging and preparation equipment should not be stored here.

6.3 Support Zone

The support zone will consist of the area within the safety perimeter around the work site but outside the contamination reduction zone. It will include the field office, if one is required, and an area for staging vehicles and safety equipment during site operations.

6.4 Radiological Control Zones

Task-specific radiation control areas and contamination zones will be determined by the radiological engineer and RCT.

6.5 Designated Eating Area

Ingestion of hazardous substances is likely when workers do not practice good personal hygiene habits. It is important to wash hands, face, and other exposed skin thoroughly after completion of work and before smoking, eating, drinking, and chewing gum or tobacco. No smoking, chewing, eating, or drinking is allowed at the task site. The designated eating areas at the site will be the cafeteria, TAN-678, at the Special Manufacturing Capability/Containment Test Facility, or TAN-602.

7. HAZARD EVALUATION

Personnel may be exposed to industrial safety hazards or chemical and physical agents while working at the task site. Table 2 summarizes each task and the associated hazards. Tables 3 and 4 contain information about the hazardous chemicals.

The LOFT Facility is the site of a 5,000-gal tar-coated carbon steel underground storage tank used to store fire suppressant foam for the control and equipment building at the LOFT facility. The tank is 6 ft in diameter by 25 ft long and when empty, weighs approximately 5,520 lb. The tank contains 5,000-gal of a protein (blood) based, biodegradable compound. Based on a MSDS (see Appendix A) from similar compounds used in the 1950s, the fire suppressant foam contains hexylene glycol, ferrous sulfate, chlorophenols, and ethylene glycol. Exact concentrations are proprietary and are unavailable. The tank was analyzed for toxic characteristics. The material contains 226 ppm (w/w) chromium and 5.4 ppb (w/v) cyanide. The hazardous materials present at LOFT-07 are described in Table 3.

The TSF-11 clarifier pits are located approximately 3 ft east of TAN-604. The three TSF clarifier pits are concrete settling basins, with a total estimated capacity of 1,000-gal. Each individual settling basin is approximately 2.5 ft wide × 2.5 ft long × 6 ft high. The three settling basins are located at ground surface and are encased in a concrete structure with exterior dimensions of 4 ft wide × 10 ft long × 7 ft high. Wastewaters from paint thinners and paint strippers were washed down a service sink located in the Paint Shop Room in TAN-604 from 1957 to 1985. Analytical data from sludge and aqueous samples collected in 1987 and 1989 indicate that hazardous constituents are present in the clarifier pit media. The hazardous materials present at TSF-11 are presented in Table 4.

The TSF-36 french drain is located approximately 20 ft west of TAN-603. The drain consists of 36 in^2. concrete conduit placed vertically in the ground over layers of gravel and soil. The drain is served by a 2-in. steel pipe and covered by a concrete and steel mesh manhole cover. Wastewater from a condensate return pump in the boiler room located in TAN-603 went to the french drain. There is also evidence of a one-time release of radionuclides to the drain from a leak in the steam condensate return system in TAN-603. The hazardous materials present at TSF-36 are described in Table 5.

The radiological and industrial hygiene hazard monitoring plans are outlined in Sections 7.1 and 7.2, respectively.

7.1 Radiological Hazards

LOFT-07 and TSF-11 task site activities have been evaluated according to Chapter 3 of the EG&G Idaho *Radiological Control Manual* (EG&G Idaho 1993d). As a result of this evaluation, it has been determined that a radiological work permit (RWP) is not required for those activities. A similar evaluation will be performed for TSF-36 before beginning work at the site; a RWP will be prepared if necessary.

Table 2. Task site activities and associated hazards.

Activity or task	Associated hazards		
	LOFT-07	TSF-11	TSF-36
Task 1—removal, treatment, and disposal of remaining tank/structure contents	Metals; organics; low-level radionuclides; electrical hazards	Metals; organics; low-level radionuclides; electrical hazards	Metals; organics; low-level radionuclides
Task 2—excavate soils and cut, cap, and remove auxiliary systems	Metals; organics; low-level radionuclides; excavation, trenching and shoring; electrical hazards; moving machinery and falling objects; cutting and welding	Metals; organics; low-level radionuclides; excavation, trenching and shoring; electrical hazards; moving machinery and falling objects; cutting and welding	Metals; organics; low-level radionuclides; excavation, trenching and shoring; electrical hazards; moving machinery and falling objects; cutting and welding
Task 3—remove and dispose of tank/structure	Excavation; confined space; trenching and shoring; moving machinery and falling objects; confined space	Excavation; confined space; trenching and shoring; moving machinery and falling objects; confined space	Excavation; confined space; trenching and shoring; moving machinery and falling objects; confined space
Task 4—soil/waste sampling and field screening	Moving machinery and falling objects	Moving machinery	Moving machinery
Task 5—restore site	Moving machinery	Moving machinery	Moving machinery

Table 3. Hazardous materials present at LOFT-07.

Hazardous material name and CAS number	Exposure limit[a] (PEL/TLV/REL)	Routes of Exposure[b]	Symptoms of overexposure	Target organs/systems	Carcinogen? (source)[c]	Expected Levels
Protein Hydrolysate #69430-36-0	None Established	—	—	—	—	Low
Hexylene Glycol 2-methyl-2,4-Pentanediol; #107-41-5	OSHA PEL = 25 ppm ACGIH TLV 25 ppm ceiling limit	Inh Ing Con	Skin, eye, lung and throat irritation, central nervous system depression, and digestive tract irritation.	Kidneys	N	Low
Ferrous Sulfate #7720-78-7	OSHA PEL = 1.0 mg/m^3 ACGIH TLV = 1.0 mg/m^3	Inh Ing	Respiratory system irritation and gastrointestinal irritation.	Central nervous system, gastro-intestinal track	N	Low
Chlorophenol	None Established	Abs Inh Ing	Central nervous system depression, nervous disorders and dermal eruptions.	Central nervous system, liver, skin, gastrointestinal track	N	Low
Ethylene Glycol; 1,2-ethanediol; #107-21-1	OSHA PEL = 50 ppm ceiling limit ACGIH TLV = 50 ppm (vapor) ceiling limit	Cont Inh Ing	Eye, nose and throat irritation, digestive tract irritation, nervous system depression, visual disturbances, kidney damage, convulsions, or coma.	Kidneys	Y	Low
Chromium #7440-47-3	NIOSH = 0.5 mg/m^3 OSHA = 1 mg/m^3	Ing Con	Sensitization, Dermatitis.	Kidneys, lungs, central nervous system, liver, skin	Y	Low
Cyanides as CN #151-50-8 #143-33-9	NIOSH = 5 mg/m^3 OSHA = 5 mg/m^3	Inh Abs Ing Con	Asphyxiation and death can occur, weakness, headache, confusion, nausea, vomiting, increased respiration rate, slow gasping respiration, eye and skin irritant	Central nervous system, cardio-vascular system, liver, kidneys, skin	N	Low

a. MSDS, Chub National Foam, Inc., 1990
b. (Inh) inhalation; (Ing) ingestion; (Abs) skin absorption; (Con) Contact.
c. IARC-3, NIOSH, EPA-D

PEL — permissible exposure limit
TLV — threshold limit value.
REL — recommended exposure limit.

Table 4. Hazardous materials present at TSF-11.

