

**CONSTRUCTION WORK PLAN
CONTRACTOR QUALITY CONTROL PLAN
SAMPLING AND ANALYSIS PLAN
AND
SITE HEALTH AND SAFETY PLAN**

**TIME CRITICAL REMOVAL ACTION
SITE 18 - STORM DRAIN SYSTEM
NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA**

**CONTRACT NO. N62474-93-D-2151
Delivery Order No. 0041**

Submitted to:

**Department of the Navy
Engineering Field Activity, West
Naval Facilities Engineering Command
900 Commodore Drive, Building B-103
San Bruno, California 94066-2402**

Submitted by:

**IT Corporation
4585 Pacheco Boulevard
Martinez, California 94553**

Table of Contents

1.0 Work Plan

2.0 Contractor Quality Control Plan

3.0 Sampling and Analysis Plan

4.0 Health and Safety Plan

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Revision 0

July, 1996

Issued to: _____

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NAVAL AIR STATION
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Approved by: Thomas A Davis
Robert Swatek *for*
IT Contractor Quality Control
Program Manager

Date: 7/3/96

Approved by: Gary Elston
Gary Elston
IT Project Manager, DO No. 0041

Date: 7/3/96

Approved by: Valerie Crooks
Valerie Crooks
IT Program Manager

Date: 07/03/96

Table of Contents

1.0 Introduction	1
2.0 Project Plans and Permits	2
3.0 Meetings/Notification Prior to Mobilization	2
4.0 Underground Utility Location	2
5.0 Mobilization	3
6.0 Onsite Transport of Solids and Liquids	4
7.0 Phase Separation	4
8.0 Sand Filtration	5
9.0 Carbon Adsorption	6
10.0 Filtered Water Storage	6
11.0 Initial Video Logging of Storm Sewer Lines	7
12.0 Initial Cleaning of Storm Sewer Lines	8
13.0 Final Video Logging of the Storm Sewer Lines	10
14.0 Demobilization	10
15.0 Post Construction Documentation	10
16.0 Project Organization	11
17.0 Management Approach	11
18.0 Health and Safety	11
19.0 Quality Assurance	12
20.0 Project Administration	12

Table of Contents: Continued

21.0 Project Schedule 13

22.0 Site Background and Environmental Considerations 13

List of Figures

- Figure 1: Vicinity Map, Alameda NAS, Rev.B
- Figure 2: Site Plan, Temporary Storage and Treatment Area, Rev.B
- Figure 3: Equipment Layout, Water Filtration System, Rev.B
- Figure 4: Piping and Instrumentation Diagram, Water Filtration System, Rev.B
- Figure 5: "Storm Drain System - Site 18" Project Schedule

1.0 Introduction

This work plan has been prepared to conduct a time critical removal action of solids from Site 18, the station storm drains at the Naval Air Station, Alameda, California. This work plan is based on the report entitled "Time Critical Removal Action Scoping - Site 18, Storm Sewer System Solids and Debris Removal, Naval Air Station Alameda, Alameda, California," PRC Environmental Management, Inc., August 15, 1995.

Site 18 is NAS Alameda's storm sewer system. The system consists of 194,000 linear feet of sewer lines ranging in size from 4" to 42" in diameter. The system is comprised of 35 subsystems. The outfall from each subsystem discharges directly into either the Sea Plane Lagoon, Oakland Inner Harbor or the San Francisco Bay. Recent samples of the solids and debris in the storm sewer system indicate the presence of elevated concentrations of petroleum hydrocarbons, metals, and solvents.

This removal action will consist of removing solids and debris from approximately 150,000 linear feet of the system and from all manholes in the system except those within subsystems "F", "FF" and "R". Subsystems "F", "FF" and "R", all lines which were cleaned or replaced in 1991, and all catch basins are excluded from this scope of work.

Solids and debris will be removed from the sewer system by high pressure water jetting. The solids, debris and wastewater generated by the high pressure water jetting will be removed by the cleaning trucks from the nearest downstream manhole. The trucks will transport the waste material to a filtration system temporarily installed in a designated area within NAS Alameda. At the filtration area, solids and debris will be accumulated in screened roll-off bins and liquids will be stored in 21,000 gallon holding tanks. The solids in the roll-off bins will be analyzed to allow determination of the most appropriate method of offsite disposal. To the maximum extent possible, the wastewater will be recycled for use in the line cleaning operations. When water is no longer suitable for use in cleaning lines, spent wastewater will be treated at the Industrial Wastewater Treatment Plant (IWTP). All lines will be video taped before and after cleaning.

