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GENERAL HEALTH AND SAFETY PIAN
ENVIRONMENTAL CONTAMINATION ASSESSMENT
NAVAL AIR STATION PENSACOLA
PENSACOLA, FLORIDA

July, 1990

Prepared for:

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
2155 Eagle Drive, P.O. Box 10068
Charleston, South Carolina 29411-0068

Contract Number N62467-88-C-0200

ecology and environment, inc.
316 SOUTH BAYLEN STREET, PENSACOLA. FLORIDA 32501, TEL. (904) 435-8925
International Specialists in tho Environment

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1.0 INTRODUCTION

The purpose of this General Health and Safety Plan is to outline the health and safety procedures and protocol to be followed during sampling and field activities conducted as part of contamination assessments and remedial activities at 37 sites on Naval Air Station (NAS) Pensacola, located in Pensacola, Escambia County, Florida. This work is being conducted as part of the Navy Installation Restoration (IR) Program to investigate and remediate uncontrolled hazardous waste disposal sites associated with naval operations.

This General Health and Safety Plan should not be interpreted as a static document. Changes in working conditions or potential exposure levels, or discovery of additional contaminants or sites, will warrant appropriate addenda to this document as work progresses. These changes will also be reflected in the site-specific safety plans (SSSPs) that will be generated for each field task assignment.

All fieldwork conducted by Ecology and Environment, Inc., (E & E) and its subcontractors will be performed in accordance with Occupational Safety and Health Administration (OSHA) Standard 29 CFR 1910.120, which regulates hazardous waste site operations.

2.0 SITE BACKGROUND

The NAS Pensacola installation occupies an area of approximately 5,800 acres on a peninsula in southern Escambia County, five miles southwest of the City of Pensacola. This peninsula is bounded on the north by Bayou Grande, and on the east and south by Pensacola Bay. Figure 2-1 is a location map of NAS Pensacola.

Located at the installation are various housing, training, and support activities and a Naval Aviation Depot (NADEP), a large industrial complex for major repairs and refurbishment of aircraft engines and frames. The main industrial operations conducted at NAS Pensacola are concentrated in the older portion of the base, on the eastern end of the peninsula. The western end primarily contains the main airfield (Forrest Sherman Field) and undeveloped wooded land.

NAS Pensacola has historically conducted many activities involving hazardous materials. Some of the activities are no longer performed, and to a large extent there are no records of these former activities. Solid wastes have been disposed of primarily at two landfill areas: one west of the golf course site (Site 1, Sanitary Landfill) and the other north of Chevalier Field (Site 11). Liquid wastes from the NADEP operations were discharged to storm sewers until 1973, when an industrial sewer system and industrial wastewater treatment plant (IWTP) were installed. Other activities involving hazardous materials include pesticide application, use of radioactive materials, transformer storage, transport and storage of fuel, and firefighting/crash training.

Previous environmental studies of NAS Pensacola were conducted under the Navy Assessment and Control of Installation Pollutants (NACIP) Program, and consisted of an Initial Assessment Study (IAS) followed by a two-part Confirmation Study. The on-site survey portion of the IAS was performed in 1982 by a team of Navy environmental specialists. The IAS final report was released in June 1983. Geraghty & Miller, Inc.,

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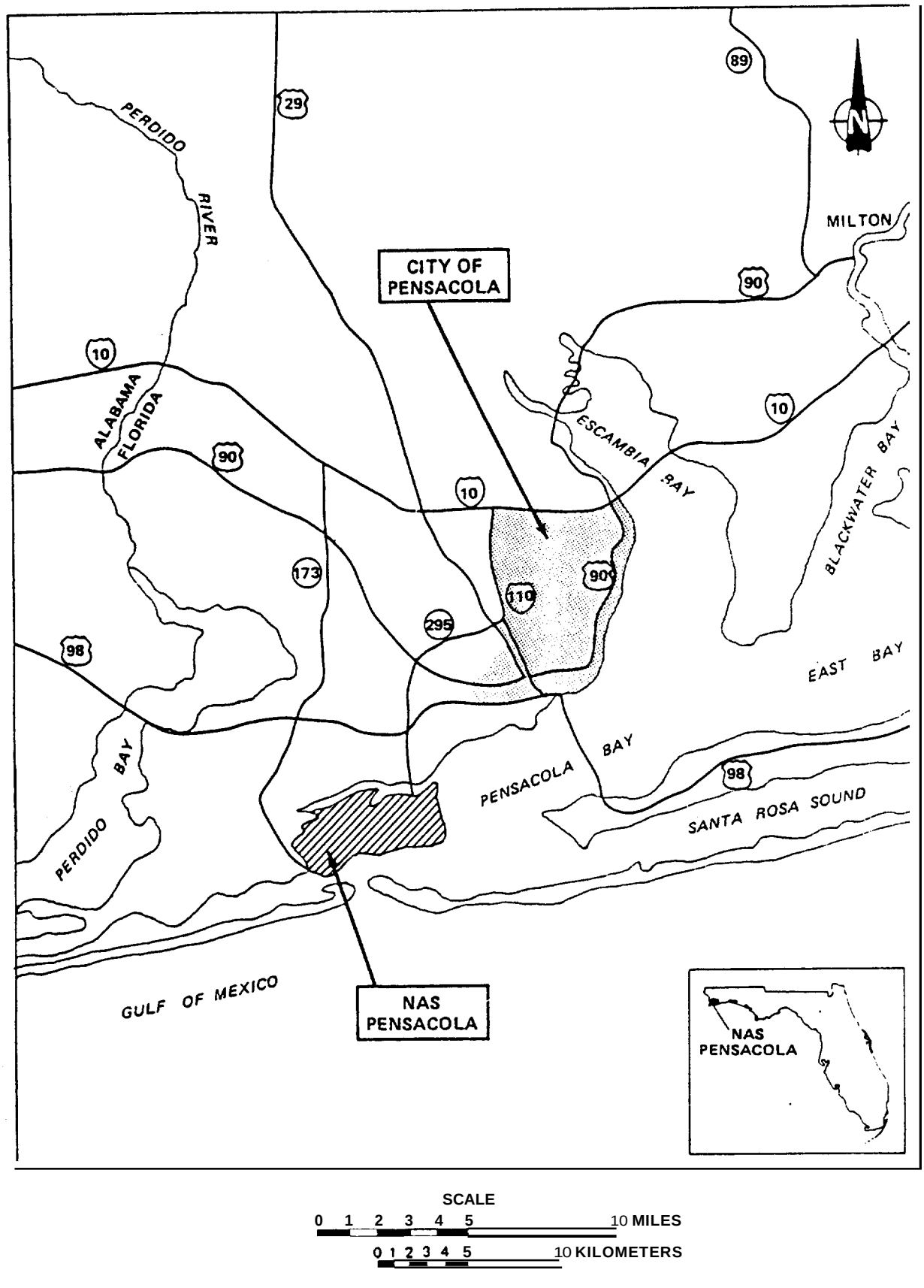

Figure 2–1 LOCATION OF NAS PENSACOLA

(G & M) was retained by the Navy in 1984 to perform the Confirmation Study, which consisted of a Verification Study followed by a Characterization Study. Final reports were issued in July 1984 and March 1986, respectively. Groundwater, surface water, sediment, and soil samples were collected and analyzed during both parts of the Confirmation Study.

Table 2-1 is a list of the 37 sites to be investigated as part of this study, and Figure 2-2 shows the general site locations.

[Bold items enclosed in brackets denote changes from original text]

Table 2-1

NAS PENSACOLA SITES

Site No.	Site Name/Description
1	Sanitary Landfill
2	Waterfront Sediments Area
3	Crash Crew Training Area
4	Army Rubble Disposal Area
5	Borrow Pit
6	Fort Redoubt Rubble 'Disposal Area
7	Firefighting School Area
a	Rifle Range Disposal Area
9	Navy Yard Disposal Area
10	Commodore's Pond
11	North Chevalier Disposal Area
12	Scrap Bins
13	Magazine Point Rubble Disposal Area
14	Dredge Spoil Fill Area
15	Pesticide Rinsate Disposal Area
16	Brush Disposal Area
17	Transformer Storage Yard
18	PCB Spill Area
19	Fuel Farm Pipeline Leak Area
20	Pier Pipe Leak Area
21	Sludge at Fuel Tanks Area
22	Refueler Repair Shop
23	Chevalier Field Pipe Leak Area
24	DDT Mixing Area
25	Radium Spill Area
26	Supply Department Outside Storage Area
27	Radium Dial Shop Sewer
28	Transformer Accident Area
29	Soil South of Building 3460
30	Buildings 649 and 755
31	Soil North of Building 648
32	IWTP Sludge Drying Beds
33	WWTP Ponds
34	Solvent area North of Building 3557
35	Miscellaneous IWTP SWMUs
36	Industrial Waste Sewer
37	Sherman Field Fuel Farm

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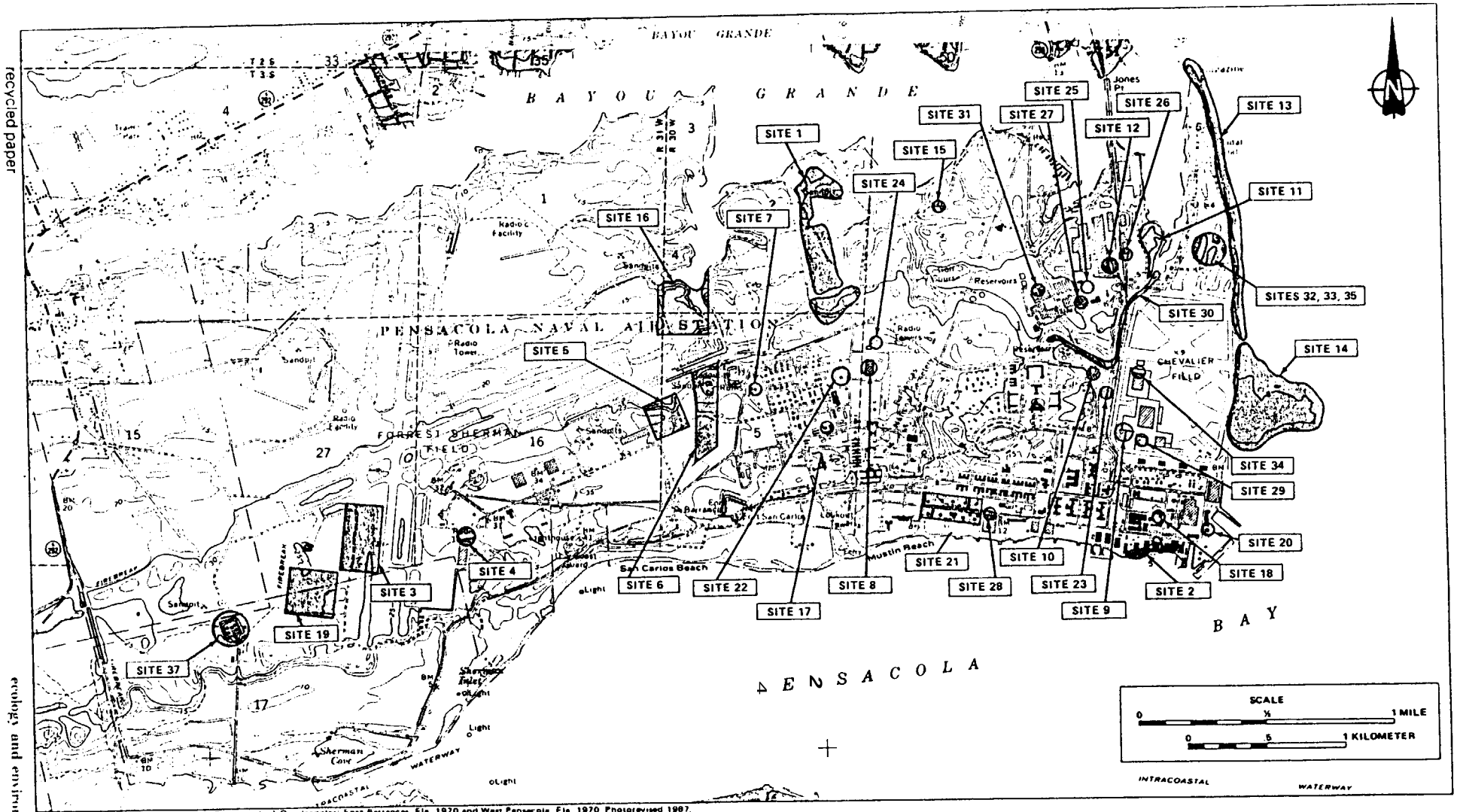

SOURCE: U.S.G.S. 7.5 Minute Series (Topographic) Quadrangles: Fort Barrancas, Fla. 1970 and West Pensacola, Fla. 1970, Photorevised 1987.