Hazardous material name and CAS number	Exposure limit[a] (PEL/TLV/REL)	Routes of exposure[b]	Symptoms of overexposure	Target organs/systems	Carcinogen? (source)[c]	Expected levels
Arsenic #7740-38-2	NIOSH = 0.002 mg/m^3	Inh Abs Con Ing	Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, Peripheral neuropathy, respiratory irritant, hyperpigmentation of skin	Liver, kidneys, skin, lunges, lymphatic system	Y	Low
Barium, as soluble Barium #10022-31-8 #10361-37-2	ACGIH = 0.5 mg/m^3	Inh Ing Con	Upper respiratory system irritant, gastrointestinal irritant, eye and skin irritant	Heart, central nervous system, skin, respiratory system, eyes	N	Low
Cadmium #7440-43-9	OSHA = 0.2 mg/m^3	Inh Ing	Pulmonary edema, dyspnea, cough, chest tightness, substernal pain, headache, chills muscle aches, nausea, vomiting, diarrhea, anosmia, emphysema, proteinuria, mild anemia	Respiratory system, kidneys, prostate, blood	Y	Low
Chromium #7440-47-3	NIOSH = 0.5 mg/m^3 OSHA - 1 mg/m^3	Ing Con	Sensitization, dermatitis	Kidneys, lungs, central nervous system, liver, skin	Y	Low
Cobalt #7440-48-4	NIOSH/OSHA = 0.05 mg/m^3	Ing Con	Dermal sensitization	Skin	N	Low
Copper #7440-50-8	NIOSH/OSHA = 1 mg/m^3	Inh Ing Con	Irritation of nasal mucous membranes, pharynx, nasal perforation, eye irritation, metallic taste, dermatitis	Respiratory system, skin, liver, kidneys, increase risk with Wilson's disease	N	Low
Lead #7439-92-1	NIOSH = 0.100 mg/m^3 OSHA = 0.050 mg/m^3	Inh Ing Con	Weak, lassitude, insomnia, facial pallor, anorexia, weight loss, malaise, constipation, abdominal pain, colic, anemia, gingival lead line, tremor, paralysis of wrists/ankles, encephalopathy, nephropathy, irritation eyes, hypotension	Gastrointestinal tract, central nervous system, kidneys, blood, gingival tissue	N	Low

Table 4. (continued).

Hazardous material name and CAS number	Exposure limit[a] (PEL/TLV/REL)	Routes of exposure[b]	Symptoms of overexposure	Target organs/systems	Carcinogen? (source)[c]	Expected levels
Mercury #7439-97-6	ACGIH = 0.025 mg/m^3	Inh Abs Con	Cough, chest pain, dyspnea, bronchitis, pneumonitis, tremor, insomnia, irritability, indecision, head, fatigue, weakness, stomatitis, salivation, gastrointestinal distress, anorexia, weight loss, proteinuria, irritant to eyes and skin	Skin, respiratory systems, central nervous system, kidneys, eyes	N	Low
Nickel #7440-020-0	NIOSH = 0.015 mg/m^3 OSHA = 0.007 mg/m^3	Inh Ing Con	Headache, vertigo, nausea, vomiting epigastric, pain; substernal pain, cough, hyperpnea, cyanosis, weakness, leukocytosis, pneumonitis, delirium convulsions	Lungs, paranasal sinus, central nervous system	Y	Low
Silver #7440-22-4	NIOSH/OSHA = 0.01 mg/m^3	Inh Ing Con	Blue-gray eyes, nasal septum, throat, skin; irritation skin, ulceration, gastrointestinal distress	Nasal septum, skin, eyes	N	Low
Vanadium, as V_2O_5 #1314-62-1	NIOSH = 0.5 mg/m^3 OSHA = 0.5 mg/m^3	Inh Con	Eye irritant, green tongue, metallic taste, throat irritation, cough, wheezing, bronchitis, eczema, dyspnea	Respiratory system, skin	N	Low
Zinc #7440-66-6	NIOSH/OSHA = 5 mg/kg^3	Inh Ing	Headache, cough, metallic taste, fever, chills	Respiratory system	N	Low
2-butanone #78-93-3	NIOSH/OSHA = 590 mg/m^3	Inh Ing Con	Irritant eyes/nose; headache; dizziness; vomiting	Central nervous system, lungs	N	Low
1,1,1-trichloroethane #71-55-6	NIOSH = 350 ppm ACGIH = 350 ppm OSHA = 350 ppm	Inh Ing Con	Headache, central nervous system depression, irritation of eyes, dermatitis, cardiac arrhythmia	Skin, central nervous system, cardiovascular system, eyes	Y	Low
1,1-dichloroethene #75-35-4	ACGIH - 5 ppm	Inh Ing	Weakness, abdominal pain, gastrointestinal bleeding, hepatomegaly, pallor or cyanosis of extremities	Liver, kidney	Y	Low

Table 4. (continued)

Hazardous material name and CAS number	Exposure limit[a] (PEL/TLV/REL)	Routes of exposure[b]	Symptoms of overexposure	Target organs/systems	Carcinogen? (source)[c]	Expected levels
acetone #67-64-1	NIOSH 590 = mg/m^3 OSHA 1800 = mg/m^3	Inh Ing Con	Irritant eyes, nose, throat; headache, dizziness, dermatitis	Respiratory system, skin	N	Low
dichlorodifluoromethane #75-71-8	NIOSH/OSHA = 4950 mg/m^3	Inh Con	Dizziness, tremors, unconsciousness, cardiac arrhythmia, cardiac arrest	Central nervous system, peripheral nervous system	N	Low
ethylbenzene #100-41-4	NIOSH/OSHA = 435 mg/m^3	Inh Ing Con	Irritant eyes, mucous membranes, headache; dermatitis, narcosis, coma	Eyes, upper respiratory system, skin, Central nervous system	N	Low
methylene chloride #75-09-2	OSHA = 500 ppm	Inh Ing Con	Fatigue, weakness , sleepiness, light headed, limbs numbness/tingle, nausea, irritant eyes, skin	Skin, central nervous system, eyes	Y	low
toluene # 108-88-3	NIOSH/OSHA = 375 mg/m^3	Inh Abs Ing Con	Fatigue, weakness, confusion, euphoria, dizziness, headache, dilated pupils, lacrimation, nervousness, muscle fatigue, insomnia, paresthesia, dermatitis	Central nervous system, liver kidneys, skin		Low
xylene #1330-20-7	NIOSH/OSHA = 435 mg/m^3	Inh Abs Ing Con	Dizziness, excitement, drowsiness, incoherent, staggering gait, irritant eyes, nose throat; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain, dermatitis	Central nervous system, eyes, gastrointestinal tract, blood, liver, kidneys, skin	N	Low
2-methylnapthalene #91-57-6	None established	Ing	Eye irritation, headache, nausea, abdominal pain	Skin, liver, eyes	N	Low
bis(2-ethylhexyl)phthalate #117-81-7	OSHA PEL = TWA 5 mg/m^3 ACGIH TLV = TWA 5 mg/m^3	Ing	Skin and eye irritation	Gastrointestinal tract	Y	Low
butylbenzylphthalate #85-68-7	OSHA PEL = TWA 5 mg/m^3 ACGIH TLV = TWA 5 mg/m^3	Ing Inh	Skin and eye irritation, respiratory irritation, drying of skin	Liver, skin	N	Low

Table 4. (continued).

Hazardous material name and CAS number	Exposure limit[a] (PEL/TLV/REL)	Routes of exposure[b]	Symptoms of overexposure	Target organs/systems	Carcinogen? (source)[c]	Expected levels
di-n-butylphthalate #84-74-2	OSHA = 5 mg/m^3 ACGIH = 5 mg/m^3	Ing	Hallucinations, distorted perceptions, nausea or vomiting and kidney, ureter or bladder changes	Central nervous system, kidneys	N	Low
di-n-octylphthalate						Low
naphthalene #91-20-3	NIOSH/OSHA = 50 mg/m^3	Inh Abs Ing Con	Eye irritant; headache, confusion, excitement, malaise, nausea, vomiting, abdominal pain, irritation bladder, profuse sweating , jaundice, hemoglobinuria, renal shutdown, dermatitis.	Eyes, blood, liver, kidneys, skin, red blood cells, central nervous system	N	Low
Aroclor-1260 #11096-82-5	NIOSH = 0.001 mg/m^3	Inh Abs Ing Con	Eye and skin irritant, acne form of dermatitis, liver damage	Skin, eyes, liver	Y	Low
Alpha chlordane #57-74-9	OSHA PEL = TWA 0.5 mg/m^3	Ing Con	Tremors, convulsions, excitement, gastritis	Central nervous system	Y	Low

a. Source: NIOSH 1990.

b. (Inh) Inhalation; (Ing) Ingestion; (Abs) Absorption; (Con) Contact.

c. NIOSH, IARC-3, EPA-D.