2.0 Project Plans and Permits

Before mobilization and field activities begin, this work plan, a site health and safety plan, a contractor's quality control plan and a sampling and analysis plan will be submitted for Navy comments, revised as necessary, and re-submitted to the Navy. Navy personnel will obtain concurrence on the plans from the appropriate regulatory agencies. It is expected that most of the wastewater generated will be suitable for treatment at the Industrial Waste Treatment Plant (IWTP) at NAS Alameda; however, prior to sending any wastewater to the IWTP, IT will obtain approval to do so from both IWTP operations and East Bay Municipal Utility District (East Bay MUD) personnel.

3.0 Meetings/Notification Prior to Mobilization

A coordination/mutual understanding meeting and a pre-construction meeting with the appropriate project participants will be held prior to mobilization to the field. Typical participants in this type of meeting are the project manager, site quality control manager, site superintendent and site supervisors for major subcontractors. Since some of the storm drains, manholes and lines run through residential areas on the base, IT will prepare a notice to inform base residents of the cleaning/maintenance activities being performed under this scope of work. After receipt of EFA West's approval, this notice will be distributed prior to commencing any field activities in the base residential areas.

4.0 Underground Utility Location

No excavation work is included within this scope of work; therefore, no efforts to locate underground utilities are included in this plan. In the unlikely event that a sewer line caves in when subjected to high pressure jetting, excavation will be required to repair the line. Standard protocol for obtaining utility clearances will be followed prior to beginning excavation to make any such line repairs.

5.0 Mobilization

The Navy presently operates and maintains a temporary storage and treatment area (TSTA) located on Perimeter Road, NAS Alameda. The location of the TSTA is shown on the NAS Alameda, Vicinity Map, Figure 1. Approximately 10,000 square feet of asphalted space adjacent to the TSTA area has been allotted to set up the filtration system, associated storage tanks and project support facilities as shown in Figure 2. This area has been chosen as it is centrally located, remote from most activity and provides relatively flat and open work space. The filtration system subcontractor will mobilize an office/break trailer to this location in addition to any storage facilities for small tools and equipment. All power, communication and sanitary services will be established. An existing chain link fence will limit access to this area. Additionally, an orange security fence surrounds the actual TSTA site.

IT's site personnel will have offices in Building 114, adjacent to Building 1, at NAS Alameda.

The phase separators, sand filters, carbon adsorber, water storage tanks and all ancillary equipment will be positioned within a secondary containment area as shown in Figure 3, "Equipment Layout." The secondary containment area will be constructed of seamless 30 mil, high density polyethylene (HDPE). The HDPE will extend over the top of surrounding straw bales and railroad ties, which will constitute the containment berm wall. The HDPE will be securely anchored with straw bales on the outside of the containment berm. Prior to laying down the HDPE, the entire area underneath will be swept clean, by hand or mechanical methods, to aid in preventing puncturing of the HDPE liner. Walkovers will be provided, on at least two sides, to insure crossing over this berm in a safe manner that will not harm the HDPE. Eye wash station(s), first aid kit(s) and fire extinguisher(s) will be provided at appropriate locations within the secondary containment area. An equipment decontamination zone, storage facilities for decontamination rinsate and temporary containers for used personal protective equipment will be in this area. In the event of rain or if other free liquids are present in the secondary containment area, the subcontractor will be responsible for supplying a small portable pump which will be used to transfer such liquids into one of the phase separators.

6.0 Onsite Transport of Solids and Liquids

The onsite transportation of waste material generated by the line cleaning operations will be performed by the same trucks which perform the cleaning. These trucks have two tanks on board: a 2,500 gallon for storing waste material and a 700 gallon tank for storing water to be used for cleaning. After the cleaning truck discharges 2,500 gallons of waste material into the phase separators at the filtration area, 700 gallons of cleaning water from the storage tanks will be loaded into the other tank on the truck. A 5,000 gallon water truck will shuttle back and forth between the filtration area and the locations where line cleaning is taking place to provide the additional water needed by the cleaning trucks. Operators of cleaning trucks and water trucks will be properly licensed to carry the respective loads. In advance of the trucks leaving a line cleaning location, an inspection will be performed of the vehicle to ensure all valves are closed, hoses properly stored and vacuum engines/pumps/generators are in the "Off" position. Defined traffic routes will be established on a daily or weekly basis, depending on the work locale. Traffic control personnel will be positioned around all vehicles engaged in a removal action in any areas that have the potential for foot or vehicular traffic.

7.0 Phase Separation

This is the first step in the filtration system. A "Piping and Instrument Diagram" for the entire filtration system is provided in Figure 4. It is expected the solids removed from the sewer lines will vary dramatically in density, size and shape; therefore, the objective of this step is to separate as much of the sediment and debris from the water with a minimum amount of materials handling.