Figure 2-2 NAS PENSACOLA SITE LOCATIONS

3.0 *STANDARD* OPERATING PROCEDURES

3.1 TEAM ORGANIZATION

Key personnel who will be involved in the project are:

- Senior Project Director - Rick Rudy, P.G.;
- Program Manager - John Dumeyer, P.E., P.G.;
- Project Manager - John Barksdale;
- Corporate Health and Safety Director - Paul Jonmaire, Ph.D.; and
- Regional Safety Coordinator - Mary Miller.

The regional safety coordinator will approve all health and safety decisions regarding site work, determine initial levels of protection to be used for site tasks, and audit health and safety procedures at the site.

For each field task or site, a site safety officer (SSO) will be assigned by the project manager and approved by the regional safety coordinator. The SSO will conduct air monitoring, advise field team members on safety issues, and hold required safety meetings. The assigned site team leader will supervise and delegate duties to field team members, direct site operations, and control subcontractor activities. Field team personnel will perform all sampling, surveying, inspections, and field monitoring as specified in E & E's site-specific safety plan (SSSP).

3.2 WORK ZONES

When appropriate, the NAS Pensacola sites will have a work zone layout consisting of an exclusion zone (contamination area), a contamination reduction zone (through which the exclusion zone is entered/exited), and a support zone. Figure 3-1 is a diagram of the typical site work zones. The boundary line separating the exclusion

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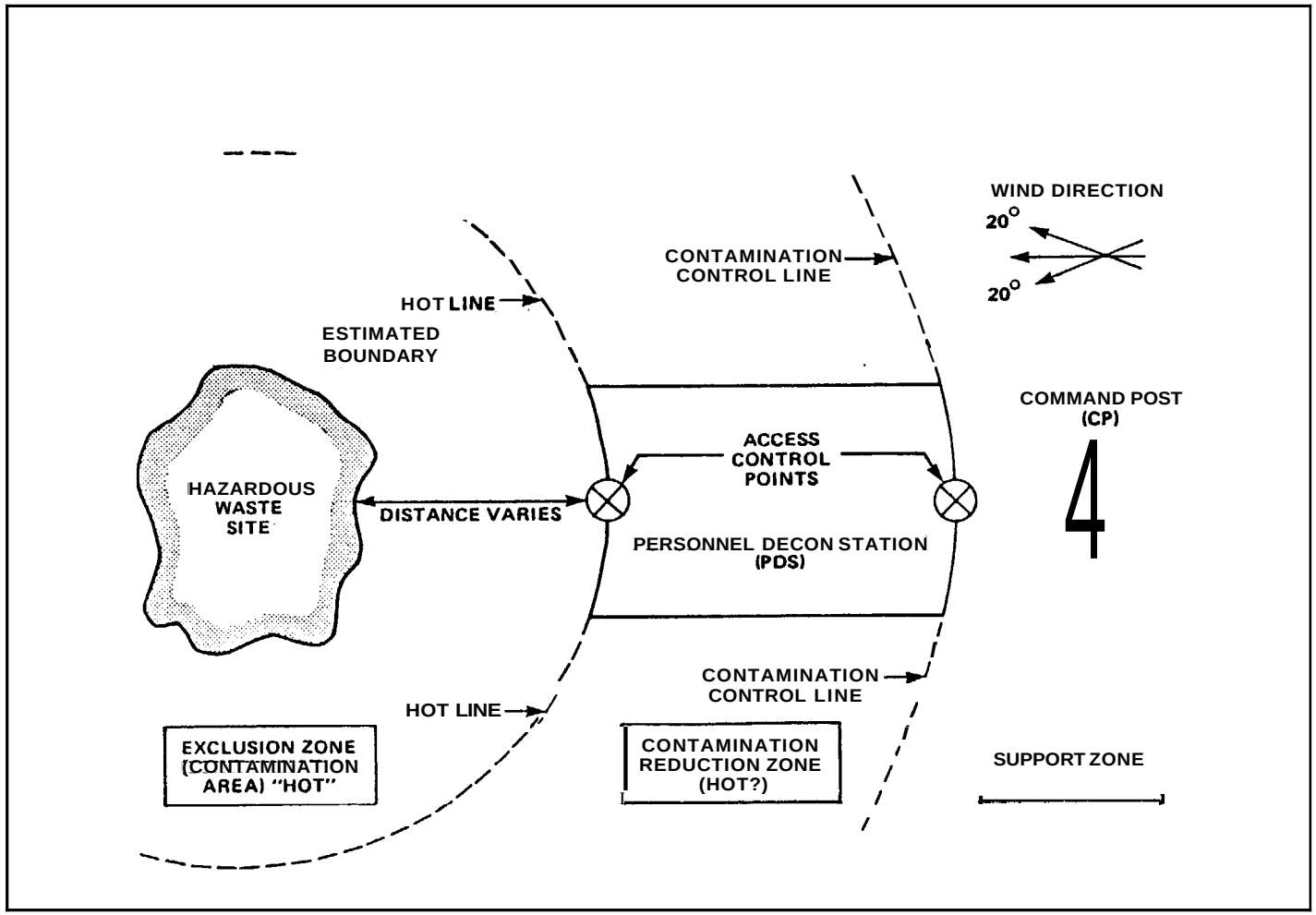

Figure 3–1 TYPICAL SITE WORK ZONES

zone and the contamination reduction zone is called the hot line. The boundary line separating the contamination reduction zone and the support zone is called the contamination control line. A general description of the work zones is as follows:

- Support Zone is all the area outside and upwind of the contamination reduction zone, where support functions can be conducted from a temporary command post;
- Contamination Reduction Zone is the buffer zone outside the contaminated area, between the exclusion zone and the support zone, where personnel and equipment decontamination is performed as personnel exit the work area; and
- Exclusion Zone is the contamination area, where hazardous materials and/or operations are located. The level of protection utilized in this area will depend on the nature of the specific site, the nature of the specific site task to be performed, and such variable factors as dust levels, wind speed, and wind direction.

3.3 SITE ENTRY PROCEDURES

Unauthorized personnel (i.e., persons not approved by E & E or the Navy) will not be allowed to enter the work site. No one will be allowed to enter the exclusion zone without the proper protective equipment. Work crew members will enter the exclusion zone in pairs, employing the "buddy system." Initially, most exclusion zones will be considered Level C areas (see Section 5.2). Based on ambient air monitoring, and criteria described in Section 5.2, personnel protection may be downgraded or upgraded.

Boundaries of the exclusion and Contamination zones will be indicated clearly by some type of temporary marker (e.g., surveyor's tape) to prevent accidental entry. There will also be wind direction indicators (telltales) at each boundary.

Initially, the proposed support zone will be monitored to determine if it is clean enough for support operations to be established. A hot line and decontamination area will be established, and team members will enter the site and perform a preliminary assessment with monitoring

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instruments to locate any "hot spots." The level of personnel protection will then be determined based on monitoring data from the emission sources and in the breathing zone.

Work sites that cover a large area or are situated geographically or logistically in such a manner that single access points are not practical may require site-specific modifications to the typical work zone layout.

3.4 DECONTAMINATION PROCEDURES

Personnel will adhere to the following decontamination procedures when passing from the exclusion zone into the support zone. In the contamination reduction zone, non-expendable equipment will be dropped on a plastic sheet, and outer boot covers will be removed and placed in a sealable double bag for disposal. Inner boots will not touch the ground in the exclusion zone after removal **of** the outer boot covers. The worker will then step into a 10-gallon washtub containing trisodium phosphate (TSP) and sodium bicarbonate, and vash his boots with a large scrub brush. The worker will then step into another tub containing rinse water and again scrub his boots. Outer gloves will then be washed and rinsed in separate buckets using the same procedures as used to clean the boots. If site personnel are leaving the site for the day, they will place their outer gloves in the sealable double bag for disposal. Protective coveralls will then be taken off and dropped into sealable double bag for disposal. If an air-purifying respirator (APR) with cartridges was worn, it will then be removed and the cartridges placed in the sealable double bag for disposal. Inner surgical gloves will be kept on until the worker washes his mask. The gloves will then be disposed of in the sealable double bag. Heat stress monitoring may be conducted at this point. Personnel will then wash their hands and face before crossing into the support zone.

When a worker takes a rest period, he will only **go** through a partial decontamination. The outer boots will be washed and rinsed, and the outer gloves washed, rinsed, and removed (but not discarded). The worker will then rest in a shaded area.

If a team member is injured or becomes ill while in the exclusion zone, the decontamination process may be expedited. Following a gross

[Bold items enclosed in brackets denote changes **from** original text]

decontamination process (the composition of which will depend on the nature/severity of the injury or illness), the team member will be moved to the support area to await medical assistance. Even if the team member appears to have improved after removal from the exclusion zone, he will still be taken to the hospital as a precautionary measure. No risks will be taken that might jeopardize the safety of any personnel.

All sampling equipment will be decontaminated between sampling locations to prevent cross-contamination of samples and inadvertent exposure of field team members handling the equipment. An initial cleaning with TSP detergent and water will be performed, followed by rinsing with, in succession: isopropanol, hexane, isopropanol again, and distilled or organic-free water. Non-metallic sampling equipment that will be used to collect samples for metals analysis will also be rinsed with a 10% solution of nitric acid prior to the distilled water rinse.

All expendable protective clothing and equipment generated by sampling and decontamination activities will be disposed of in sealable double bags, and the sealed double bags will be placed in 55-gallon drums; the drums will be labeled and transported to a designated location for final disposal by the Navy.

3.5 EMERGENCY EQUIPMENT AND PROCEDURES

The possibility of the spread of contamination during field inspections and sampling activities at NAS Pensacola is minimal except via air dispersion. If an emergency should arise (e.g., a fire or explosion), all personnel will immediately leave the site and the Navy police and fire departments will be notified of the situation, the possibility of chemical migration from the site, and the potential effects to the surrounding area. Further emergency action will be performed in cooperation with police and fire department personnel.

Emergency exit routes from the exclusion zone and proper use of emergency equipment will be clearly defined for all personnel during the initial safety meeting. There will always be at least two team members prepared to provide assistance in case of the need for a rescue. One of the team members will be assigned to assist with decontamination activities.

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The emergency equipment that will be kept in the support zone includes first-aid kits, a fire extinguisher, and emergency eye wash. Sufficient clean water will be kept on-site to provide for an emergency shower. Because of the unknown concentrations of pollutants, on-site escape respirators may be required. A vehicle will be located at the work site to transport an unconscious or injured work team member from the exclusion zone to the contamination reduction zone. All personnel will know the location of all emergency equipment. Copies of the American Red Cross first-aid manual will also be kept in the support vehicle. All team members have been certified by the American Red Cross in first-aid and cardiopulmonary resuscitation (CPR),

If a team member is injured, becomes ill, or has been chemically exposed, the following steps will be taken:

- If the team member has been in the exclusion zone, he will be quickly decontaminated (gross decon); the hospital, paramedics, etc., will be called, if necessary;
- The injured person's protective equipment will be removed and the person will be returned to the support zone;
- The American Red Cross first-aid manual will be referenced for determination of proper emergency procedures; the chemical evaluation forms that will be contained in the SSSP will also be referred to for additional information;
- The responding paramedical team or a designated team member will take the injured team member to the hospital; a team member will accompany the injured person to the hospital in order to give accident information to the emergency room staff and later to E & E's Corporate Health and Safety Director; and
- The incident will be recorded in the site safety logbook and site field logbook, and a written injury report will be completed. The site safety logbook and site field logbook will be kept on site during working hours. Following the fieldwork, **the logbooks** and a copy of the injury report will be kept on file with other site and project documents.