PEL—permissible exposure limit.

TLV—threshold limit value.

REL—recommended exposure limit.

Table 5. Hazardous materials present at TSF-36.

Hazardous material name and CAS number	Exposure limit[a] (PEL/TLV/REL)	Routes of exposure[b]	Symptoms of overexposure	Target organs/systems	Carcinogen? (source)[c]	Expected levels
No. 2 diesel	None listed	Inh Ing Abs	Eye, skin, and respiratory irritation	Skin, respiratory system, eyes	N	Low to moderate
Copper #7440-50-8	NIOSH/OSHA = 1 mg/m^3	Inh Ing Con	Irritation of nasal mucous membranes, pharynx, nasal perforation, eye irritation, metallic taste, dermatitis	Respiratory system, skin, liver, kidneys, increase risk with Wilson's disease	N	Low
Lead #7439-92-1	NIOSH = 0.100 mg/m^3 OSHA = 0.050 mg/m^3	Inh Ing Con	Weak, lassitude, insomnia, facial pallor, anorexia, weight loss, malaise, constipation, abdominal pain, colic, anemia, gingival lead line, tremor, paralysis of wrists/ankles, encephalopathy, nephropathy, irritation eyes, hypotension	Gastrointestinal tract, central nervous system, kidneys, blood, gingival tissue	N	Low
Mercury #7439-97-6	ACGIH = 0.025 mg/m^3	Inh Abs Con	Cough, chest pain, dyspnea, bronchitis, pneumonitis, tremor, insomnia, irritability, indecision, head, fatigue, weakness, stomatitis, salivation, gastrointestinal distress, anorexia, weight loss, proteinuria, irritant to eyes and skin	Skin, respiratory systems, central nervous system, kidneys, eyes	N	Low
Nickel #7440-020-0	NIOSH = 0.015 mg/m^3 OSHA = 0.007 mg/m^3	Inh Ing Con	Headache, vertigo, nausea, vomiting epigastric, pain; substernal pain, cough, hyperpnea, cyanosis, weakness, leukocytosis, pneumonitis, delirium convulsions	Lungs, paranasal sinus, central nervous system	Y	Low
Zinc #7440-66-6	NIOSH/OSHA = 5 mg/m^3	Inh Ing	Headache, cough, metallic taste, fever, chills	Respiratory system	N	Low

Table 5. (continued).

Hazardous material name and CAS number	Exposure limit[a] (PEL/TLV/REL)	Routes of exposure[b]	Symptoms of overexposure	Target organs/systems	Carcinogen? (source)[c]	Expected levels
Cesium isotopes	DAC = 4.0×10^{-8} μCi/mL[d]	Ig	Nausea, vomiting	Bone	Y	Low to moderate
Cobalt-60	DAC = 1.0×10^{-8} μCi/mL[d]	Ig	Nausea, vomiting	Whole body	Y	Low to moderate
Europium isotopes	DAC = 8.0×10^{-9} μCi/mL[d]	Ig	Erythema, nausea, vomiting			
Isopropyl alcohol 67-63-0	400 ppm/400 ppm/400 ppm, TWA; 500 ppm/500 ppm/ 500 ppm, STEL	Inh Ing Abs	Dizziness, nausea, light headedness, eye, skin, and respiratory irritation, headaches	Eyes, skin, respiratory system	N	NA[d]
Nitric acid 7697-37-2	2 ppm/2 ppm/2 ppm, TWA; 4 ppm/4 ppm/4 ppm, STEL	Inh Ing Abs	Eye, skin, and respiratory irritation, dental erosion	Eyes, respiratory system, skin, teeth	N	NA[d]
Gasoline 8006-61-9	300 ppm/300 ppm/none listed, TWA; 500 ppm/500 ppm/C	Inh Ing Abs	Dizziness, nausea, light headedness, eye, skin, and respiratory irritation	Skin, respiratory system, eyes	Y (NIOSH-X)	NA[d]
Alconox	None listed	Inh Ing	Respiratory irritation	Respiratory system	N	NA[d]

a. Source: NIOSH 1990, ACGIH 1992–1993.

b. (Inh) Inhalation; (Ing) Ingestion; (Abs) Absorption; (Con) Contact.

c. NIOSH, IARC-3, EPA-D.

d. NA = not applicable: these materials will be contained, controlled, and dispensed in accordance with standard acceptable practices.

PEL — permissible exposure limit.

TLV — threshold limit value.

REL — recommended exposure limit.

7.1.1 LOFT-07 Radiological Hazards

The LOFT-07 tank contents were sampled in September 1991 for gamma emitters and gross alpha/beta. The samples were reanalyzed in 1993 for strontium-90 and tritium. Results for strontium-90 and tritium activities were decayed back to the original sampling data (Copeland 1991). Statistically positive results are presented in Table 6.

7.1.2 TSF-11 Radiological Hazards

The TSF-11 tank sludge was sampled in 1989 as part of the INEL Tank Closure Program and a sample was submitted for gamma spectroscopy. The tank sludge was sampled again in 1993 and analyzed for specific alpha emitters. The results are presented in Table 7.

7.1.3 TSF-36 Radiological Hazards

A "hot spot" located approximately 3 ft below grade in TSF-36 was sampled in May 1993 and analyzed by gamma spectroscopy. Cs-137 at 6.48 pCi/g was detected in the sample at 6.48 pCi/g. In August 1993, the drain was sampled again. The gross alpha activity in the samples collected ranged from 2.35 ± 0.60 pCi/g to 3.09 ± 0.68 pCi/g and gross beta from 13.62 ± 1.80 pCi/g to 26.59 ± 3.31 pCi/g. The Cs-137 activity ranged from 5.437 ± 0.375 pCi/g to 5.885 ± 0.407 pCi/g.

7.2 Environmental and Personnel Monitoring

Personnel working at the task site may be exposed to hazardous materials or hazardous physical agents, as already described. Industrial safety hazards and other physical hazards will be monitored and controlled as outlined in Section 7.3. Specific hazardous agent exposures that will be monitored are indicated in Table 8. Industrial hygiene and radiological monitoring plans are described in Sections 7.2.1 and 7.2.2.

7.2.1 Industrial Hygiene Monitoring

The equipment listed in Table 9 may be used by the IH on the task site to monitor chemical and (nonradiological) physical agents: mercury and volatile organic compounds.

Table 6. Radiological activities of LOFT-07 contents.

Radionuclide	Sample LST00101	Sample LST00102
Gross alpha	No true positive	No true positive
Gross beta	(3.3 ± 0.9)E+03 pCi/L	(2.8 ± 0.9)E+03 pCi/L
Cs-137	No true positive	No true positive
Strontium-90	(1.91 ± 0.15)E+02 pCi/L	(4.0 ± 0.8)E+01 pCi/L
Tritium	(8 ± 3)E+02 pCi/L	No true positive

Table 7. Radiological activities of TSF-11 contents.

Radionuclide	Sludge sample
Cs-137	(1.1 ± 0.3)E-01 pCi/gm
U-234	(4.9)E+01 pCi/gm
U-235	(5.9)E+00 pCi/gm
U-238	(2.00)E+02 pCi/gm
Am-241	(1.80)E-01 pCi/gm
Sr-90	(2.00)E-01 pCi/gm

Table 8. Contaminants to be monitored.

Task or assignment	Contaminant or agent to be monitored
Task 1—remove, treat, and dispose of remaining tank contents	mercury, volatile organic compounds, LEL, oxygen, heat stress, noise
Task 2—excavate soils and cut and cap pipes as necessary	mercury, volatile organic compounds, LEL, oxygen, heat stress, noise
Task 3—remove and dispose of the tank	heat stress, noise
Task 4—soil/waste sampling and field screening	heat stress, noise
Task 5—restore the site	heat stress, noise

Table 9. Equipment to be used for monitoring.