While the cleaning truck is removing the waste material from the manholes, a coagulant will be mixed with the waste material to aid in the removal of a larger portion of the finer clay and silt fractions of the sediment.

The waste material will be transported to the filtration area by the cleaning trucks and gravity discharged directly into one of five phase separators which will be utilized for this project. A phase separator is essentially a thirty yard roll-off bin which has been equipped with an

internal screen. A 155 mesh disposable filter cloth will be installed in the phase separators to retain all sediment and debris which are greater than 100 micron (0.1 mm) in size. Vendor information on the phase separator is provided in the Appendix. Water containing particles smaller than 100 micron in size will be forwarded to the sand filters.

A movable ramp which is specifically designed to allow the cleaning trucks to dump into roll-off bins will be properly positioned next to one of the phase separators. The cleaning truck containing up to 2,500 gallons of waste material will back up onto the ramp, the end of the tank on the cleaning truck will be opened and the tank will be hydraulically raised to a near vertical position; thus, allowing direct discharge of the waste material into the phase separator.

Multiple loads of waste material will be discharged into a given phase separator until the unit approaches highway weight limits. When this occurs, the ramp will be repositioned to allow dumping into a different phase separator. The loaded phase separator will be sampled and analyzed in accordance with the Sampling and Analysis Plan. Liquids will continue to drain for two days until analytical results are received. It is expected the solids in the phase separator will pass the paint filter test within 24 to 48 hours after receipt of the last load of cleaning material. Based on the analytical results, the phase separator will be transported to an appropriate offsite landfill where the solids and the disposable filter cloth will be discharged.

8.0 Sand Filtration

Liquid wastes from the phase separators will be fed into the sand filters. The primary objective of this process step is to remove particles greater than 10 micron (0.01 mm) in size. Water containing particles larger than 10 micron cannot be recycled to the line cleaning operations since it may damage the high pressure jet nozzles.

Three identical two-foot diameter sand filters will operate in parallel. Each filter will contain four cubic feet of #20 sand and have a maximum operating flow rate of 30 gpm. The need to backwash the filters is indicated by monitoring the differential pressure across the inlet and outlet headers of the filters. Although the set point is adjustable, typically backwash will be automatically initiated when the differential pressure exceeds seven (7) psi. Backwashing is accomplished by routing the effluent from two of the tanks into the bottom of the third tank.

The backwash water is sent back to the phase separator. To help ensure a proper backwash is performed, the instantaneous and total flow of backwash water are monitored.

Since the flow of waste material into the phase separators will be intermittent and the sand filters operate most effectively at a steady flow, a 21,000 gallon surge tank (HT-1) is provided.

At the conclusion of the project, the used sand will be removed from the filters and mixed with solids in the phase separators for disposal at an offsite landfill.

9.0 Carbon Adsorption

After particulate removal by the sand filters, the water is passed through a carbon adsorber to remove trace amounts of organics which may be present in the water. The objective of the carbon adsorber is to ensure the concentration of organics does not build up to the point where the water is unacceptable for treatment at the IWTP. Although the Part B permit for the IWTP indicates wastewaters with high organic contents are acceptable, operation of that portion of the IWTP which removes organics is no longer in service. According to IWTP operating personnel, only wastewaters with metals contamination are acceptable for treatment at the IWTP.

A single four-foot diameter carbon adsorber will be used. The tank contains 2,040 pounds of granulated activated carbon and has a maximum operating flow rate of 75 gpm. When the carbon becomes exhausted as indicated by a sudden rise in the organic content of the water going into the storage tanks, the unit will be bypassed while fresh carbon is installed. The spent carbon will be mixed with the solids in the phase separator and sent to an offsite landfill.

10.0 Filtered Water Storage

During this project, approximately 1,000,000 gallons of wastewater will be treated through the filtration system. Most of this water will be recycled for use in the line cleaning operations. Five (5) 21,000 gallon Baker-type tanks are included in the system to store water prior to

recycling and to provide retention capacity in the system as necessary to accommodate a two-day turnaround time on water samples sent to an offsite lab. Because the recycled water must be nearly particulate-free, tanks with an internal epoxy coating will be used.

Treated water going into the storage tanks will be sampled in accordance with the Sampling and Analysis Plan. While it is expected that most of the contaminants will remain with the sediment in the phase separators, there may be a gradual accumulation of contaminants in the water, particularly after it has been recycled several times. When analyses indicate the concentration of any contaminant in the treated water is greater than 50% of the concentration acceptable for treatment at the IWTP, water currently in the storage tanks will be isolated. Fresh water will be used for the line cleaning operations. The water in the isolated tanks will be sent to the IWTP at the maximum rate possible, which is typically 15,000 gallons per week according to IWTP operating personnel. Monitoring the treated water quality in this manner will minimize the amount of water which must be managed offsite.