Table 3-1 lists the emergency contacts to be used during performance of **NAS** Pensacola fieldwork. All emergency contacts will also be listed in the SSSP. Figure 3-2 shows the location of the **NAS** Dispensary. The route from the site to the Dispensary will be driven

Table 3-1

EXERGENCY CONTACTS

Local Resources	Phone Number
Ambulance On Base	**452-4138**
Ambulance Off Base [(Escambia County)]	911
Emergency Room - NAS Dispensary (On Base)	**452-2733**
Emergency Room - Baptist Hospital (Off Base)	**434-4811**
Fire Department	**911**
Police	**911**
[Escambia County Emergency Management Office	911]
[NAS Pensacola Fire Department]	452-3333]
NAS Environmental Coordinator - W. DeWayne Ray	**452-4515**
U.S. Navy Southern Division Engineer In Charge, [David Criswell]	[803-743-0612]

ec to st Emergency Room (NAS Dispensary):

The NAS Dispensary is located northwest of the intersection of Turner Street and Ellyson Avenue in Building 625-A.

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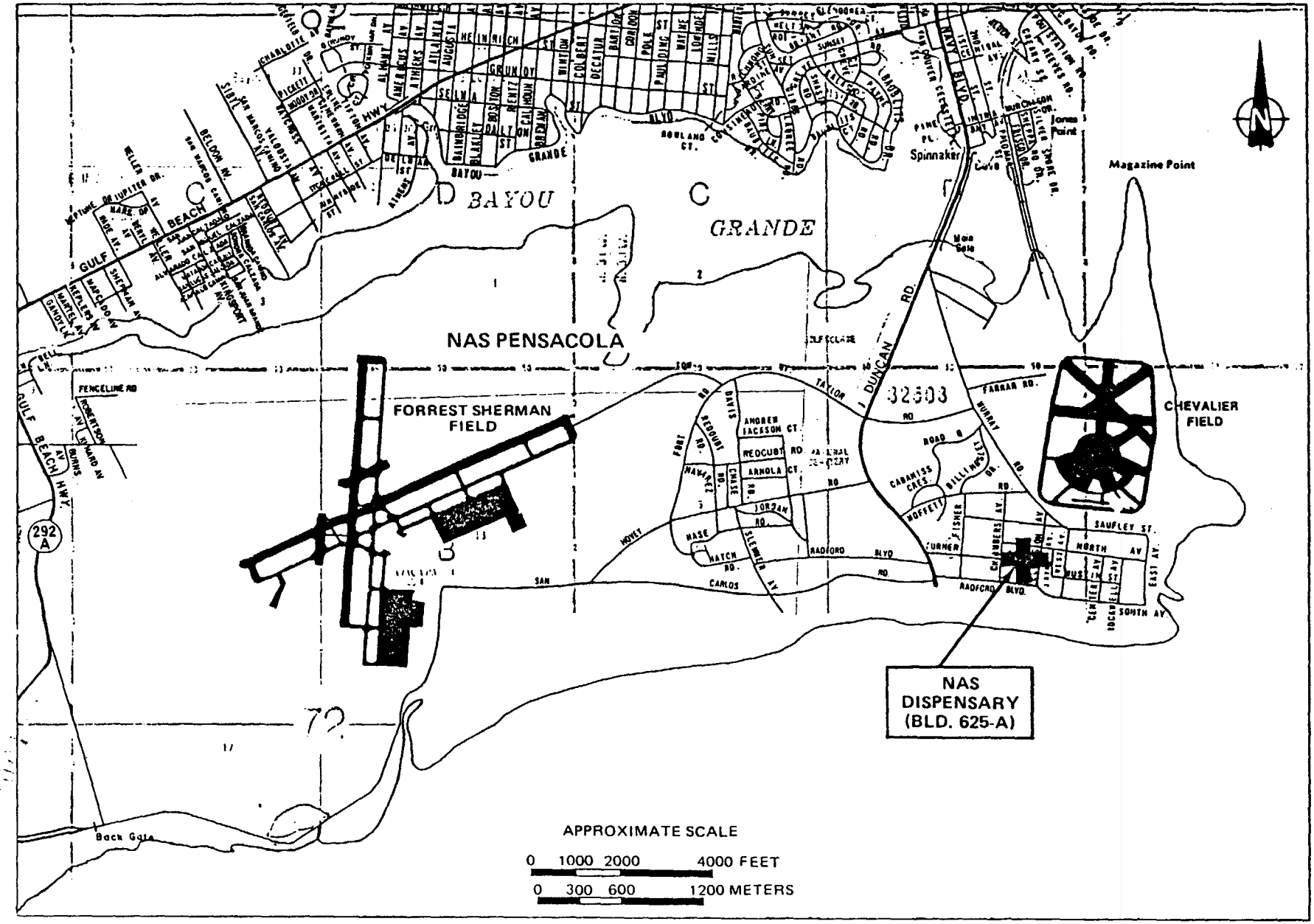

Figure 3–2 LOCATION OF NAS DISPENSARY

prior to any site activities. A map of the Dispensary location will also be contained in the SSSP and will be placed in all support vehicles. [In the event of an emergency, the NAS Pensacola Fire Department could provide initial emergency response. However, the Escambia County Ambulance will be used to transport any victims. If a patient is contaminated, the ambulance and/or hospital will be notified prior to receiving the patient. Any situations or emergencies that occur which may affect waterways or other areas in Escambia County will be reported to the Escambia County Emergency Management Office.]

All team members will assume worst-case situations while on-site and will take all precautions during site activities. Before work begins in an area, the air will be monitored for volatile organic vapors with an HNu or an OVA. Field crew members will note any possible dangerous situations that may arise during site activities.

3.6 SITE SECURITY

The NAS Pensacola installation is not a completely secured area. E & E personnel will secure all samples and equipment to prevent possible tampering by unauthorized persons and will inform the Navy of any vandalism at site locations.

Should any problems or questions arise concerning site security, the Installation Restoration Program Engineer In Charge (EIC) and/or the NAS Pensacola Environmental Coordinator will be informed.

3.7 COMMUNICATIONS

Work party members will be in constant communication with the site team leader. In addition, to the greatest extent possible, the SSO or his designee will maintain a direct line of sight with all work crew members. ,The team leader will inform the proper NAS Pensacola representatives of any emergency situations that arise.

[A cellular telephone will be located in the field at all times so that any emergency can be reported immediately and continuous communication/coordination with NAS Pensacola can be maintained.]

[Bold items enclosed in brackets denote changes from original text]

4.0 HAZARD **COMMUNICATION AND TRAINING**

4.1 **COMPREHENSIVE HEALTH AND SAFETY** TRAINING

Prior to conducting fieldwork, all E & E field personnel will have been formally trained for hazardous waste fieldwork in accordance with the criteria established in Environmental Protection Agency (EPA) Executive Order *1440-2* and 29 CFR 1910.120; will have been properly fitted for respirator use in accordance with 29 CFR 1910.134; will have taken and passed physical examinations; and will have been approved for hazardous waste site work by the Corporate Health and Safety Director.

Personnel assigned to the NAS Pensacola sites will have had previous field experience and will be familiar with the type of work being done. Team members will understand the scope of work and the specific activities involved in the work. Prior to any on-site work, a meeting will be held to discuss all site activities to ensure that all team members fully understand their responsibilities, site hazards, type **of** work to be performed, equipment to be used, and procedures to be followed.

Personnel will be required to follow all procedures contained in this General Health and Safety Plan or incorporated by reference. Any variance from the plan must be approved by E & **E's** regional safety coordinator. At no time will personnel who lack proper training be allowed on-site.

4.2 **SITE-SPECIFIC SAFETY PLANS**

Site-specific safety plans (SSSPs) will be developed prior to initiating each phase of the fieldwork for the NAS Pensacola investigation. Each SSSP will be reviewed and approved by the regional safety coordinator. The SSSP will contain all pertinent information regarding chemical and physical hazards, field team personnel

responsibilities, levels of protection, work areas, control of site access, decontamination procedures, environmental monitoring, and site emergency procedure information. An E & E SSSP form has been included in Appendix A. A copy of the SSSP will be furnished to the EIC prior to the initiation of fieldwork.

4.3 PRE-INVESTIGATION HEALTH AND SAFETY BRIEFING AND MORNING SAFETY HEETING

Prior to site activities, all field team members will be provided with a copy of the SSSP for the given task. The site team leader and SSO will brief team members on safety hazards and procedures. The initial briefing will thoroughly inform team members about all site activities. Besides this initial comprehensive briefing, a morning safety meeting will be held daily to define the work objectives of the day and any modifications to the SSSP.

4.4 DOCUMENTATION

All site activities will be documented by the team leader in the site field logbook. The designated SSO will keep a site safety logbook to record additional information regarding site conditions, selection of protection levels, subcontractor supervision, and environmental monitoring data obtained. The logbooks will become part of the permanent site record. Site entrance and exit times for all non-E & E personnel will also be indicated in the field and safety logbooks.

4.5 MEDICAL SURVEILLANCE

All E & E personnel taking part in field activities will have passed the prescribed medical examination and be approved to work in a hazardous environment by the E & E Corporate Health and Safety Director. The medical examination will have been performed by a certified physician, as specified in 29 CFR 1910, Sections 120 and 134. The physician will approve the personnel for work on a hazardous waste site and for wearing respiratory equipment, and will complete a medical summary form for each employee, which will be kept on-site during working hours and opened in any emergency situation.

[Bold items enclosed in brackets denote changes from original text]

4.6 SUBCONTRACTORS

All E & E subcontractor personnel working at **NAS** Pensacola will be fully trained and qualified for hazardous waste site fieldwork. Subcontractor personnel will have passed a physical exam and had all required training as specified in **29 CFR 1910,** Sections **120** and *134.* Proof of training and medical surveillance will be furnished to E & E prior to fieldwork being performed by any subcontractor personnel.

[**Bold** items enclosed in brackets denote changes from original text]

5.0 EEALTH AND SAFETY EQUIPMENT

5.1 ENVIRONMENTAL MONITORING EQUIPMENT

SSSPs will establish levels of personnel protection for the work at each NAS Pensacola site. However, ambient air monitoring may indicate that the prescribed level of protection must be upgraded or may be downgraded. If personnel feel unsafe with the prescribed level of protection, they may upgrade; however, they may not downgrade without prior approval of the SSO. The determination of the level of personnel protection to be worn will be made by the SSO with guidance from the regional safety coordinator. Some of the factors that will be taken into consideration are: weather, wind speed and direction, ambient air characterization, and type of work being performed.

Below is a list of monitoring instruments that will be used, as appropriate, to characterize chemical and physical hazards. All action levels will be provided in the SSSP. All air monitoring equipment will be calibrated daily or before and after each use, as required for each instrument. Field personnel will adhere to manufacturer procedures and calibration standards. Only trained and experienced members of the field team will maintain, operate, and interpret the field monitoring instruments.

- **HNu IS-101 and OVA 128-GC.** These direct-reading instruments will be used to measure the concentration of organic compound vapors in the ambient atmosphere in order to ensure adequate protection of field personnel and the NAS Pensacola community. These instruments measure the total concentration as related to an equivalent calibration standard, typically benzene or methane. These instruments are intrinsically safe and can be used in a potentially explosive environment. The appropriate usage of these instruments (e.g., using the OVA in place of or in addition to the HNu) and the selection of

calibration standards will be based on contaminants known or suspected to be present at a given site.