Equipment	Agent to be monitored
Personal sampling pumps and appropriate media	At discretion of IH
Sound level meter and/or noise dosimeter	Noise
Heat stress monitor (wet bulb globe temperature)	Heat stress conditions
Explosion meter	LEL
Oxygen meter	Oxygen content
HNu	Volatile organic compounds
Mercury analyzer	Mercury

All industrial hygiene equipment will be maintained by the IH per the manufacturer's recommendations. Instruments will be calibrated before and after use, or according to the schedule outlined in the EG&G Idaho *Company Procedures Manual*, Section 11.4, "Calibration of Industrial Hygiene Instruments."

Air sampling will be conducted using NIOSH methods and according to the EG&G Idaho *Company Procedures Manual*, Section 11.5, "Industrial Hygiene Air Contaminant Sampling Procedure." Samples will be personal samples whenever possible; each nonradiological contaminant/agent listed in Table 7 will be monitored. The number and frequency of sampling will depend on the IH's assessment of potential exposures and risk assessment for task site. personnel, in accordance with EG&G Idaho *Company Procedures Manual*, Section 11.9, "Industrial Hygiene/Workplace Surveys." Sampling data, results from direct-reading instruments, and field observations, will be recorded on Form EG&G-737, "Industrial Hygiene Data Monitoring Form," and entered into the IH database, System 80. The FTL shall record the four-digit number printed at the upper right-hand corner of the IH monitoring data form that corresponds to the day's industrial hygiene monitoring. This will allow easier access to the monitoring data once it is entered into System 80.

7.2.2 Radiological Monitoring

Radioactive contamination at the task site is outlined in Section 7.1. Additional surveys, smears, and other sampling will be performed if necessary by the RCT at the task site. Appropriate survey equipment will be used by the RCT to verify boundaries and work zones, survey personnel and equipment before leaving the task site, and verify that waste items are sent to the appropriate disposal facility.

The RCT will be responsible for radiological monitoring in accordance with the EG&G *Radiological Control Manual*, Chapters 5 and 7, and Section 10 of the EG&G Idaho *Company Procedures Manual.* All health physics equipment will be source-checked daily and calibrated according to Chapter 5 of the EG&G *Radiological Control Manual* (EG&G Idaho 1993d). The equipment will be maintained by the RCT according to the manufacturer's instructions.

The equipment listed in Table 10 (or equivalent) may be used to monitor radiological contamination on site.

Personnel Radiological Exposure Monitoring. In order to evaluate exposure to ionizing radiation, all task site personnel will be required to wear Thermoluminescent dosimeters (TLDs) at the task site. Personal sampling pumps (also called lapel monitors) may be worn by personnel at the request of the RCT in order to further evaluate individual exposures.

Table 10. Radiological monitoring equipment.

Equipment	Monitoring use
Ludlum 2A (or equivalent)	Beta/gamma screening
Ludlum 61 (or equivalent)	Alpha screening

7.2.3 Action Levels

To ensure worker safety at the task site, action levels have been set for. These levels are indicated in Table 11. If levels of these contaminants reach the action level(s) noted, the corresponding action will be taken at the task site.

7.3 Physical Hazards Evaluation, Control, and Monitoring

The physical hazards present at the task site, and the methods that will be used to monitor and control them, are described in the following paragraphs.

7.3.1 Temperature Extremes

Heat Stress. Workers may be required to work outdoors during summer months and/or wear protective clothing that prevents the body from cooling. High body temperatures can result in heat fatigue, physical discomfort, and death. Personnel must inform the FTL or HSO if they experience any of the signs and symptoms of heat stress or observe that their work buddy is experiencing these symptoms. The EG&G Idaho *Company Procedures Manual,* Section 11.10, discusses the hazards of heat stress.

Monitoring for heat stress conditions shall be performed by the IH according to the EG&G Idaho *Company Procedures Manual,* Section 11.10, and the *Industrial Hygiene Manual,* Section 20, "Temperature Extremes." Depending on the ambient weather conditions, work conditions, and physical response of task operations personnel, the IH will inform the FTL of necessary adjustments to the work/rest cycle. A supply of cool drinking water will be provided at the task site and consumed only in the designated eating area.

Workers may be periodically interviewed by the IH or HSO to ensure that the controls are effective and that excessive heat exposure is not occurring. Workers will be encouraged to monitor their body signs and to take a break if symptoms of heat stress occur. The signs of heat stress are:

Table 11. Action levels for the task site.[a]

Agent name and monitoring method	Action level	Action taken
Organic vapors (PID)	5 ppm sustained in workers breathing zone	Upgrade respiratory protection to full-face respirator with organic vapor cartridge
Mercury (Hg analyzer)	0.025 mg/m^3 sustained in workers breathing zone	Upgrade respiratory protection to supplied air full-face

a. Must meet American National Standards Institute requirements for rate and flow.

- Clammy skin
- Dizziness or nausea
- Fatigue
- Profuse sweating
- Skin color change
- Vision problems.

Individuals showing any of the symptoms listed above will stop work, move to a shaded area to rest, be provided cool drinking water, and be monitored by a Medic First qualified person. If personnel exhibiting symptoms of heat stress do not show signs of immediate recovery when removed to the rest area, they will be transported to the dispensary for medical attention.

Heat stroke is an extremely serious condition that can result in death and should be treated as such. ***An individual who stops sweating, or who shows symptoms of confusion, slurred speech, or any other evidence of change in level of consciousness, will be transported to the nearest medical facility for evaluation.***

Cold Stress. Exposure to low temperatures may be a factor if work is done in the winter months, or at any time of year if the conditions are right. Relatively cool ambient temperatures and wet or windy conditions increase the potential for cold injury to personnel. The EG&G Idaho *Company Procedures Manual,* Section 11.10, discusses the hazards of cold stress. The IH will monitor cold stress conditions in accordance with Section 11.10 of the EG&G Idaho *Company Procedures Manual,* and Section 20 of the *Industrial Hygiene Manual.*

7.3.2 Noise

Personnel working at the task site may be exposed to noise levels in excess of 85 db(A) during the use of generators and heavy equipment. Noise monitoring will be performed by the IH per the EG&G Idaho *Company Procedures Manual,* Section 11.7, to determine if persons assigned to the jobs identified above are exposed to noise above the allowable 8-hour time-weighted average of 85 db(A). Persons whose exposure exceeds the allowable level will be enrolled in the INEL Occupational Medical Program Hearing Conservation Program. Personnel working on jobs that are noisy will be required to wear hearing protection until the noise levels have been evaluated, and will continue to wear the hearing protection specified by the IH until directed otherwise.

7.3.3 Fire and Explosion Hazards

Explosion and fire hazards at the site include fuel used to power the portable generator. Equipment will be refueled in the support zone and only the minimal amount of fuel (<5-gal) will be stored onsite.

7.3.4 Biological Hazards

The LOFT-07 is a blood protein based compound used for fire suppressant. A sample was cultured in January 1993 and found to be biological inactive.

7.3.5 Confined Spaces

Work in confined spaces may subject workers to risks involving oxygen deficiency and toxic or explosive atmospheres. There are possible confined spaces present at the task site but will not be entered by task personnel. Confined spaces will be evaluated by an IH or safety engineer per the EG&G Idaho *Company Procedures Manual,* Section 11.3, should conditions change and entry is required. The evaluation will include completion of Form EGG-1150, "Confined Space Entry Permit." A trained attendant will be outside the space to assist entrants, monitor the well-being of entrants, and notify the rescue team if necessary. Personnel required to enter the space will be thoroughly briefed on the hazards involved, the meaning of warning signals of any monitoring equipment that is worn or taken into the space, any special tools or equipment to be used, and actions to take in case of an emergency.

7.3.6 Industrial Safety Hazards

Personal Protective Equipment. Wearing PPE will reduce a worker's ability to move freely, see clearly, and hear directions and noise that might indicate a hazard. Also, PPE can increase the risk of heat stress. Work activities at the task site will be modified as necessary to ensure that personnel are able to work safely in the PPE that is required.