Prior to sending any wastewater to the IWTP, IT will obtain approval to do so from both IWTP operations and East Bay Municipal Utility District (EBMUD) personnel.

11.0 Initial Video Logging of Storm Sewer Lines _____

Each storm sewer line will be video logged prior to commencing any cleaning activities on that specific line. Additionally, the initial logging will confirm the exact location of each outfall shown on the system map and identify connecting lines which may not be shown on the current maps. This will provide information on the current physical condition of the line and a record of the amount of solids accumulated in the line prior to cleaning. All video logging will be recorded on VHS type cassettes and turned in daily to IT's site superintendent. Additionally, each tape will be reviewed while it is being taped. Each cassette will be clearly and legibly marked to indicate the exact locations of the lines presented on the cassette. The date and time will be continuously indicated on the video tape. The distance from the point where the filming is initiated will also be continuously indicated on the video tape so that the locations of problem areas in the line can be readily determined. The tape (s) will be reviewed by IT, IT's cleaning and video subcontractors, PRC when available and EFA West when available. Regulatory agencies may review the tapes at their discretion. All tapes will be reviewed by the

review team within 48 hours of its taping. Cleaning of the taped line will follow in an expeditious manner. The objectives of this review will be to identify any sections of the line in need of repair or considered unsuitable for high pressure water jetting and to define the actions to be taken on any such sections of the line. Criteria for evaluating the integrity of the line will include organic root intrusion, joint separation and/or failure, and obvious holes in the line. If a decision regarding the integrity of the line cannot be reached between IT, PRC and EFA West, the final decision will be made by the Base Closure Team. The Facilities Management Office (FMO) at NAS Alameda will be notified periodically of all lines discovered by IT that are in need of repair.

12.0 Initial Cleaning of Storm Sewer Lines _____

The solids and debris accumulated in the lines will be removed by high pressure water jetting. The pressure of the jet will not exceed 2,000 pounds per square inch (PSI) for lines in good condition or 1000 PSI for lines that are in less than good condition. Lines identified during the review of the initial video tape as being in need of repair or unsuitable for high pressure jetting will be managed as directed by the review personnel. Reduced jetting pressure or inflatable plugs will be used as necessary to allow cleaning of as much of the line as is practicable.

Inflatable plugs are constructed of thick flexible rubber and are designed to be placed by hand approximately two feet into a line and inflated. It is important that the plug is placed far enough down the line so that when it is inflated it will not crack the line into which it was placed. Inflation from surface grade is possible as an extended inflation line and valve is attached to the plug along with a length of suitable line to be able to pull and remove the plug from surface grade. Inflatable plugs installed at the upstream catch basin or manhole will be used to isolate any lines which have an invert elevation below the high tide level of San Francisco Bay. This will minimize the amount of seawater which becomes mixed with the water used by the cleaning process; thus, minimizing the volume of wastewater to be treated by the filtration system.

The waste material removed from any given line will flow to the nearest downstream manhole where the material will be withdrawn by vacuum into the cleaning truck. For each subsystem,

work will commence at the farthest most extremities of the subsystem and proceed towards the outfall. High pressure jetting of any given line will continue until it becomes visually obvious from the turbidity level of the water that a minimal amount of solids are being removed. Oversize debris which will not fit through the six-inch (6") diameter suction line on the cleaning truck will be removed from the manhole by personnel working from surface grade and placed in a lined 55 gallon drum. Should the oversize material be too large to safely retrieve from the surface, confined space entry equipment will be available at the site to allow removal of the material by hand. Oversize debris will be dumped into the phase separators for ultimate disposal at an offsite landfill.

Thirty-two subsystems are included in the approximately 150,000 linear feet of storm sewer lines to be addressed in this scope of work. The sequence in which the subsystems will be cleaned is as follows:

1. Subsystems that service Buildings 5, 114 and 360. These are subsystems A,B,D, JJ and J.
2. Subsystems whose outfalls go into the Sea Plane Lagoon. These are subsystems G,H,I,K and L.
3. The subsystem which services the residential area of the base. This is subsystem E.
4. The remainder of the subsystems throughout the base, starting in the southeastern corner of the base and proceeding in a clockwise manner around the perimeter of the base. These subsystems are Q, ZZ, P, O, N, M, S, T, U, HH, GG, EE, DD, V, CC, W, BB, AA, Y, Z and KK.

All catch basins in the system were recently cleaned by PWC; therefore, no catch basins will be cleaned during this project.

Under this scope of work, no activities will be performed on the lines, catch basins or manholes within Subsystems "F", "R" and "FF".

Sewer lines which were cleaned or replaced in 1991 will not be cleaned during this project; however, the manholes associated with these lines will be cleaned as part of this project.