- HSA **260** ***Oxygen*** Meter/Explosimeter. This instrument measures the oxygen level and lower explosive limit of the ambient atmosphere as a percentage reading. The unit is intrinsically safe and will be used to monitor all drilling operations as well as work conducted around combustible materials.
- Hini-Ram Particulate Monitor. This instrument can be used to detect dust and aerosol levels in the ambient atmosphere, in order to determine the proper level of respiratory protection. Contaminants such as metals and PCBs are often bound to soil particles and may pose an inhalation hazard during drilling, excavating, and soil sampling.
- Rad-Hini Radiation Meter. This instrument is used on all E & E site investigations to survey €or elevated radiation levels. If a background level greater than 0.1 mR/hour or 100 counts/minute is detected, the field team will evacuate the site and consult with the corporate radiation group. Work will be resumed only after permission has been obtained from the Corporate Health and Safety Director.
- Bicron Radiation **Survey** Rate Heter. This instrument will be used to survey for radiation levels and to screen for soils which may be contaminated with radioactive materials at sites where radioactive materials are known to have been used and/or spilled (Sites 25 and 27).
- Draeger Chemical Detection Tubes. These tubes will be used for the detection of specific airborne chemicals, such as hydrogen sulfide, hydrogen cyanide, methylene chloride, and vinyl chloride, which do not induce a response in direct-reading instruments such as an HNu or OVA.
- Gillian **Pumps.** Air-sampling for metals and cyanide may be performed using Gillian pumps if elevated particulate levels are found using the Mini-Ram particulate monitor.
- HCN/H_2S Honitox. Sites where these highly toxic gases may be present will require use of these continuous direct-reading audible alarm units to warn field team members of concentration levels requiring

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site evacuation.

- Noise Dosimeter. Any areas having continuous noise levels in excess of 80 dBA will require the use of hearing protection. Noise surveys can be performed to determine the decibel level and calculate the length of exposure allowed.
- Magnetometer/EM-31. Prior to drilling, excavating, or hand-augering, these instruments may be utilized to locate buried drums, tanks, cylinders, pipelines, or other subsurface obstructions or hazards.

5.2 LEVELS OF PROTECTION AND PERSONNEL PROTECTIVE EQUIPMENT

The following levels of protection and personnel protective equipment will apply to all personnel performing site work or touring the site:

Level D - For organic vapor levels of 0 ppm to 1 ppm above background in the breathing zone and oxygen levels between 19.5 and **25.0** percent. Level D protective equipment and clothing consists of:

- Cotton underclothing;
- Tyvek or saran-coated Tyvek (Saranex);
- Chemically resistant (neoprene or similar material) safety toe and shank boots that meet or exceed ANSI **Z41.1-1967/75;**
- Latex (or similar material) boot covers;
- Surgical inner gloves;
- Neoprene or appropriate outer gloves;
- Air-purifying respirator (APR) with cartridges carried by personnel on-site in case air monitoring indicates a need to upgrade the level of protection;
- Hard hat; and
- TLD badge (whole-body radiation dosimeter).

Level C - For continuous organic vapor levels of 1 ppm to 5 ppm in the breathing zone and oxygen levels between 19.5 and 25.0 percent. Level C protective equipment and clothing consists of:

- o Full face APR with NIOSH/MSHA-approved cartridges (for organic vapors, acid gases, and pesticides) and HEPA filter; and
- o All other protective equipment and clothing the same as for Level D.

Level B - For continuous organic vapor levels of 5 ppm to 50 ppm in the breathing zone and oxygen levels less than 19.5 percent. Level B protective equipment and clothing consists of:

- o Full face respirator and self-contained breathing apparatus (SCBA) with 5-minute escape cylinder replacing APR; and
- o All other protective equipment and clothing the same as for Level D.

The work site area will initially be considered a Level C protection zone. If organic vapor levels exceed 5 ppm and are less than 50 ppm, or oxygen levels fall to less than 19.5%, personnel protection will be upgraded to Level B. If organic vapor levels remain at 0 ppm to 1 ppm above background (in the breathing zone) and oxygen levels are between 19.5 and 25.0 percent, the level of protection may be downgraded to Level D. No work will be conducted in areas where oxygen levels exceed 25.0 percent because of the increased potential for explosion.

Level D protection will be used only if the continuous air monitoring indicates that it is safe. If instrument readings indicate the need to upgrade, personnel will exit the site and re-enter in Level C. The option to downgrade to Level D will be at the discretion of the SSO.

Proper use of the personnel protective equipment should provide effective protection, but if a team member feels his health has been affected, the MED-TOX system will be implemented, and the team member will be medically examined to determine if he has been exposed (see Section E of SSSP). If personnel protective equipment becomes grossly contaminated, the affected team member will return to the contamination, reduction zone and undergo decontamination before redressing in clean

[Bold items enclosed in brackets denote changes from original text]

gear to return to the exclusion zone. Prior to entry into the contamination reduction and exclusion zones, all equipment should be checked by the individuals wearing it. Protective equipment may be removed only within the contamination reduction zone.

5.3 PERSONNEL **HONITORING**

High temperatures and extreme humidity are normal conditions during the summer months in the Gulf Coast of Florida. Weather conditions, in addition to the wearing of respirators and protective clothing, can predispose field team members to heat stress and heat stroke.

Shade will be provided in break areas for personnel during rest periods. Following a partial decon (removal of mask, boot covers, and gloves, and hand and face washing), drinking water will be provided. At this time, body temperature and pulse rate may be recorded. No food or tobacco will be allowed in the exclusion or contamination reduction zones. Only after washing and entering the support zone will personnel be allowed to eat, drink, or smoke.

The work day will be limited to daylight hours. Team members will be allowed rest periods during the work day and will be encouraged to drink water to replace fluids lost during field operations. Initially, workers will be encouraged to take frequent rest periods until they become acclimated to working conditions. As mentioned above, during these rest periods, heat stress monitoring, consisting of oral temperature and pulse rate measurement, may be performed. All heat stress monitoring will be recorded by the SSO on a heat stress monitoring sheet. These sheets will be maintained in a heat stress notebook. All other personnel and site monitoring information will be recorded in the site safety logbook.

6.0 GENERAL HAZARD EVALUATION

6.1 CONTAMINATION SUMMARY

The following operations at NAS Pensacola may have resulted in the generation of wastes containing hazardous substances:

- Fuel handling and management;
- Painting and paint stripping;
- Waste solvent disposal;
- Firefighting and crash training;
- Aircraft maintenance;
- Metal plating;
- Low-level radioactive materials handling; and
- Operation of general waste management facilities (e.g., landfills and industrial/domestic wastewater treatment plants).

Waste handling at NAS Pensacola has included burial, incineration, wastewater treatment, surface impoundment, and discharge to surface water bodies.

Due to the number of hazardous materials used and the possible extent of contaminant migration, it can never be assumed by the field team that work will be conducted in an area where all of the chemical hazards have been defined. A conservative approach to the level of contamination will be assumed in the selection of protective clothing and equipment until laboratory analyses have proven otherwise.

Some NAS Pensacola sites may contain hazards that have not been thoroughly documented, but are suspected due to the nature of contaminants previously found or the histories of these sites. For example, the landfills and rubble disposal areas may be suspected of having asbestos-containing building materials from renovation and

demolition of structures. Various electroplating, photochemical, and radioactive wastes, as well as buried drums, tanks, and gas cylinders, may be present at undocumented locations on NAS Pensacola. Appendix B contains listings of hazardous and/or potentially hazardous materials that have been handled, used, stored, or disposed of at or by the various NAS Pensacola facilities.

Table 6-1 lists the known NAS Pensacola sites and anticipated chemical hazards. For the purpose of writing investigative work plans, many of the sites have been grouped according to geographic location and/or similarity of potential contaminants. The suspected contaminants can be generally categorized into metals, organic compounds, petroleum hydrocarbons, PCBs, pesticides, radioactive materials, and asbestos. The work plan and SSSP for each site will incorporate a detailed site history and previous sampling results to determine the specific protective measures needed for each site. Appendix C contains a summary of exposure information for selected chemicals that may be encountered during field sampling activities.

6.2 SOLVENTS

Operations conducted at the Naval Aviation Depot (NADEP), formerly the Naval Air Rework Facility (NARF), extensively use and dispose of large quantities of organic solvents. Various organic compounds have been detected in groundwater samples at Sites 1, 3, 11, 19, 26, 27, and 31.

6.3 METALS

The presence of heavy metals has been detected in soil, sediment, and/or groundwater samples at Sites 1, 11, 15, 26, and 30, and in Pensacola Bay and Bayou Grande sediments. Specific metals found include aluminum, barium, cadmium, chromium, copper, iron, lead, magnesium, nickel, silicon, strontium, titanium, and zinc.

6.4 PETROLEUM HYDROCARBONS

Sites 19, 20, 21, 22, 23, and 37 are known or suspected to be contaminated as a result of fuel storage and handling. Groundwater contamination has been detected at or near some of these site areas as a

Table 6-1

DETECTED AND/OR POTENTIAL CONTAMINANTS AT NAS PENSACOLA SITES

Site Group	Site No.	Site Name	Metals	Organic Compounds: Volatile	Organic Compounds: Semi-Volatile	Petroleum Hydrocarbons	PCBs	Pesticides	Radioactive Materials	Asbestos
A	1	Sanitary Landfill	D	D	D	P	P	P	P	P
B	11	N. Chevalier Disposal	D	D	P	P	P	P	P	P
	12	Scrap Bins	P	P	P	P	P	P		
	26	Supply Dept. Out. Storage	D	D	P	P	P	P		
C	2	Waterfront Sediments	D		P	P				
	13	Magazine Pt. Rubble Disposal	P							P
	14	Dredge Spoil Fill	P		P	P				
D	15	Pesticide Rinsate Disposal	D					D		
	24	DDT Mixing Area	P		P	P		P		
E	30	Bldgs. 649 and 155	D	P	P	P	P	P		
F	9	Navy Yard Disposal	D	D	P	P	P	P	P	P
	10	Commodore's Pond								
	23	Chevalier Field Pipe Leak	D	D	P	P				
	29	Soils S. of Bldg. 3460	D	D	P	P			P	
	34	Solvent N. of Bldg. 3557	P	P	P	P				
G	25	Radium Spill Site	P	P	P	P			P	
	21	Radium Dial Shop Sewer	P	D	P	P			D	
H	8	Rifle Range Disposal	P							
	22	Refueler Repair Shop	P	P	P	P				

D - Detected Contaminants
P - Potential Contaminants

Table 6-1 (Continued)

site Group	Site No.	Site Name	Metals	Organic Compounds		Petroleum Hydrocarbons	PCBs	Pesticides	Radioactive Materials	Asbestos
				Volatile	Semi-Volatile					
I	17	Transformer Storage Yard				P	D			
	18	PCB Spill				P	D			
	28	Transformer Accident				P	P			
J	3	Crash Crew Training	P	D	P	P	P			
	19	Fuel Farm Pipeline Leak	P	D	P	P				
	37	Sherman Field Fuel Farm	P	P	P	P				
K	7	Firefighting School	P	P	P	P	P			
	20	Pier Pipe Leak	P	P	P	P				
	21	Sludge at Fuel Tanks	P	P	P	P				
L	4	Army Rubble Disposal	P							P
	5	Borrow Pit								
	6	Fort Redoubt Rubble Disposal	P							P
	16	Brush Disposal								
M	31	Soil N. of Bldg. 648	P	D	P	P			P	
N	36	IWTP Sewer	P	P	P	P	P	P	P	
O	32	IWTP Sludge Drying Beds	P		D	P	P	D	P	
	33	WWTP Ponds	P	P	D	P	P	D	P	
	35	Misc. IWTP SWMUs	P	P	D	P	P	D	P	

D - Detected Contaminants
P - Potential Contaninants

result of petroleum leaks. Sites 3 and 7 may be contaminated due to the use of petroleum-based fuels for firefighting and crash training. Site 21 probably contains sludge from aviation gasoline fuel tanks and may contain elevated concentrations of petroleum hydrocarbons, as well as tetraethyl lead.