Elevated Work Areas. When performing certain task site activities (see Table 2), personnel will be required to work on elevated equipment or at heights. When such work is performed, personnel will use a safety belt/harness and lanyard, or a safety net (for work at heights exceeding 25 ft) per Section 16 of the EG&G Idaho *Safety Manual.* Personnel required to use fall-protection PPE shall be trained in its proper use, limitations, and how to maintain and inspect the equipment.

Handling Heavy Objects. Operations personnel may risk injury by lifting heavy objects. All operations personnel are therefore cautioned against lifting objects that are too heavy. Mechanical and hydraulic assists will be used whenever possible to minimize lifting dangers.

Moving Machinery and Falling Objects. Task site personnel may be subject to cuts and bruises, or get caught in moving machinery during certain task site activities (see Table 2). Injuries will be avoided or minimized by following safe practices for operation of machinery; ensuring that guards are maintained in place; wearing gloves, eye protection, hard hats, and steel-toed boots; and using mechanical assists whenever possible. Loose clothing or neck chains for security badges will not be worn; long hair must be pulled back and secured when working around equipment with moving parts.

Excavation Trenching and Shoring. Work at the task site will involve excavations for purposes of removal of underground tanks. Work in or near any excavation presents serious potential hazards; personnel protective systems, barricades, signs, and daily inspections are some

of the safeguards required for excavation work. All excavations at the task site will be in accordance with the requirements outlined in OSHA 29 CFR 1926, Subpart P, "Excavations," and the EG&G Idaho *Safety Manual* Section 20, Appendix B.

Electrical Hazards. Overhead power lines, downed electrical wires, and buried cables pose shock or electrocution hazards. Portable electrical equipment may also pose these hazards. Overhead electrical hazards will be identified by operating personnel before raising masts on drill rigs or using cranes. Underground utility clearances must be obtained before drilling or excavating operations by contacting Telecommunications (526-1591 or 526-2512). The EG&G Idaho *Safety Manual*, Supplement 2.2 "Safe Work Permits (SWPs)/Special Safe Work Permits (SSWPs)," and Section 10, "Electrical Safety," will be followed for all work performed near overhead electric lines and electrical work.

Decontamination. The chemical and radiological decontamination processes used to remove contaminants from tools, equipment, and task site personnel can spread contamination and increase the risk of exposure if decontamination activities are not performed according to procedures. High pressure hot water and steam, if used in the process, can present a hazard if it rebounds into the face or onto the body or personnel, and contaminants may become airborne from this process. Decontamination procedures must be followed and appropriate PPE must be used during decontamination activities.

Inclement Weather. In the event that adverse weather conditions develop that pose a threat to persons or property on the task site, such as sustained strong winds (25 mph or greater), electrical storms, heavy precipitation, or extreme heat or cold, the situation will be evaluated by the FTL with input from the HSO, IH, safety engineer, RCT, and other personnel, as appropriate. A decision to stop all work at the task site will be made by the FTL with input from the HSO, IH, and RCT based on the hazards involved and the situation. In some cases, work at the site may proceed provided that workers are afforded adequate, appropriate protection. At no time will individual health and safety be jeopardized in order to continue work.

7.4 Other Task Site Hazards

Task site personnel should look for potential hazards and immediately inform the FTL or HSO of the hazards so that action can be taken to correct the condition.

The FTL will conduct daily inspections to the task site to ensure that barriers and signs are being maintained, unsafe conditions are corrected, and debris is not accumulating on the site. These inspections will be noted in the FTL logbook. Health and safety professionals present at the task site may, at any time, recommend changes in work habits to the FTL.

Individuals working at the task site are responsible to use safe work techniques, report unsafe working conditions, and exercise good personal hygiene and housekeeping habits throughout the course of their job.

Should field conditions change requiring specialized safety equipment not delineated in this HSP, a Safe Work Permit (EGG-17) will be processed.

8. PERSONAL PROTECTIVE EQUIPMENT

PPE that will be used at the task site was selected based on the toxicity and anticipated levels of known or suspected hazardous materials and agents (including radiological hazards) at the task site, recommendations contained in NIOSH (1985), and on the hazard analysis in Section 7 of this HSP. Based on the hazard analysis and the recommendations cited above, Level C and Level D is appropriate for the protection of personnel working at the task site.

8.1 Level D Personal Protective Equipment

Level D PPE affords little protection against chemical hazards and is appropriate for use at the task site because personnel are not expected to be exposed to hazardous chemicals above an allowable limit, and no danger exists due to absorption of chemicals through the skin. Level D is basically a standard work uniform. This level of PPE at the task site consists of:

- Coveralls
- Eye protection (glasses with side shields)
- Safety footwear (steel toe boots)

8.2 Level C Personal Protective Equipment

Level C PPE is appropriate for use at the task site because the contaminants are well-characterized and personnel can be protected using air purifying respirators; there is minimal hazard exposure to personnel via skin absorption; and there is very little danger that an IDLH (immediately dangerous to life or health) condition will develop. Personnel working at the task site and wearing Level C PPE shall wear:

- Full-face air-purifying respirator with organic vapor or combination cartridge
- Chemical-resistant (impermeable tyvek) coveralls
- Steel-toe shoes or boots as described in Supplement 16.4 of the EG&G Idaho *Safety Manual*
- Chemical-resistant (butyl or olefin rubber) outer shoe/boot cover
- Inner gloves (latex)
- Outer gloves (nitrile).

PPE must be inspected by the user prior to donning it and before entry into the zone. Items found to be defective will not be used.

All personnel required to wear respirators must have been trained and acceptably fit-tested for the assigned respirator, per the training and documentation requirements in Section 3. Requirements for respirator use, emergency use, storage, cleaning, and maintenance, as stated in the EG&G Idaho *Company Procedures Manual,* Section 11.1, will be followed.

Table 12 lists each task or assignment and the corresponding level of PPE, as well as any additional or special items necessary for personal protection at the task site. For TSF-36, additional PPE may be specified in an RWP if necessary.

Table 12. Level of PPE and modifications for specific tasks.

Task or assignment	Level of PPE	Modifications
Task 1—removal, treatment and disposal of remaining tank/structure contents	Level C Level D (TSF-36)	Full-face air-purifying if action levels are exceeded. Face shield or safety goggles during content removal if respirator is not required.
Task 2—excavate soils and cut, cap and remove auxiliary systems	Level D for excavation Level C for other task activities at LOFT-07 and TSF-11	Welder,[a] hard hats all crew,[b] face shield for welder if free liquids are present in pipes
Task 3—removal and dispose of tank/structure	Level D	Hard hats, leather gloves
Table 4—soil waste sampling and field screening	Level D	Hard hats
Task 5—restore Site	Level D	Hard hats, leather gloves

a. Specifications for welder PPE will be delineated in the welding and cutting permit.

b. Hard hat is not required for backhoe/front endloader/crane operator if protected by cab.

9. DECONTAMINATION PROCEDURES

Decontamination procedures for personnel and equipment are necessary to control contamination and protect personnel.

9.1 Single-Station Decontamination (PPE Level C)

When Level C PPE is required, the decontamination station should be located at the junction between the exclusion zone and the contamination reduction zone.

At point of entry/exit from exclusion to contamination reduction zone:

1. Drop tools and equipment into appropriate container(s)
2. Remove tape
3. Remove boot covers and outer gloves
4. Remove boots and suit (if worn)
5. Remove and drop respirator
6. Remove inner gloves.

At point of entry/exit from contamination reduction to support zone:

7. Remove coveralls.

In locker room or change area:

8. Thoroughly wash
9. Put on personal clothing.

9.1.1 Decontamination in Medical Emergencies

If a person is injured or becomes ill, the situation will be evaluated by first aid personnel on the task site. Emergency care will be initiated and emergency preparedness procedures for the facility at which the task is being performed will be activated. ***Medical care for serious injury or illness will not be delayed for decontamination.*** In such cases, gross contamination may be removed by removing the injured person's outer protective gear (if possible). Additional decontamination may be performed at the medical facility. The IH or RCT (depending on the type of contamination) should accompany the employee to the medical facility to provide information and decontamination assistance to medical personnel. Chapter 5 of the EG&G *Radiological Control Manual* contains information on proper handling of radiologically contaminated wounds (EG&G Idaho 1993d).