In the event of a line collapsing during the cleaning procedures, IT's site superintendent will be responsible for notifying PWC of the problem. Following that notification, the superintendent will then notify the ROICC Office and EFA-West.

A map which shows the location, line sizes and materials of construction for the entire storm sewer system is included in the Appendix. To monitor the current status of each line section to be cleaned, a separate drawing has been generated for each subsystem. Although full size drawings will be used by field supervisory personnel, an 11" by 17" example of one of these subsystem drawings is also provided in the Appendix.

13.0 Final Video Logging of the Storm Sewer Lines _____

After cleaning, the lines will be video logged to provide a record of the extent to which solids were removed from the line and a record of the current condition of the line. A compilation of line sections which need repair and/or were not cleaned because of their low elevation will be kept and tracked during the project, and detailed in a post construction document.

14.0 Demobilization _____

Demobilization will consist of the disposition of government owned property, removal of all equipment from the filtration area, removal and proper disposal of the materials used to construct the secondary containment areas, return of rental equipment and the cleanup and removal of any debris or materials utilized by IT or IT's subcontractors during the project.

15.0 Post Construction Documentation _____

At the conclusion of the project, a comprehensive drawing of the entire storm sewer system and a drawing of each subsystem addressed by this scope of work will be provided to the Navy. These drawings will clearly identify all sections that need to be repaired and/or were not cleaned during this project. The drawings will also indicate any manholes, catch basins or lines which were identified during the project which were not shown on previous drawings. Shipment records and the associated analytical results will be provided for all wastewater sent

to the IWTP. Analytical data and manifest documents will be provided for all wastewater and solids managed at offsite facilities. All video tapes will be provided to EFA West. For any lines deemed unsuitable for cleaning, a written explanation of the reason for not cleaning the line will be provided along with the associated video tape.

16.0 Project Organization _____

A Project Manager will be the point of contact for the Navy and will be responsible for the project execution, continuity, and reporting. The Site Management Team will consist of a Project Administrator, Quality Control Manager, Health and Safety Officer and Superintendent. Support for the project will be provided by the Program Management Office (PMO) staff in Martinez.

17.0 Management Approach _____

The project will be implemented using management personnel located in the Martinez office of IT. The Site Superintendent will manage and coordinate the daily activities of all IT personnel and IT's subcontractors. Cleaning and video taping of the sewer lines and operation of the filtration system will be subcontracted to small businesses. All craft labor will be provided by these subcontractors. IT will not provide any craft labor on this project.

Project costs will be accrued on a weekly basis and provided for the review of the Project Manager. Using this data, the Project Manager will evaluate the progress of the project and maintain continual updates of the project schedule. In accordance with the contract, IT will provide this data to the Navy via monthly status reports.

18.0 Health and Safety _____

A Site Health and Safety Officer will be present at the site during all field activities to ensure implementation of the requirements of the Health and Safety Plan. Air monitoring will be performed during all intrusive construction activities to monitor breathing zones. It is expected that a majority of the work at the site can be performed in Level D (modified)

personal protective equipment; however, the use of Level C personal protective equipment may be required during the initial cleaning of some subsystems, operation of the filtration system and removal of oversize debris from the manholes.

For more specific guidance, refer to the Site Health and Safety Plan.

19.0 Quality Assurance

The Site CQC Manager will be present at the site during all field activities to oversee sampling, testing, and inspections and to maintain the level of quality control -required under the terms of the contract. The CQC representative will prepare Daily Quality Control Reports for submittal to the ROICC office and a weekly report which will summarize the previous week's quality control and production activities for submittal to the Navy's Remedial Project Manager. All submittals during the project will be reviewed by the Site CQC Manager prior to transmittal to the Navy. All CQC activities will be performed in accordance with the requirements defined the site specific CQC Plan.

20.0 Project Administration

A Project Administrator will be assigned to provide administrative support to the Site Superintendent and Project Manager. The Project Administrator and associated PMO personnel perform the activities necessary for the implementation and performance of the project within applicable contractual and regulatory requirements. These functions include: acquisition and coordination of receipt of all materials, supplies, and equipment less than \$25,000, assisting in the mobilization and setup of site construction facilities, establishing and maintaining project record files, oversight of hourly time sheet preparation, verification of compliance with the Davis-Bacon Act, control and tracking of government property, and assisting in the preparation of vouchers and project closeout documentation.

21.0 Project Schedule

Pre-construction activities will be performed during January through May, 1996. These activities include preparation and submittal of all project plans by IT. Concurrently with activities pertaining to project plans, IT will prepare inquiries, obtain bids and award subcontracts for performance of the field activities.