6.5 PESTICIDES

Pesticide contamination has been found at Site 15, where pesticides were routinely stored, mixed, and disposed of. The following pesticides are known to have been used and stored at NAS Pensacola:

Insecticides	Herbicides		Hiscellaneous
Carbary1	CAMA	MSMA	Dexon
Diazinon	Copper	Simazine	Maneb
Dursban	Dalapon	2,4-D	Methyl Bromide
Trichlorfon	Glyphosate	Kerb	Nemacur
DDT			

6.6 POLYCHLORINATED BIPHENYLS (PCBs)

PCBs have been detected at Site 17, which is a transformer unit storage area. A transformer accident occurred at Site 18 and a spill of transformer oil has been documented at Site 28.

6.7 RADIOACTIVE MATERIALS

The former Radium Dial Shop (Building 709) is known to have handled radioactive solutions, and a spill occurred at Site 25. Radiation levels of 1.2 mR/hour have been measured in the sewer at Site 27. Building 709 was dismantled in 1976; however, no records are available regarding the disposal of the building materials. Radium and beryllium were previously stored in Building 183. The Naval Aerospace Regional Medical Laboratory used tritium, carbon-14, and iodine-125 isotopes, and stored these materials in an underground vault until they decayed to levels sufficiently low for disposal.

[Bold items enclosed in brackets denote changes from original text]

6.8 ORDNANCE

In general, the use of live ordnance at NAS Pensacola has been limited. The Rifle Range Disposal Area (Site 8) was used as a firing range for small arms and .50-caliber weapons. A firing range was also built near one of the runways at Forrest Sherman Field and was used for testing .30-caliber, .50-caliber, and 20-mm aircraft armament,

Ordnance items have been stored in 17 magazines on the grounds of NAS Pensacola (see Appendix B) to be used primarily for training or in cases of national emergency. The types of ordnance stored are: 1) bulk smokeless powder; 2) small arms ammunition; 3) pyrotechnic materials; 4) high explosives; 5) fuses and detonators; 6) cartridge-activated devices; 7) aircraft escape propulsion system kits; 8) black powder salute blanks; and 9) riot control devices.

Prior to drilling, boring, or augering in any areas where ordnance was known or suspected to have been utilized, or in areas potentially used for ordnance disposal (e.g., the landfill or other solid waste disposal areas), the boring locations will be surveyed using geophysical techniques to check for the presence of unexploded ordnance.

[Bold items enclosed in brackets denote changes from original text]

7.0 TASK-SPECIFIC HAZARDS

7.1 GENERAL PHYSICAL HAZARDS

All personnel will anticipate and take precautions to avoid or prevent the following general hazards:

- Heat stress;
- Trips and falls;
- Improper lifting of heavy objects;
- Poisonous spiders and snakes; and
- Vehicular accidents.

7.2 DRILLING OPERATIONS

Drilling operations will be performed at many sites in order to install monitoring wells and to obtain subsurface soil samples. Continuous monitoring for organic vapors and explosive atmospheres will be performed during drilling. Monitoring for hydrogen sulfide, hydrogen cyanide, radioactivity, and particulates will be performed if deemed necessary. The locations of all underground utilities will be determined prior to the commencement of drilling operations. See Appendix D for a summary of drilling safety protocol.

7.3 SOIL SAHPLING

During soil sampling, continuous monitoring will be performed for organic vapors, radioactivity, and particulates. A geophysical survey will be performed prior to hand-augering in areas potentially having underground utilities or other subsurface hazards, and in areas that may contain buried ordnance. Proper protective clothing will be worn as specified in Section *5.2* and in the SSSP.

[Bold items enclosed in brackets denote changes from original text]

7.4 SEDIMENT SAMPLING

Safety procedures for sediment sampling will consist of those for soil sampling. In addition, some sediment samples may be collected using boats. All personnel sampling from a boat will be capable swimmers and will abide by all NAS Pensacola and United States Coast Guard requirements for necessary equipment and boating safety. It may also be necessary to collect some sediment samples in deeper water using self-contained underwater breathing apparatus (SCUBA) diving techniques. Any personnel performing SCUBA diving will be fully trained and certified for the type of diving required.

7.5 GROUNDWATER SAMPLING

Continuous air monitoring will be conducted during monitoring well installation and development, aquifer testing, and groundwater sampling. A face shield will be worn for splash protection if conditions warrant. All existing monitoring wells will also be surveyed prior to sampling to determine the levels of organic vapors present.

7.6 SURFACE WATER SAMPLING

The safety precautions described for groundwater sampling will be observed, as appropriate, during surface water sampling. At the time of sample collection, precautions will also be taken to avoid slipping or falling into the water.

7.7 EQUIPMENT DECONTAMINATION

Air monitoring will be performed during steam cleaning and chemical rinsing of drilling and sampling equipment to determine the levels of organic vapors in the breathing zone and the required level of respiratory protection. All sampling equipment will be thoroughly decontaminated prior to transport or storage. Monitoring equipment will be covered or wrapped during use, if possible, to prevent contamination of the instruments.

[Bold items enclosed in brackets denote changes from original text]

8.0 REFERENCES

Naval Energy and Environmental Support Activity (NEESA), 1983, Initial Assessment Study of Naval Air Station, Pensacola, Pensacola, Florida, NEESA 13-015.

Geraghty & Miller, Inc., 1984, Verification Study, Assessment of Potential Ground-Water Pollution at Naval Air Station, Pensacola, Pensacola, Florida.

Geraghty & Miller, Inc., 1986, Characterization Study, Assessment of Potential Ground-Water Pollution at Naval Air Station, Pensacola, Pensacola, Florida.

National Institute for Occupational Safety and Health Association, 1985, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities.

U.S. Environmental Protection Agency, 1984, Standard Operating Safety Guidelines.

[Bold items enclosed in brackets denote changes from original text]

APPENDIX A

SITE-SPECIFIC SAFETY PLAN FORM

[Bold items enclosed in brackets denote changes from original text]

ecology and environment, inc.

SITS SAFETY PLAN

Version 988

A. GENERAL INFORMATION

Project Title: _____ Project No.: _____

TDD/Pan No.: _____

Project Manager: _____ Project Dir.: _____

Location(s): _____

Prepared by: _____ Date Prepared: _____

Approval by: _____ Date Approved: _____

Site Safety Officer Review: _____ Datb Reviewed: _____

Scope/Objective of Work: _____

Proposed Date of Field Activities: _____

Background Info: Complete: [ ] Preliminary (No analytical data available) [ ]

Documentation/Summary:

Overall Chemical Hazard:	Serious	[ ]	Moderato	[ ]
	LOW	[ ]	Unknown	[ ]
Overall Physical Hazard	Serious	[ ]	Moderate	[ ]
	LOw	[ ]	Unknown	[ ]

B. SITE/WASTE CHARACTERISTICS

Waste Type(s):

Liquid	[ ]	Solid	[ ]	Sludge	]	Gas/Vapor	[ ]

Characteristic(s):

Flammable/ Ignitable	[ ]	Volatile	[ ]	Corrosive	1	Acutely Toxic	[ ]
Explosive	[ ]	Reactive	[ ]	Carcinogen	[ ]	Radioactive'	[ ]

Other: _____

Physical Hazards:

Overhead	[ ]	Confined. Space	[ ]	Below Grade	[1	Trip/Fall	[ ]
Puncture	[ ]	Burn	[1	Cut	I 1	Splash	[ ]
Noise	I 1	Other:					

*Requires completion of additional form and special approval from the Corporate Health/Safety group. Contact RSC or HQ.

Site History/Description and Unusual Features (see Sampling Plan for detailed description): _____

_____

_____

Locations of Chemicals/Wastes: _____

_____

Estimated Volume of Chemicals/Wastes: _____

_____

_____

site currently in operation Yes: [ ] No: [ ]

C. WARD EVALUATION

List Hazards by Task (i.e., drum sampling, drilling, etc.) and number them. (Task numbers are cross-referenced in Section D)

Physical Hazard Evaluation: _____

_____

_____

_____

_____

_____

_____

_____

_____

Chemical Hazard Evaluation:

Compound	PEL/TWA	Route of Exposure	Acute Symptoms	Odor Threshold	Odor Description

Note: Complete and attach a Hazard Evaluation Sheet for major known contaminant.

D. SITE SAFETY WORK PLAN

Site Control: Attach map, use back of this page, or sketch of site showing hot tone, contamination reduction, zone, otc.

Perimeter identified? [ ] Site secured? [ ]

Work Areas Designated? [ ] Zone(s) of Contamination Identified? [ ]

Personnel Protection (TLD badges required for a11 field personnel):

Anticipated Level of Protoction (Cross-referonce task numbers to Section C):

	A	B	C	D
Task 1				
Task 2				
Task 3				
Task 4				

Action Levels for Evacuation of Work Zone Pending Reassessment of Conditions:

- Level D: O_2 <19.5% or >25%, explosive atmosphere >10% LEL, organic vapors above background levels, particulates >_____ mg/m^3, other _____
- Level C: O_2 (19.5% or >25%, explosive atmosphere >25% LEL_3(California-20%), unknown organic vapor (in breathing zone) >5 ppm, particulates >_____ mg/m^3, other _____
- Level B: O_2 <19.5% or >25%, explosive atmosphere >25% LEL (California-20%), unknown organic vapors (breathing zone) >500 ppm, particulates >——— mg/m^3, other _____
- Level A: O_2 <19.5% or >25%, explosive atmosphere >25% LEL (California-20%), unknown organic vapors >500 ppm, particulates >_____ mg/m^3, other _____

Air Monitoring (daily calibration unless otherwise noted):

contaminant of Interest	Type of Sample (area, personal)	Monitoring Equipment	Frequency of Sampling

Personnol Decon Protocol: _____

Decon Solution Monitoring Procedures, if Applicable: _____

Special Site Equipment, Facilities, or Procedures (Sanitary Facilities and Lighting Must Meet 29 CFR 1910.120):

Site Entry Procedures and Special Considerations: _____

Work Limitations (time of day, weather conditions, etc.), and Heat/Cold Stress Requirements: _____

General Spill Control, if Applicable: _____

Investigation-Derived Material Disposal (i.e., expendables, decon waste, cuttings): _____

Sample Handling Procedures Including Protective Wear: _____

Team Member*	Responsibility
	Team Leader
	Site Safety Officer

*All entries into exclusion zone require Buddy System use. All E & E field staff participate in medical monitoring program and have completed applicable training per 29 CFR 1910.120. Respiratory protection program meets requirements of 29 CFR 1910.134, and ANSI 288.2 (1980).