9.1.2 Equipment Decontamination and Disposal of Contaminated Materials

Contamination of PPE is expected at minimal level, and will be disposed of under proper site protocol.

9.1.3 Site Sanitation and Waste Minimization

Task site personnel will use lavatory facilities located at TAN-604 and TAN-678. Potable water and soap are also located at these buildings for personnel to wash their hands and face.

Waste materials will not be allowed to accumulate at the task site. Appropriate containers for contaminated and noncontaminated waste will be maintained at step-off areas, in the support zone, and at other appropriate locations at the task site. All waste will be surveyed by the RCT prior to removal from the task site. Personnel should make every attempt to minimize waste through judicious use of consumable materials. All task site personnel are expected to make good housekeeping a priority at the job site.

10. EMERGENCY RESPONSE PLAN FOR TASK SITE

In the event that an emergency develops onsite, the procedures delineated herein will be followed immediately:

- Grab the wrist or put both hands around the waist of another worker to signal to stop work immediately and evacuate the work site.

- Assemble at the north side of TAN-630 following an evacuation of the LOFT-07 task site. Assemble at the northwest corner of TAN-602 following an evacuation of the TSF-11 task site. This location is upwind and upgrade from the task site.

- From task site LOFT-07 assemble at the north side of TAN-630 in the event of a site-wide take-cover assembly. From task site TSF-11 assemble on the west side of TAN-602 in the event of a site-wide take-cover alarm. This location is upwind and upgrade from the task site.

- The take-cover location where personnel will assemble following an evacuation of the task site is the north side of TAN-630 for the LOFT-07 site and the northwest corner of TAN-602 for the TSF-11 site.

- A two-way F-net radio will be used to summon emergency assistance to the task site.

Responsibilities at the task site during an emergency event are as provided in Table 13.

At least two persons with current Medic First training will be present at the task site to render first aid assistance to victims in an emergency.

Spill control at the task site will be handled by task site personnel if the spills are small enough to be safely contained at the site. Radiological contamination in uncontrolled areas is considered a "spill." If any uncontrolled release of hazardous or radioactive material is noticed, task site personnel will initiate the SWIMS approach:

- *S*top the spill using appropriate measures

- *W*arn area personnel

- *I*solate the area

- *M*inimize exposure to the spill

- *S*ecure any ventilation paths and ensure that an RCT surveys the area to determine the extent of a radiological material spill.

Table 13. Responsibilities during an emergency.

Responsible person	Action assigned
HSO or any task worker	Signal evacuation
HSO	Call Warning Communication Center (WCC)
Medic First trained personnel	First aid to victims
HSO	Contact area emergency action director (EAD)
HSO	Contact Occupational Medical Program
IH/RCT and FTL	Spill containment
IH/RCT and FTL	Spill reporting

10.1 Emergency Equipment on the Site

Emergency response equipment that will be maintained at the site includes the items described in Table 14.

The nearest emergency response team is the TAN fire department, located at TAN-687. This team has response capability for medical emergencies, fires, or hazardous materials spills.

Figures 9, 10, and 11 show the route to the medical facilities and locations of the nearby emergency response teams.

An emergency drill may be conducted at the beginning of the task. The objective of the drill is to allow task site personnel an opportunity to practice their respective emergency response actions. ***Any radio or telephone communications that are included in this drill shall be immediately preceded and followed with a statement that clearly identifies the situation as a drill to prevent an actual emergency response from being initiated by WCC.*** Additional drills will be conducted if activities at the task site continue for more than 12 months.

Each drill or actual emergency event at the task site will be followed by a critique, and any deficiencies in the emergency plan that are identified will be corrected.

Table 14. Emergency response equipment to be maintained at the task site.

Equipment name and quantity required	Location at task site	Responsible person	Frequency of inspection
Fire extinguisher	Exclusion zone	FTL	Monthly
First aid kit	Support zone	FTL	Monthly before and after each use
Eye wash station[a]	Decontamination zone/exit area	FTL	Weekly by TAN personnel, daily functional inspection by HSO
Hazardous materials spill kit	Support zone	FTL	Before and after each use

a. Must meet American National Standards Institute requirements for rate and flow. ANSI-3581.1-1990. Eyewash required onsite during product handling and tank decontamination activities at LOFT-07 and TSF-11.

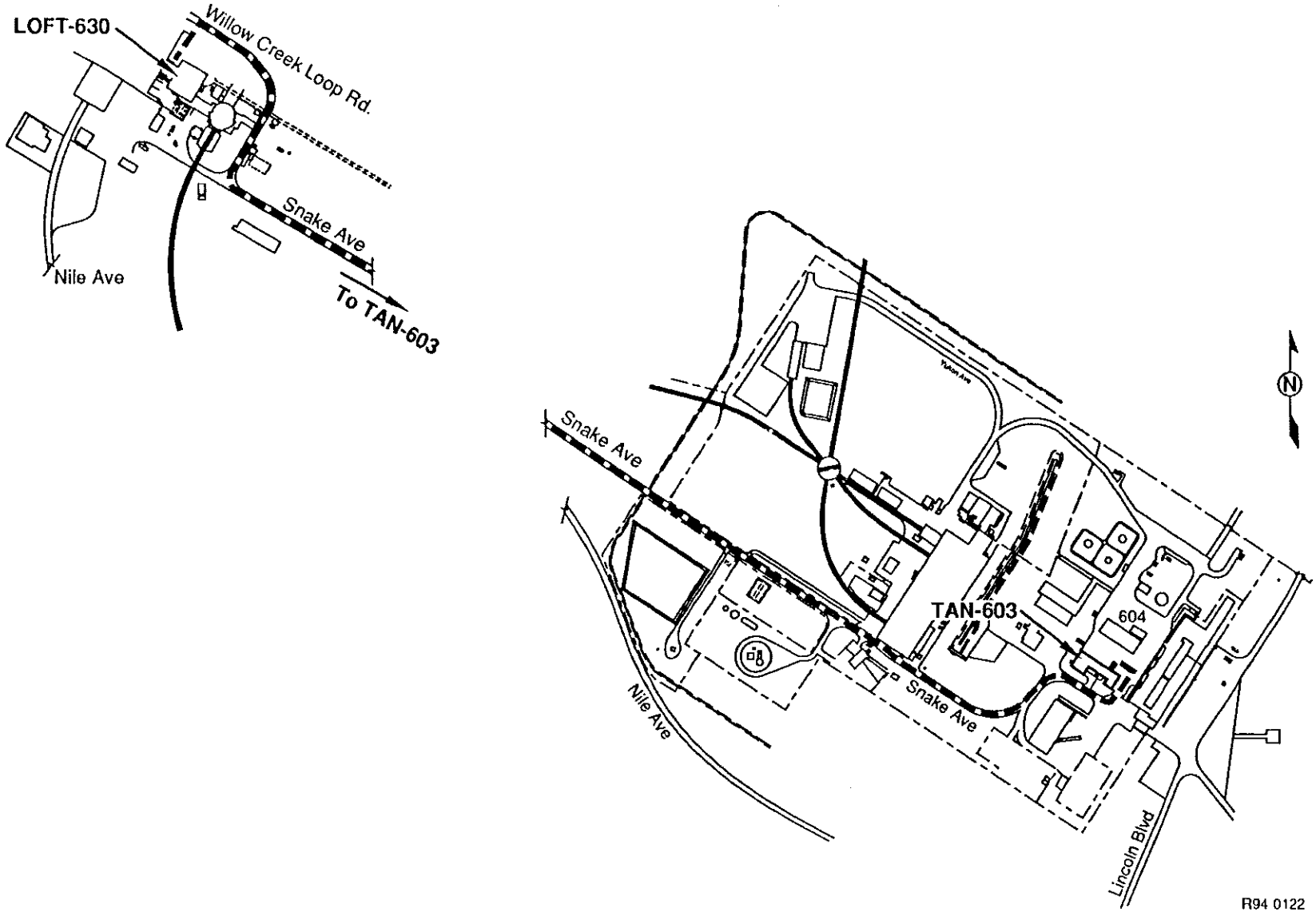

Figure 9. Map showing the route to the TAN dispensary from LOFT-07.