Field activities will commence in early July and be completed by late November, 1996. The duration of field activities is based on working five (5) days per week, eight (8) hours per day. Multiple video and cleaning crews will be utilized as necessary to maintain this schedule.

Post construction documentation will be provided within fifteen (15) days after completion of field activities. A detailed schedule is as shown in Figure 5.

22.0 Site Background and Environmental Considerations

The temporary storage and treatment area (TSTA) and the adjoining area where the filtration system will be installed are located within the Naval Aviation Depot Farm Area (NADEP) at Naval Air Station Alameda, Alameda, CA. The NADEP lies between the northern most runway and the Oakland Estuary along Perimeter Road in the north west section of the base. This area formerly housed the offices and infrastructure to support the Naval Construction Battalion stationed at NAS Alameda.

Soil in the area is heterogeneous, but consist primarily of sands and sandy silt. Most of this area is comprised of fill material. Topographically, the area is flat with no major changes in grade. A rock levy on the estuary prevents erosion of soils on or near the site, although migration of soils is possible due to the frequency of high winds coming off San Francisco Bay. Additionally, the entire site is overlaid with varying thicknesses of asphalt.

The animal life at the project site is minimal and is generally made up of seabirds, rodents and hares. Activities at the site will not significantly impact animal life. No rare species of animal life are found at the NADEP Farm Area.

The filtration system is being constructed on land previously used for light industrial purposes. Within the past year, nearly all of the structures in this area have been removed. The project will not have any significant impact on the land. Additionally, the natural resources of the site will not be used in any way during the project; therefore, there will be no impact to natural resources.

Air emissions from the treatment area will be monitored on a daily basis by qualified personnel. It is not anticipated that harmful or objectionable fugitive emissions will be generated from the treatment process since the water to solid ratio will be approximately 10:1. No heavy earth moving equipment will be required on the site, other than the cleaning trucks, and trucks used to transport the phase separators; therefore, dust generated by project activities will be minimal. If for any reason dust becomes a problem, the Site Superintendent will require that water be sprayed over the site to relieve the situation.

The entire treatment process area will be confined within secondary containment. Thirty (30) mil high density polyethylene plastic will cover the bottom of this containment as one piece. Berms will be constructed of sufficient height so as not to allow liquids to migrate outside of the containment. All potentially hazardous waste solids will be contained in liquid-tight phase separators.

Water used for the initial start up of the project will be obtained from the fire hydrant system located throughout the base. Due to the high volume of water necessary to complete the project, every effort will be made to recycle the water for cleaning the lines; thereby, minimizing the impact on public water supplies. In the event of rain, pumps will be available to the site to remove the rain water from the containment area and pump this water into the phase separators.

Although not substantial, there will be an increase in traffic throughout the base during line cleaning operations. The public transit system or parking will not be impacted. Due to the possible alterations to present traffic patterns, traffic control personnel will be utilized at each line cleaning location that could hinder traffic flow. In those areas that are not considered heavy traffic use, barricades and/or cones will be placed so as to significantly increase the visibility of the cleaning operations to vehicular and foot traffic.

Public services such as base security and base fire protection will be notified that the project is occurring. However, it is not anticipated that these agencies or any other government agencies will be required to perform any services for the express purpose of this project.

The proposed project will not be fuel and/or energy intensive. Fuels will be used by the various trucks necessary for the transport and cleaning services. The filtration process is not expected to consume any energy other than that necessary to run pumps. A moderate amount of electrical energy will be consumed by office trailer and equipment. Electrical energy will be supplied by a transformer located in the process area and phone lines are available. No new utilities will need to be brought to the site.

Anticipated noise levels generated at the site will be within standards as set forth for industrial use. Personnel at the filtration area may experience elevated noise levels, however, engineering controls will be implemented to ensure that noise levels remain under CAL-OSHA guidelines. It is not anticipated that indigenous personnel will be exposed to excessive noise levels.

A site specific health and safety plan will be prepared to address worker safety. Parameters to protect worker safety identified in the health and safety plan include:

- 1) delineated exclusion zones with restricted entry into the exclusion zone.
- 2) all personnel within the exclusion zone will be required to wear personal protective equipment
- 3) admittance into the exclusion zone will require proof of 40 hour OSHA training, proof of an 8-hour refresher course and a current medical clearance to perform work in an exclusion zone
- 4) Personnel decontamination zones will be implemented to ensure that contaminated material is left within the confines of the exclusion zones.

The filtration system is located in an isolated area of NAS Alameda. It is anticipated there will be no health hazard to the community. Additionally, since the filtration area is located in an isolated area of the base, the equipment will not obstruct views open to the public. The NADEP area will be returned to its former condition upon the completion of the project.

No excavating activities are included in the scope of this project; therefore, it is not anticipated that any paleontological and/or archeological finds will be encountered. All buildings previously razed at the site were not considered of historic significance.