E. EMERGENCY INFORMATION

(Use supplemental shoots, if necessary)

LOCAL RESOURCES

(Obtain a local telephone book from your hotel, if possible)

Ambulance _____

Hospital Emergency Room _____

Poison Control Center _____

Polio (include local, county sheriff, state) _____

_____

Fire Departnwnt _____

Airport _____

Agency Contact (EPA, State, Local USCG, etc.) _____

Local Laboratory _____

UPS/Fed. Express _____

Client/EPA Contact _____

Site Contact _____

SITE RESOURCES

Site Emergency Evacuation Alarm Method _____

Water Supply Source _____

Telephone Location, Number _____

Cellular Phone, if available _____

Radio _____

Other _____

EMERGENCY CONTACTS

1. Dr. Raymond Harbison (Univ. of Arkansas) ..... (501) 661-5766 or 5767
   (501) 370-8263 (24 hours)

2. Ecology and Environment, Inc., Safety Director
   Paul Jonmaire ..... (716) 684-8060 office
   (716) 655-1260 home)

3. Rogional office Contact ..... _____ home)
   _____ office

4. FITOM, TATOM, or Office Manager ..... _____ home)

APPENDIX B

POTENTIALLY HAZARDOUS MATERIALS USED, STORED, OR DISPOSED OF AT **SELECTED** NAS PENSACOLA FACILITIES **(NEESA 1983)**

[Bold items enclosed in brackets denote changes from original text]

Summary of Ordnance Storage at NAS and NARF

BLDG. No.	YEAR BUILT	DESIGN TYPE	CAPACITY/LB.	STORAGE ASSIGNMENT 1969-1971	STORAGE ASSIGNMENT 1971-1980	STORAGE ASSIGNMENT 1980-Present
391	1940	Black Powder	9,000	Bulk Smokeless Powder	Black Powder	Black Powder
447	1941	Smokeless Powdrr & Projectile	Physical Capacity	Small Arms Ammunition	Small Arms Ammunition	Sinal I Arms Ammunition
478A	1942	Inert Storage	N/A	Inert	Inert	Inert
610	1937	Smokeless Powder & Projectile	5,000	Small Arms Ammunition	Smokeless Powder	AEPS Kits & Overage Ordnance
611	1937	Smokeless Powder & Projectile	5,000	Pyrorechnics	Pyrotechnics	Pyrotechnics
612	1937	High Explosive	15,000	High Explosives, 20mm	Smokeless Powder	Rocket Motors
673	1941	Smokeless Powder & Projectile	20,000	High Explosives, 20mm	Smokeless Powder	CADS Kits
703	1941	Small Arms	Physical Capacity	Small Arms Ammunition	Small Arms Ammunition	Small Arms & 50 Caliber
704	1543	Fuse & Detonator	5,000	Fuses & Detonators	Smokeless Powder	Fuses A Detonators
705	1943	Smokeless Powder & Projectile	5,000	Small Arms Ammunition	Pyrotechnics	CADS Kits
1909	1956	Smokeless Powder & Projectile	Physical Capacity	Small Arms Ammunition	Small Arms Ammunition	Small Arms Ammunition
1910	1956	Smokeless Powder & Projectile	Physical Capacity	Small Arms Ammunition	Small Arms Ammunition	Small Arms Ammunition
1912	1956	Smokeless Powder & Projectile	20,000	Small Arms Ammunition	Small Arms Ammunition	Small Arms Ammunition
1913	1956	Smokeless Powder & Projectile	20,000	Small Arms Ammunition	Pyrotechnics	Small Arms Ammunition
1914	1956	Smokeless Powder & Projectile	Physical Capacity	Small Arms Ammunition	Fuses & Detonators	Riot Control Ordnance
3300	1969	Smokeless Powder & Projectile	1,000	Small Arms Ammunition	Smokeless Powder	AEPS, CADS Kits

HAZARDOUS MATERIALS AT NAVAIREWORKFAC PENSACOLA IN 1981

Material	Specification	Description
Acetone	O–A–51	
Acetylene	BB–A–106	
Acid, acetic	O-A-76	
Acid, boric		
Acid, chromic	O-C-303	
Acid, Fluoboric		
Acid, hydrochloric	MIL-H-13528	
Acid, hydrofluoric	O-H-795	
Acid, nitric	O-N-350	
Acid, oxalic	O-O-690	
Acid, phosphoric		
Acid, sulfamic		
Acid, sulfuric	O-S-809B	
Alcohol, butyl	IT–8–806B	
Alcohol, ethyl	HIL–A–6091	
Alcohol, isopropyl	IT-1-735	
Alodine	MIL-C-81706	Chromic Acid, etc.
Ammonia	*O-A-045*	
Ammonium chloride	O-A-491	
Ammonium nitrate	MIL-A-47240	
Ammonium thiosulfate		
ARP-2		detergent solution
Barrier Coating Solurion	MIL–8–81744	
Beryllium copper (Be less than 2%)		
Black oxide solution	MIL-C-13924	
Butyl acetate	TT-8-840	
Cadmium metal		
Cadmium oxide	MIL–C–6151	
Carbon dioxide	88-C-101B	
Carbon removing compound	P–c–111	
	MIL-C-19853	
Chem mill Enchant 9H Alketch 1NH		modified solium hydroxide alkaline aluminum salts
Chlorine gas	BB–C–120	
Cleaning compound, aluminum surface	MIL-C-5410	
Cleaning compound, aircrafr surface	MIL-C-43516	
Cleaning compound	P-C-535	
Cleaning compound, solvent emulsion	P-C-444	
Cleaning compound, solvent oil cooler	MIL–C–6864	
Cleaning compound, paint brush	O-C-0042	
C1-2 Smoke abatement		Methyl cyclopentadienyl manganese tricarbonyl
Coating, polyurethane, rain erosion resistant	MIL-C-83231	

HAZARDOUS MATERIALS AT NAVAIREWORKFAC PENSACOLA IN 1981

Material	Specification	Description
Coacing, rain erosion resistanc	MIL-C-7439	
Coacing, epoxy	MIL-C-22750	
Coacing, polyurethane	MIL-C-81773	
Coacing, resin	MIL-R-3043	
Copper metal	QQ-C-521	
Copper sulface	O-C-828	
Cuprous cyanide	MIL-C-51264	
Damping fluid (dimechyl polysiloxane)	MIL-D-1078	
Desealanc	MIL-D-6093	Stripper, Mechylene Chloride
Dlchloromechane (mechylene chloride)	MIL-0-6998	
Diverstrip 0-95		Acidic organic painc stripper w/dicloromechane
Dope	MIL-D-5553	
Econochrome 40		Chromic acid salcs
Ethyl acetate	TT-E-751	
Ethylene glycol	MIL-E-52171	
Ethylene glycol monoethyl ocher acecate	MIL-E-7125	
Enamel	TT-E-489 TT-E-521	
Endox 114		Alkaline powder added to sodium cyanide for metal cleaning.
Enscrip S		Povdered additive used with Sodium Cyanide to strip nickel place.
Enthox 980		Chromic acid and ocher salts.
Grease	MIL-G-3545 MIL-G-4343 MIL-G-6032 MIL-G-21164 MIL-G-23827 MIL-G-25013	
MIL-G-25537		
	MIL-G-81827 MIL-G-81322 MIL-G-81937	
Helium	BB-H-1168 MIL-H-83147	
Hydrru1ic fluid	MIL-H-5606 HIL-H-6083 MIL-H-83286	
Hydrogen	BB-H-886B	
Hydrogen pcroxidr	MIL-H-22868	
Iridice 15	HILA-3171 Type VIII Chromic Acid, LCC.	
Lacquer, acrylic	MIL-L-81352	
Lacquer. cellulose nicrace	TT-L-20 TT-L-32	

HAZARDOUS MATERIALS AT NAVAIREWORKFAC PENSACOLA IN 1981

Material	Specification	Description
Lacquer	TT-L-54	
Lacquer	MIL-L-19537	
	MIL-L-19538	
Lead fluoborate		
Lubricant, dry film	MIL-L-8937	
	MIL-L-46147	
Mercury		
Methyl ethyl ketone	TT-M-261	
Methyl isobutyl ketone	TT-M-268	
Naphtha, aliphacic	TT-N-95	
Nickel acetate		
Nickel carbonate		
Nickel chloride	MIL-N-51301	
Oil, lubricating	VV-L-800	
	MIL-L-2104	
	MIL-L-2105	
	MIL-L-6081	
	MIL-L-6085	
	MIL-L-6086	
	MIL-L-7808	
	MIL-L-7870	
	MIL-L-21260	
	MIL-L-22851	
	MIL-L-23699	
	MIL-L-15016	
	MIL-L-81087	
	MIL-L-81846	
Oxygen, gaseous	MIL-O-27210	
Oxygen, liquid	MIL-O-27210	
Paint	TT-P-28	
Parco lubrite	MIL-P-50002	
Phosphate coating, Mn or Zn base (Parkerize)	MIL-P-16232	
Potassium carbonate		
Potassium cyanide		
Potassium hydroxide	O-P-566	
Potassium nitrate	MIL-P-15613	
Potassium sodium tartrate (Rochelle salt)	O-C-265	
Preservative	MIL-C-16173	
Primer, epoxy	MIL-P-23377	
Primer, zinc chromate	TT-P-1757	
Remover, paint, acid activated	MIL-R-81903	
Remover, paint, acrylic	TT-R-248	
Remover, paint, epoxy	MI1-r-81296	
Remover, (Organic coating, hoc tank type)	MIL-R-81835	
Remover, rust, hot alkaline	MIL-D-26549	

HAZARDOUS MATERIALS AT NAVAIREWORKFAC PENSACOLA IN 1981

Macerial	Specificacton	Description
Remover, resin, hoc alkaline (Clarkson NA 4)		
Sealanc	MIL-S-81733	
Sealanc, polyurethane	MIL-C-27725	
Scaling canpound, polysulfide	MIL-S-8802	
Silver nitrace		
Silver cyanide	0-N-335	
SN		Nickel sulfamace placing solucion
SNHA		Sulfamace nickel hardening ag____
SNR		Double strengch nickel sulfamace placing solucion
Smuc Co 2		Acidic macerial w/fluoride sa____
Sodium acecace		
Sodium bicarbonace	P-S-641	
Sodlum carbonace	O-S-571	
Sodlum cyanide		
Sodium dichromace	O-S-595	
Sodium hydroxide	O-S-598	
Sodium nicrace	MIL-S-322	
Sodium scannace		
Sodium chiocyanace		
Solvenc, dry cleaning (Scoddard)	P-D-680	
Scrip, resin B&B 27197 or Turco 3823		
Scrip, AL resin RPI 706		
Tecrachloroechylene	Q-T-2366	
Tecrapocassium pyrophosphacr (Unichome 80)		
Thread compound, anciseze	MIL-T-5544	
Thinner, polyurechane	MIL-T-81772	
Thinner, cellulose acecace bucyrace dope	MIL-T-6096	
Thinner, acrylic lacquer	MIL-T-19544	
Thinner	MIL-T-19588	
Thinner	TT-T-266	
Thinner	MIL-T-6097	
Tin fluoborace		
Toluene	TT-T-548	
Treacment, corrosion preventative, magnesium alloy	MIL-M-3171	
1,1,I, Trichloroechane	0-t-620 MIL-T-81533	
Trichloroechylene	0-T-634	
Trichlorocrifluoroechane	MIL-C-81302	
Tricresyl phosphace	TT-T-656	
Turcoform Al cleaner		Alkaline aluminum cleaner
Turcosprayzall		Alkaline cleaner
Walkway compound, nonslip	MIL-W-5044	
Xylene	TT-X-916	
ZE-3 emulsifier	MIL-I-25135	
ZL-22A penecrant	MIL-I-25135	
ZP-4 developing fluid	MIL-1-23135	
Zinc chloride		

SUMMARY OF PAINTING OPERATIONS AT NAS PENSACOLA

This cable describes disposal practiced prior to connection of all facilities co the Industrial Waste Treatment Plant, in 1973.

		Approximate Average Amount of Waste Per Year		
Bldg.	Approximate dates of operations	Paint Sludges	Paints and Thinners	Comments
104	1940 to 1976	100 gallons	260 gallons	Waste venc co bay
604	1937 to present	1600 gallons	2000 gallons	Waste went to wet dumpster and to sewer co hay.
606	1965 to Present	0 gallons*	2600 gallons	Waste went co bay.
627	1939 co present	1600 gallons	2600 gallons	Prior to 1952. no painc sludge was generated. Wastes venc to hay.
630	1968 co presenc	-	-	Helicopter blade paincing, waste quantity is insignificant.
631	1940 co presenc	-	-	Small componenc painting. waste quancicy is insignificanc.
632	1950 co 1974	-	-	Small parrs painting, waste quantity is insignificant.
648/649 75612691	191.9 to prescnc	360 gallons	600 gallons	Waste dumped adjacenc co building complex.
708	1941 co 1960	1600 gallons	5000 gallons	Waste paincs and thinners to bay. disposicion of painc sludges unknown.
709	1941 to 1973	-	-	Small operacion.
3260	1968 to presenc	-	-	Small parts painting, waste quantity is insignificanc.
3450	1973 to present	-	-	Quantity of waste generated is insignificant.
3460	1975 co presenc	-	-	Small parts painting, waste quanricy is insignificanr.
3588	1980 co presenc	-	-	Current opcracion, not covered in chis report.

total escimaced painc sludges generaced from 1939 co abouc 1973: 170,000 gallons

Total escimaced waste painr thinners and paints from 1937 to abouc 1973 dumped into Pensacola Bay: 340,000 gallons

Total estimated waste paint thinners and paincs from 1939 co abouc 1973 dumped adjacenc to Bldg. 648 complex: 20,000 gallons

* Dry air filter type painc booth, used filter pads uenc to landfill.