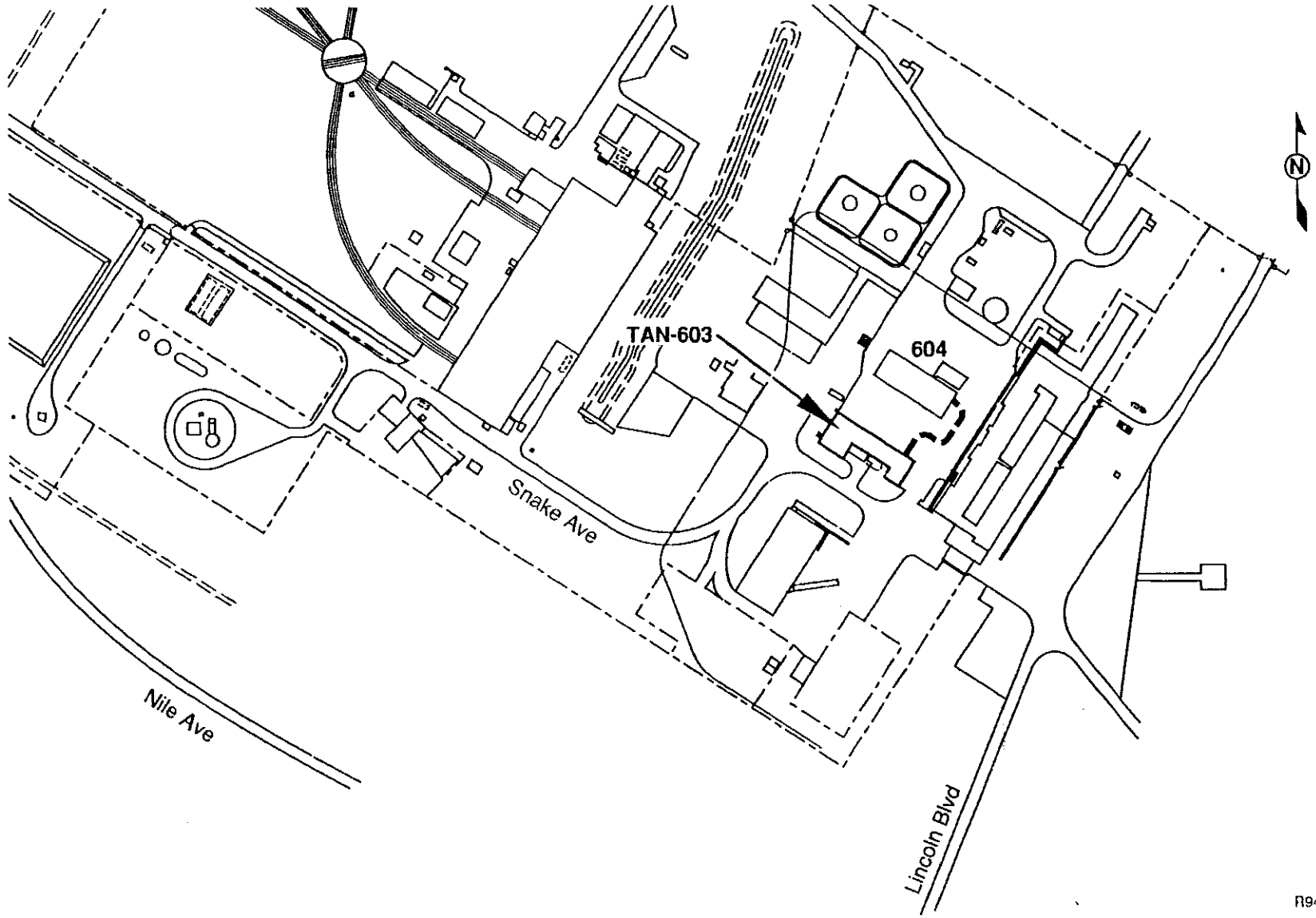

Figure 10. Map showing the route to the TAN dispensary from TSF-11.

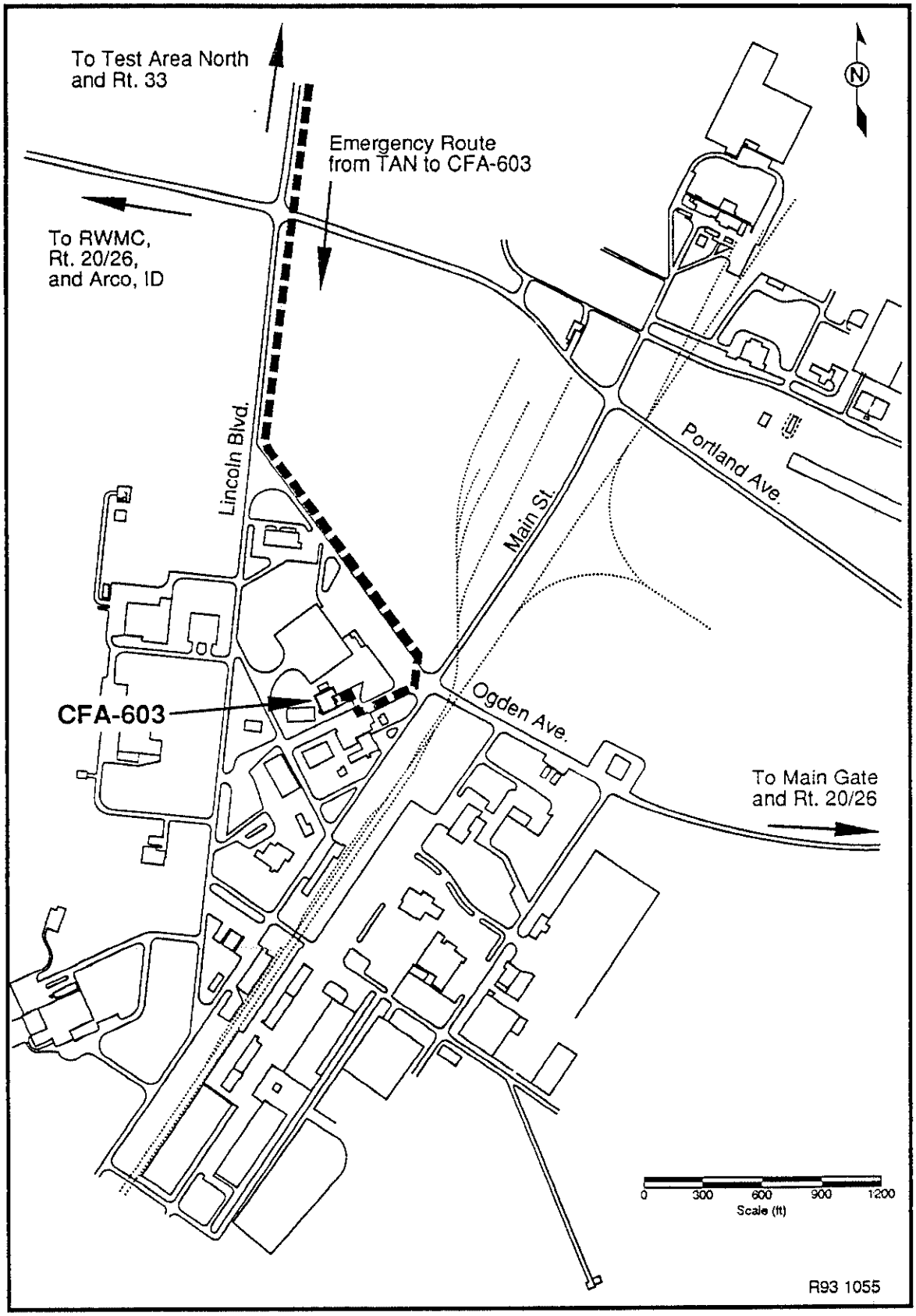

Figure 11. Map showing the route to the CFA dispensary from TAN.