The proposed project is to remove contaminants from the base storm sewer system. These contaminants will be transported to the filtration area where solids will be removed from liquids and both will be securely stored. It is not anticipated that this removal action will cause any additional contamination to any areas of the base or surrounding areas.

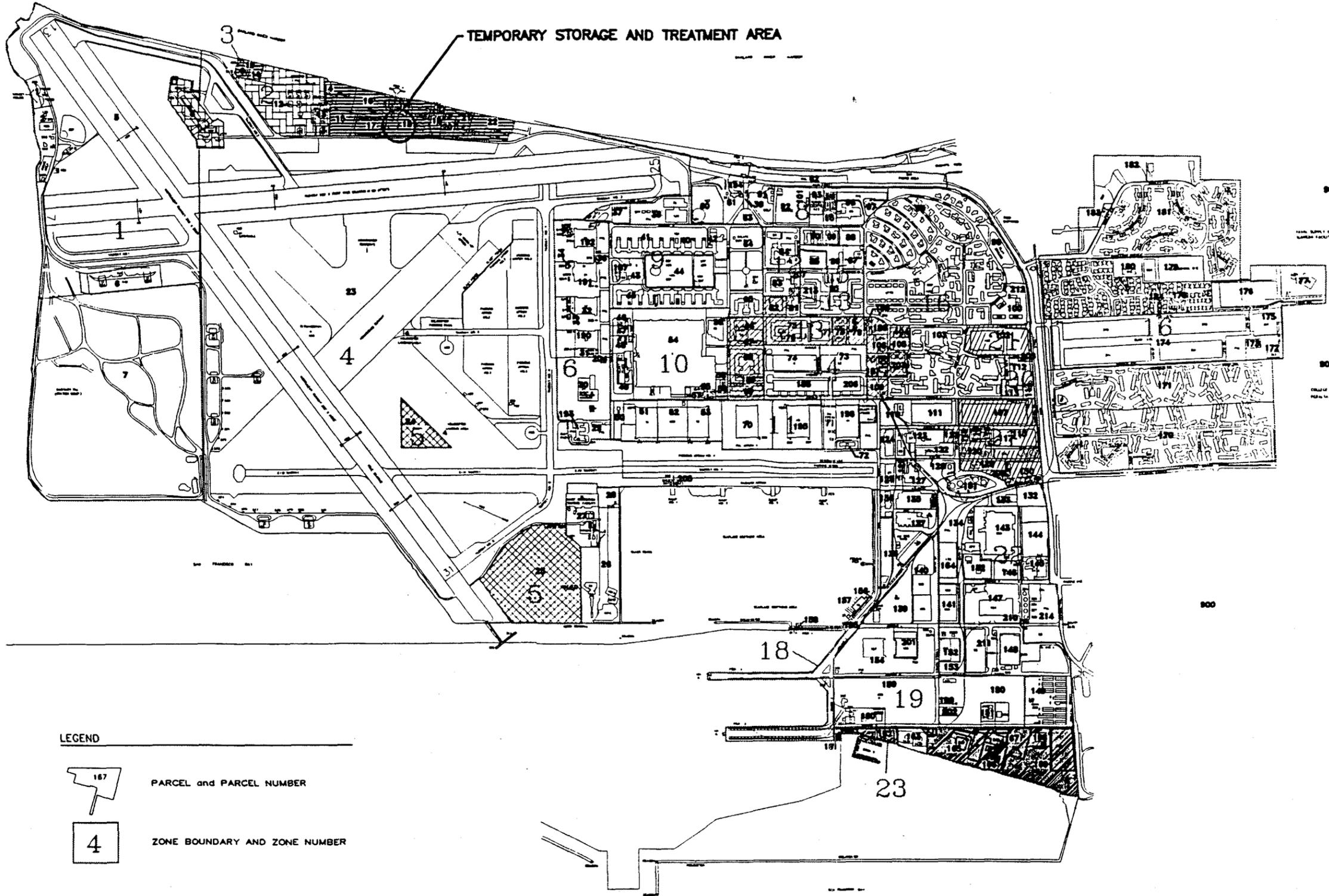
In summation, the project will not degrade the environment, reduce habitats for fish or game or otherwise cause a human health threat to the base and its surrounding communities. It is anticipated the long term effects of the project will aid in increasing the speed with which the base will be able to be turned over to the community for public use.

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TEMPORARY STORAGE AND TREATMENT AREA



LEGEND

- PARCEL and PARCEL NUMBER
- ZONE BOUNDARY AND ZONE NUMBER

NOTE: FACILITIES AND/OR STRUCTURES SHOWN REFLECT THOSE ORIGINALLY PROVIDED TO ERM-WEST IN COMPUTER AIDED DESIGN (CAD) FORMAT AND MAY NOT BE CURRENT.