PARTIAL LIST OF **CHEMICALS USED** AT **BUILDING** 29/604A **IN** 1966

Sodium Cyanide
Hydrofluoric Acid
Resin Stripper (Phenol)
Alodine (Chromium)
Sodium Carbonate
Nitric Acid
Sodium Hydroxide
Ammonium Nitrate
Hydrochloric Acid
Sodium Dichromate (Chromium)
Chromium Trioxide (Chromium)
Sulfuric Acid

PARTIAL LIST **OF CHEMICALS** USED **IN MAGNESIUM** TREATMENT **LINE,**
BUILDING 649, AS OF **1966**

Kerosene
Inspection fluid
Detergent
Carbon Remover (Phenol)
Thinner-lacquer
Trichloroethylene
Perchlotoethylene
Steam cleaner
Potassium Permanganate **flow** outfall
Sodium Hydroxide
Paint remover
Dichlorome**chano**1
Nitric Acid
Phosphoric Acid
Chroma**c**e

PARTIAL LIST OF CHEMICALS USED IN BUILDING 649/755, PLATING SHOP IN 1966

Sodium Cyanide
Liquid Degreaser (oil)
Hydrofluoric Acid
Trichlorokane (oil)
Resin Stripper (Phenol)
Unichrome Strip Salts
Safety Solvent
Copper sulfate
Alodine (Chrome)
Boric Acid
Fluoboric Acid
Trichloroethylene
Steam Cleaner
Sodium Carbonate
Nitric Acid
Sodium Hydroxide
Ammonium Nitrate
Hydrochloric Acid
Ammonium Hydroxide
Sodium Dichromate
Chromium TDrioxide
Sulfuric Acid
Nickel: solutions
Silver solutions
Lead solutions
Tin solutions

PARTIAL LIST OF CHEMICALS USED AT BUILDING 709, AS OF 1966

Kerosene
Sodium Cyanide
Methyl Ethyl Ketone
Trichloroethane
Calibrating Fluid
Stoddard Solvent
Unichrome Strip Salts
Carbon Remover
Safety Solvent
Thinner-Lacquer
Alodine
Boric Acid
Trichloroethylene
Steam Cleaner
Sodium Carbonate
Nitric Acid
Sodium Hydroxide
Paint Remover
Ammonium Hydroxide
Sodium Dichromate
Potassium Cyanide
Oxalic Acid
Chromium Trioxide
Sulfuric Acid
Nickel Solutions
Silver Solutions
Tin Solutions

Pesticides Normally Scored in the Golf Course
Pesticide Shop Building 3586 (From 1979 Pest Management Plan)

1. Insecticides

Carbaryl, 80% WP	10 Lbs.
Diazinon, 47.5% EC	2 Gals.
Dursban, 41% EC	10 Gals.
Dursban, .5% Mole Cricket Bait	900 Lbs.
Trichorfon, 80% SP (Dylox)	2 Lbs.

2. Herbicides

CAMA, 10.32 EC (Calar)	3 Gals.
Copper, 7% SC	5 Gals.
Dalapon, 46.7% SP	100 Lbs.
Clyphosace, 41% EC	5 Gals.
Kerb, 50% WP	21 Lbs.
MSMA, 47.8% EC	16 Gals.
Simazine, 80% WP	20 Lbs.
2, 4-D, 49.8% Amine	4 Gals.

3. Miscellaneous

Dexon, 35% WP	57 Lbs.
Maneb, 80% WP	110 Lbs.
Mechyl bromide, 98% LFU	30 Lbs.
Nemacur, 15% Granules	275 Lbs.

CHEMICALS USED AT PHOTOGWHY SCHOOL

Chemicals	Quantity
B&W, DEV. D-76	10 GL
B&W, DEV. ETHOL, UFG	5 CL
B&W, DEVL. D-72	25 CL
B&W, DEV. KODALITH	2 GL
B&W, DEVL REP, VERSAFLO	15 GL
B&W, DEV. STARTER, VERSAFLO	1 QT
B&W FIX. STARFIX	20 GL
B&W, ROYALPRINT, ACTIV. & STOPBATN	
B&W, ROYALPRINT, FIX.	5 QT.
BCW, REV, MOPIC 1st DEV. STARTER	1 QT
B&W, REV. MOPIC 1st DEV. REP.	15 GL
B&W, REV. MOPIC BLEACH & REP.	15 GL
B&W, REV. CLEARING BATH 6 REP.	15 GL
B&W, REV. RE-DEV. 6 REP.	15 CL
ME4, PREHARDNER & REP.	50 LTR
ME4, NEUTRALIZER 6 REP.	100 LTR
ME4, 1sc DEV.	100 LTR
ME4, 1st DEV. REP.	50 LTR
ME4, STOPBATH & REP.	
ME4, COLOR DEV.	100 LTR
ME4, COLOR DEV. REP.	100 LTR
ME4, FIX. & REP.	100 LTR
ME4, STAB. & REP.	100 LTR
ME4, PERSULFATE BLEACH "A"	100 LTR
ME4, PERSULFATE BLEACH "B"	100 LTR
ME4, PERSULFATE ACCELERATOR	100 LTR
C41, FLEXICOLOR DEV. REP.	5 GL
C41, FLEXICOLOR DEV. STARTER	1 QT
C41, FLEXICOLOR FIX. 6 REP.	1 GL
C41, FLEXICOLOR BLEACH REP,	5 GL
C41, FLEXICOLOR BEACH STARTER	1 QT
C41, FLEXICOLOR STAB. & REP.	1 GL
C41, FLEXICOLOR STAB. 6 REP.	5 GL

(continued)

Chemicals (continued)	Quantity
E6, 1st DEV. REP.	5 GL
E6, 1st DEV. STARTER	1 PT
E6, REV. BATH & REP.	5 GL
E6, COLOR DEV. REP.	5 GL
E6, COLOR DEV. STARTER	1 PT
E6, COND. & REP.	5 GL
E6, BLEACH STARTER	25 GL
E6, FIX. 6 REP.	5 GL
E6, STAB. & REP.	5 GL
EKTAPRINT, DEV. REP	5 GL
EKTAPRINT, BLEACH-FIX & REP.	3.5 GL
EKTRAPRINT, DEV. STARTER	25 GL
GLACIAL ACETIC ACID	
KIT CHEMISTRY FOR VERSARAC WASHER	
WETTING AGENT, PHOTO FLO	
BORIC ACID CRYSTALS	
GLOSS SOLUTION, FLEXO GLOSS	
SODIUM SULFITE	
DEV. REP. AD500	
DEV. STARTER AS500	
SODIUM SULFATE BI	
OXALIC ACID	
EKTAMATIC S30 STABILIZER	
EXTAMATIC A10 ACTIVATOR	
KODAK DEVELOPER SYSTEM CLEANER	

Hazardous Material Storage at DPDO

MATERIAL	QUANTITY
Extinguisher, Fire	1
Duplixer	41
Battery, Storage	42
Alcohol, USP	3 drums
Fluorescent Penetra	1
Acetone, Technical	1 cn
Xylene, Technical	2 cn
Xylene, Technical	6 gallons
Potassium Permangan	770 lbs.
Sodium Nitrate, ACS	56 Bt
Tetrachloroethylene	2 drums
Acetone, ACS	11 Bc
Desiccant, Activated	1 drum
Carbon Removing Compound	2 drums
Inspection Penetran	10 kits
Corrosion Removing	2 drums
Lacquer	48 pints
Paint, Oil	2 gallons
Paint, Antifouling	13 cn
Enamel	63 gallons
Lacquer	84 gallons
Adhesive	32 quarts
Cylinder, Compressed	20
Plastic Molding Kit	12 kits

Hazardous Material Storage in Building 3561

Sodium Metaphosphate	1 Pallet
Clobber Sulfuric Acid Hydrochloric Acid	2 Pallets
Oil Chevor 32 & SAV 50	1 Pallet
Floor Covering Adhesive	1 Pallet
Scale Dissolver Hydrochloric Acid	1 Pallet
Calclean Contains Sodium Melastiticate	1 Pallet
Caustic Soda	2 Pallets
Sodium Fluoride	1 Pallet
Aluminum Sulfate	1 Pallet
Acetic Acid Glacial	1 Pallet
Acid Hydrofluoro Silici H/2 SF 6	1 Pallet
Seal Kote Combustible	1 Pallet
Floor Stripper Contains Methanol and Methylene Chloride	1 Pallet
Acid Hydrofluora Silicic H/2	10 Pallets

*Does not include paint storage.

Fuel/Oil Storage Tanks at NAS Pensacola

LOCATION	#	FUEL TYPE	STRUCTURE NOS.	MAP COORDINATES	YEARS IN USE	SIZE
Bldg. 670 Below Ground	2	Contaminated Fuel		K–21	1941–present	12,000 GAL/EA
Rec. Center Above Ground	2	JP–5	643 64C	K–20	1940–present	100,000 GAL/EA
Above Ground	2	AVGAS	356 357	K–21	1927–prcscnc	90,000 GAL/EA
Pier Above Ground	1	Navy Special Fuel Oil Distillate DFM JP–5	354	K–26	1926–1969 1969–1972 1972–1974 1974–present	1,300,000 GAL
Fuel Pam Below Ground	1	JP–4	1884 1885 1887 1888	0–5	1955–present	567,000 GAL/EA
Fuel Farm	1	Water Contaminated Fuel		0–5		
Below Ground	2	DFM	681 682	F–23	1943–present	
Behind PW Above Ground	1	Diesel Fuel		H–8	1930s–present	
Behind PW Below Ground	2	Gasoline		H–8		10,000 GAL/EA
Along N. Side of Redford Blvd.	5	AVGAS	640 641 642 638 402	J–20 1–21	1940–1960	90,000 GAL/EA
Above Ground	2	Fuel Oil	478 47C	J–25	1932–prrsenc	8,778 GAL/EA
		Lube Otl Storage Facilicy	259	1–25	1918–prerenc	
Under Ground	1	Ship Fuel Storage Tank	682	F–23	1943–present	27,000 EL
Above Ground	2	Oil Storage Tank	1782 1783	1–22	1953–present	24,000 GAL/EA
Above Ground	1	Fuel Oil Tank	1942	K–12	1954–present	81,396 CALIEA

Waste Oil Collection Tanks at NAS Pensacola

a. Naval Air Station, Pensacola

Location	Storage Container Capacity in Gallons	Number and Type Container
Bldg. 632(w)	500	1 each bowser (above ground)
Bldg. 1854	500	1 each bowser (above ground)
Bldg. 3260	500	1 each bowser (below ground)
Bldg. 1853(E)	500	1 each tank (below ground)
Bldg. 1853	165	3 each drums (above ground)
Bldg. 146	165	3 each drums (above ground)
Pier 302	N/A	Tugboat bilges and engine oil

b. Navy Public Works Center, Pensacola

Location	Storage Container Capacity in Gallons	Number and Tvoe Container
Bldg. 782	500	1 each tank (above ground)
Bldg. 1771	220	4 each drums (above ground)
Bldg. 3297	2500	1 each tank (below ground)

c. Naval Air Rework Facility, Pensacola

Locacion	Storage container Capacity in Gallons	Number and Type Container
Bldg. 225(NE)	220	4 each drums (above ground)
Bldg. 604(NE)	1500	1 each tank (below ground)
BLdg. 607(NE)	220	4 each drums (above ground)
BLdg. 631(W)	500	1 each tank (above ground)
BLdg. 631(N)	2000	1 each tank (below ground)
Bldg. 649(N)	500	1 each cank (below ground)
Bldg. 2691(E)	55	1 each drum (above ground)
Bldg. 3220(S)	500	1 each cank (below ground)
Bldg. 3221(E)	500	1 each tank (below ground)
Bldg. 3221(W)	500	1 each cank (below ground)
Bldg. 3460(E)	220	4 each drums (above ground)
BLdg. 3460(W)	220	4 each drums (above ground)
Bldg. 3460(NE)	220	4 each drums (above ground)
Bldg. 3556(E)	275	5 each drums (above ground)