10.2 Telephone/Radio Contact Reference List

This reference list will be posted in the support zone of each task site.

• Warning Communications Center (WCC)	777
• Area Emergency Coordinator	
R. E. Simonds, TSF/LOFT	526-4736
W. Wyland	526-6889
• First Aid (TAN Dispensary, TAN-603)	777 or (526-6263)
• Occupational Medical Program (Willow Creek Building Dispensary)	526-1596
• Fire	777
• Security	777
• Explosives expert	
R. C. Green, CFA-612	526-2707
• Hazardous Materials Team (HAZMAT)	
TAN Fire Department	777 (526-6261)
• TAN Environmental Coordinator	
Anita Jenne'	526-6015
• Quality	
V. W. Watson, Woodruff Avenue Complex (WAC)	526-8539
• Industrial Hygiene	
B. P. Miller, CFA-689	526-5713
• Health Physics/Radiological Control	
R. D. Sayer	526-6619
• Project Manager	
T. J. Meyer, WAC	526-9286
• Field Team Leader	
C. S. Blackmore	526-9346
M. J. Nolan	526-9294
• Safety	
P. D. Williams	526-6004
R. C. Caummisar, CFA-689	526-4381

11. HEALTH AND SAFETY PLAN TRAINING ACKNOWLEDGEMENT

The signatures below certify that:

- The employee has received a copy of the HSP for removal of USTs at TAN and the plan has been reviewed with the employee
- The employee understands the hazards that are or may be involved in work at the LOFT-07 and TSF-11 site
- The employee agrees to comply with all requirements as outlined in this HSP
- The employee's training records have been verified as complete and current for the employee's assignment at the task site.

Employee's name (printed) and signature:

_____

Print Signature Date

Company of employment:

_____

Health and Safety Officer's name (printed) and signature:

_____

Print Signature Date

Field Team Leader's name (printed) and signature:

_____

Print Signature Date

12. REFERENCES

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Copeland, D. F., 1991, *Abbreviated Sampling and Analysis Plan for LOFT-07 Underground Storage Tank,* EGG-WM-9773, Revision 0, September.

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Meyer, T. J., 1994, *Abbreviated Sampling and Analysis Plan for the Characterization of Underground Storage Tank Contents,* EGG-WM-9457, Revision 4, April.

NIOSH, 1985, *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, U.S. Department of Health and Human Services, October.

NIOSH, 1990, *Pocket Guide to Chemical Hazards*, U.S. Department of Health and Human Services, June.

Appendix A

Material Safety Data Sheet

Material Safety Data Sheet for

Aer-O-Foam 6% Regular

Section I Manufacturer's Name and Address:

Chubb National Foam, Inc.
150 Gordon Drive
P.O. Box 270
Exton, PA 19341-1350

Emergency Telephone:

(215) 363-1400

Date Prepared: 8/20/90

Section II Hazardous Ingredients/Identity Information

The specific chemical identities and corresponding weight percents of some substances involved in the formulation of this product are considered a proprietary trade secret and are not disclosed on this MSDS. To comply with the trade secret provisions of existing Community and Worker Right-To-Know laws, generic chemical identities for some of the ingredients in this product have been provided.

Information about the specific chemical identities is available to attending health professionals in the event of a medical emergency. In a non-emergency situation, this information is available to other health professionals, employees or their designated representatives, as prescribed by the OSHA Hazard Communication Standard, 29 CFR 1910.1200 and the PA Worker and Community Right-to-Know Act.

Specific/Generic Chemical Identity:	OSHA PEL	ACGIH TLV	Other Limits
Water	None Established	None Established	
Protein Hydrolysate #69430-36-0	None Established	None Established	

This product contains the following substances which appear on the PA Hazardous Substances List. The properties effects of these substances are disclosed on this MSDS.

Specific/Generic Chemical Identity:	OSHA PEL	ACGIH TLV	Other Limits
Hexylene Glycol; 2 Methyl-2,4 Pentanediol; #107-41-5	25 ppm	25 ppm	
Ferrous Sulfate #7720-78-7	1.0 mg/m^3	1.0 mg/m^3	
Chlorophenol	None Established	None Established	

This product contains the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and 40 CFR Part 372.

Specific/Generic Chemical Identity:	OSHA PEL	ACGIH TLV	Other Limits
Ethylene Glycol; 1,2 Ethanediol; #107-21-1	50 ppm ceiling limit	50 ppm (vapor) ceiling limit	15 (max)

Material Safety Data Sheet for

Aer-O-Foam 6% Regular

Section III Physical Chemical Characteristics of Product

pH	7.3	Specific Gravity (Water=1)	1.14
Solubility in water	100%	Evaporation Rate (Butyl Acetate=1)	<1
Vapor Pressure (mm Hg)	N/D	Vapor Density	N/D
Boiling Point	N/D	Melting Point	N/A

Appearance and Odor: Dark brown liquid - Organic odor

N/D denotes Not Determined.

N/A denotes Not Applicable.

Section IV Health Hazard Data

This product contains the following substances, which in their pure form, pose the following hazards:

Chemical Ingredients	Routes of Entry Symptoms of Exposure Effects of Inhalation, Ingestion and Skin Absorption	Listed in NTP, IARC or OSHA:
Hexylene Glycol #107-41-5	May cause eye and skin irritation and nervous system depression. Large amounts may cause nose and throat irritation upon inhalation of vapors, and digestive tract irritation upon ingestion.	Not listed.
Ferrous Sulfate #7720-78-7	Dust and mist are irritant to the respiratory system. Ingestion can cause severe gastrointestinal irritation.	Not listed.
Chlorophenol	Chlorinated phenols are considered to have highly toxic acute, local, and systemic effects. Chronic systemic effects have been observed. In general, phenol poisoning targets the central nervous system. Absorption through skin or inhalation, ingestion may result in nervous disorders and skin eruption.	Not listed.
Ethylene Glycol; #107-21-1	May cause eye irritation upon contact, nose and throat irritation upon inhalation of vapors. Ingestion can result in digestive tract irritation, nervous system depression, visual disturbances, kidney damage, convulsions, or coma. Animal studies of large doses showed liver and kidney damage and birth defects.	Not listed.

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Section IV Health Hazard Data (continued)

Medical Conditions Generally Aggravated by Exposure:
Existing eye or skin sensitivity may be aggravated by exposure.

Emergency First Aid Procedures:

Skin contact:	Flush skin with water for 15 minutes. Apply hand cream to restore oils.
Eyes:	Flush eyes immediately with copious amounts of water for 15 minutes. Contact physician if problem persists.
Ingestion:	If conscious, give victim two glasses of water and induce vomiting. Contact physician immediately.

Section V Fire and Explosion Hazard Data

Flash Point N/A

Flammable Limits
LEL N/A
UEL N/A

Extinguishing Media: Product is an extinguishing medium.

Special Fire Fighting Procedures: N/A

Unusual Fire and Explosion Hazards: N/A

Section VI Reactivity Data

Stability: Unstable [ ] Stable [X]

Conditions to Avoid: None

Incompatibility; Material to Avoid: None

Hazardous Polymerization: May Occur [ ] Will Not Occur [X]

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Section VII Control Measures

Concentrate:	Collect spilled concentrate with absorbent material, flush area with water until it no longer foams. Disposal should be in accordance with State or Local regulations.
Foam:	Flush with water and dispose of diluted material according to State or Local regulations.

Section VIII Precautions for Safe Handling and Use

Respiratory Protection:	None required.
Ventilation:	None required.
Protective Clothing:	Rubber or PVC gloves recommended for persons with extreme skin sensitivity or skin lesions and cuts.
Eye Protection:	Safety glasses, goggles, or face shield required.
Work/Hygienic Practices:	Avoid inhalation, ingestion, or skin contact. Avoid contact with eyes.

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