Partial List of Items

Disposed of In Sanitary Landfill

Approximate Date	Item	Total Amount Disposed	Comments
1950s-1976	Ketone soaked rags		
1950s-1976	PCB and Transformer Oil Soaked Rags	6,500 ft^3	
1950s-1976	Paint Chips		Contaminated with paint strippers
1962-1976	Paint Sludge From Water Wall Paint Booth	170,000 lbs.	
1950s-1962	Paint Sludge	5,200 gals.	Burned at North end of site
1950s-1976	Dry Air Filter Pads from Paint Booths	11,963 ft^3	
1960-1964	Compressed Gas Cylinders	200.	
1973	Asbestos From Building Demolition		
1967	Wood Soaked With Plating Solutions	1,667 ft^3	Contaminated with Chrome, Nickel, Lead, Cadmium, Tin and Other Inorganic Chemicals
1970-1976	Pesticide Rinseate		
1950s-1976	Garbage	64,800 Tons	
1950s-1976	Wastes From OLFs Corry, Ellison, Saufley, Baron, and Whiting		
1950s-1976	Containers From Paints, Pesticides, Oils, Strippers, Plating Chemicals, Solvents, Thinners, etc.		
1950s-1976	Mercury		

Hazardous materials stored in Building *604*

AREA 1 CODE D CYANIDES

POTASSIUM CYANIDE
CUPROUS CYANIDE
SODIUM CYANIDE
ENDOX 214
BARIUM CYANIDE
ALUMON
SILVER CYANIDE

AREA 2 CODE C DRY STORAGE

POTASSIUM HYDROXIDE
TURCO ETCHANT TFE -98
SODIUM HYDROXIDE

AREA 3 CODE B GENERAL STORAGE (CAGE)

NIPLEX NICKEL STRIPPER
NICKEL SULFATE
ALCOR 571 SEALER
POTASSIUM SODIUM TARTRATE
(ROCHELLE SALTS)
SODIUM CARBONATE
SODIUM THIOCYANATE
POTASSIUM CHROMATE
POTASSIUM IODINE
POTASSIUM CARBONATE
AMMONIUM HYDROXIDE
SODIUM NITRATE
SODIUM CHLORIDE
AMMONIUM THIOSULFATE
RHOCO ZOXL CAD. ADD. PRENT
LIME
PARCO LUBRITE SOLUTION
PARKERIZE SOLUTION
UNICHROME *80* SALTS
SODLUM DICHROMATE
NICKEL CHLORIDE
COPPER SULFATE
SULFAMIC ACID
PLASTIC COATING COMPOUND (THERMOCOTE)
LEAD FLUOBORATE
TIN FLUOBRATE
CADIUM BRIGHTENER
CADMIUM OXIDE

AREA 4 CODE B GENERAL STORAGE (CAGE)

SODIUM THIOSULFATE
SODIUM STANNATE
IRON CHLORIDE (FERRIC) SOLUTION
MERCURY CHLORIDE
NICKEL CARBONATE
CUPRIC CARBONATE
CUPFUC SULFATE
AMMONIUM BIFLUORIDE
SULFAMIX WETTING AGENT
SULFONIC N-95
CALCIUM SULFATE
MAGNESIUM CARBONATE
SODIUM CHROMATE
SODIUM NITRITE
AMMONIUM THIOCYANATE
SULFAMIC ACID
SODIUM ACETATE
SODIUM DICHROMATE
ACETIC ACID
OXALIC ACID
AMMONIUM CHLORIDE
CALCIUM FLUORIDE
NICKEL CHLORIDE
BORIC ACID
SULFURIC INHIBITOR
HYDROCHLORIC INHIBITOR
AMMONIUM SULFIDE
FERROUS SULFATE
ZINC CHLORIDE
BARIUM CARBONATE
STANNOUS SULFATE
ANTIMONY OXIDE
UREA
AMMONIUM CITRATE
NICKEL ACETATE

(Centinued)

(CONTINUED)

AREA 10 CODE P SEPARATE STORAGE

SMUTGO #4
HYDROGEN PEROXIDE
ENDOX 114
ACTANE 821
ENSTRIP NP-1
ENSTRIP NP-2
SMUTGO -2
TURCO ALCLEAN
SODIUM STANNATE
ELECTROCLEANER

AREA 5 CODS A FLAMMABLES

HYDRAULIC FLUID, PRESERVATIVE
IRRIDITE -15

AREA 6 CODE M ACIDS

FLUOBORIC ACID
PHOSPHORIC ACID
HYDROFLUORIC ACID
HYDROCHLORIC ACID
NITRIC ACID
SULFURIC ACID
CORROSION REMOD COMP.

AREA 7 CODE N, U, V, W, COMPRESSED GAS

NITROGEN GAS, CYLINDERS

ARAEA 8 CODE G FLAMMABLES

TRICHLOROETHANE, DRUMS
LUBE OIL, VVL-800 GENERAL

AREA 9 CODE B GENERAL STORAGE

FUMETROL 101
ALODLNE 1200
AMMONIUM NITRATE
UNICHROME -65
EXTHOX -980
EBONOL -C
CHROMIC ACID
ECONO CHROME -40

AREA 12 CODE G FLAMMABLES

THICHLORETHANE-AERO
SPRAYLAT MASKANT
ORGANOCERAM MASKANT
SOLVENT, CLEANING COMPOUND
TRICHLOROETHANE, GAL. CANS
UNICHROME RACKCOAT
STOPOFF LACQUER
LACQUER REDUCER
ETHYL ALCOHOL

SELECTRON (

NICKEL NEUTRAL
LHE CADMIUM
NICKEL SPECIAL
ACTIVATOR #1
ACTIVATOR #2
ACTIVATOR #3

APPENDIX C

EXPOSURE INFORMATION SUMMARY

[Bold items enclosed in brackets denote changes from original text]

HAZARD SUMMARY

COMPOUND	TWA/PEL	ROUTE OF EXPOSURE	ACUTE SYMPTOMS	ODOR THRESHOLD
1,1,1 TCA	350 PPH 350 PPH C	Inhale, Ocular Skin	Cardiac Arrhythmia	20 PPM
TCE	25 PPM	Inhale, Oral Skin	Irritant to eyes, nose, nausea, headache, fatigue and vertigo - tremors	20 PPM
PCE	50 PPM	Inhale, Oral	Irritant to eyes nose & throat, nausea and dizziness	5 PPM
Toluene	100 PPM	Inhale, Skin	Xucous membrane irrit. fatigue, nausea, insomnia and dizziness	2-3 PPH
Chlorobenzene	75 PPM	Inhale, Skin	Irritant to eyes, skin and nose, drovsiness	0.2 PPM
Dichlorobenzene Liquid Solid	 50 PPM C 75 PPM	 Inhale, Oral Skin	 Irritant to nose & eyes, Skin blisters	
Lead a)	.05 mg/m3	Inhale, Oral	Lassitude, pallor, loss of appetite	
Zinc	10 mg/m3	Inhale, Oral	Irritant to nose, mouth, throat, nausea, vomiting and stomach pain	
Hexavalent Chromium* (Particulate}	0.1 mg/m3	Inhale, Skin Oral	Irritant to skin 6 respiratory tract, dizziness and vomiting	
Nickel*	1 mg/m3	Inhale, Oral Skin	Dermatitis, allergic Asthma	
Cadmium* (Particulate)	0.2 mg/m3	Inhale, Oral	Irritant to eyes, skin 6 mucous membrane, veakness, CNS Depression and respiratory distress	
Mercury (inorganic)	*0.05* mg/m3	Inhal, Skin	Cough, dysprea, tremors, headache, fatigue, eye and skin irritant	

COMPOUND	TWA/PEL	ROUTE OF EXPOSURE	ACUTE SYMPTOMS	ODOR THRESHOLD
PCB's				
42X Chlorine	1 mg/m3	Skin	Eye irritation & chloracne	> TLV
54% Chlorine	.5 mg/m3	Skin	Eye irritation & chloracne	> TLV
Copper Dust	1 mg/m3	Oral, Inhale	Irritant to resp. tract, nausea and metallic taste in mouth	
Ethylbenzene	100 PPH	Inhale, Oral	Beadache, dermatitis irritant to eyes and mucous membranes	2 PPM
Cyanide (Particulate)	5 mg/m3	Inhale, Oral	Asphyxia, headache, nausea, vomiting, irritant to eyes, skin and respiratory system	
Aydrogen Cyanide	10 PPH	Inhale, Oral Skin	" " " " "	.58 PPM
Arsenic a)	.01 mg/m3	Inhale, Oral Skin	Ulceration of nasal septum, dermatitis, Respiratory irritant, GI disturbances	
Xylene	100 PPH	Inhalation	Dizziness, excitement irritant to eyes and respiratory system	.5 PPM
1,2 Dichloroethene	200 PPH	Inhale, Ocular Oral, Skin	CNS Depression, nausea irritant to eyes and respiratory system	100 PPM
Hethylene Chloride*	100 PPM	Inhale, Oral Skin	Irritant to eyes, skin fatigue, vertigo, lightheadedness and sleepiness	10 PPM
Vinyl Chloride a)	1 PPH	Inhale, Oral	CNS Depression, nausea, auditory & visual dulling, skin irritant	3000 PPM

COMPOUND	TWA/PEL	ROUTE OF EXPOSURE	ACUTE SYMPTOMS	ODOR THRESHOLD
Chloroform*	10 PPH 50 PPM C	Inhale, Ocular Oral	Dizziness, mental dullness, nausea, headache, eye & skin irritant	100 PPM
Benzene	io PPM	Inhalation	Dizziness, excitement irritant to eyes, nose and throat, dermatitis	4-12 PPM
Tetraethyl Lead	0.075 mg/m^3	Inhale, oral	Hypotension, nausea, convulsions, coma, eye irritant	> TLV

* Listed as carcinogen by NIOSR

NIOSH recommended exposure limits are as follovs:

PCB:	1 mg/m3
Nickel:	15 mg/m3
Cadmium:	Reduce, to lovest possible levels
Chromium:	1 mg/m3
Arsenic:	2 mg/m3
Methylene Chloride:	Reduce to lovest possible levels
Vinyl Chloride:	Reduce to lovest possible levels
Benzene:	0.1 PPH

a) OSRA Standards in effect
C OSHA ceiling limit

APPENDIX D

DRILLING SAFETY PROTOCOL

[Bold items enclosed in brackets denote changes from original text]

DRILL RIG SAFETY

* Hard hats must be worn.
* All team members must be know the procedure to shut the rig off and the location of the "kill" switch.
* When moving a rig off the road, pay attention to obstacles in route of travel. Walk the intended route first.
* Have someone guide the rig driver when clearance is at a minimum or when hazards are in close proximity.
* Set rig brakes and block the wheels when rig is set up at the desired drilling location.
* The mast must be lowered when the rig is moved.
* Always consider overhead wires to be live, watch for sagging lines and do not operate rig within 15 feet of overhead lines.
* Make sure the site, platforms and walkways are free of obstructions.
* Make sure proper housekeeping is practiced around and on the rig at all times. Tools should be stored in a manner that permits convenient access and provides for adequate safety.
* Store gasoline in approved containers that have a spark arrestor and keep them clear of the drilling work area.
* Check rig equipment prior to starting work. Repair or replace faulty and worn items.
* Handle augers with care. Use proper lifting techniques when picking up samplers and augers. Use a tool hoist if possible and stay clear of rotating augers. Keep cables and ropes secured when not in use.
* Level and stabilize the drill rig prior to raising the mast.
* Watch for slippery ground when working in the area of the rig.
* All unattended boreholes must be properly covered.
* Do not drill during an electrical storm.
* Maintain a safe distance from the rig mechanisms during drive sampling and auger removal operations.