FIGURE 1 VICINITY MAP			
STORM DRAIN SYSTEM - DELIVERY ORDER 0041 ALAMEDA NAVAL AIR STATION ALAMEDA, CALIFORNIA			
		INTERNATIONAL TECHNOLOGY CORPORATION	
DESIGNED BY	CHECKED BY	SAM 5/17	SHEET
DRAWN BY	MAP	APPROVED BY	1
DATE		7-83	

ISSUED FOR COMMENT

OAKLAND INNER HARBOR

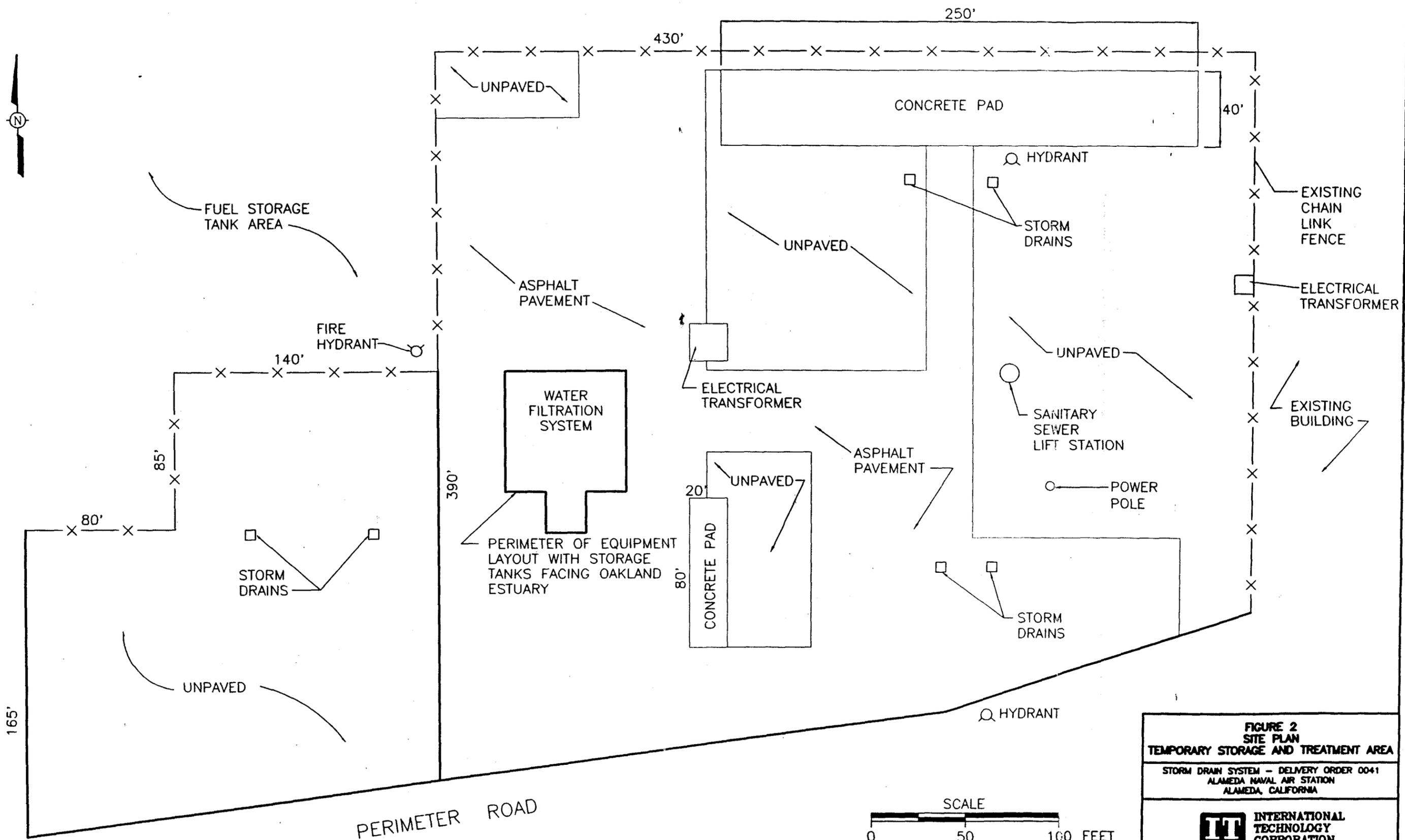
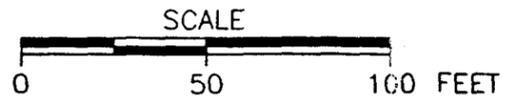
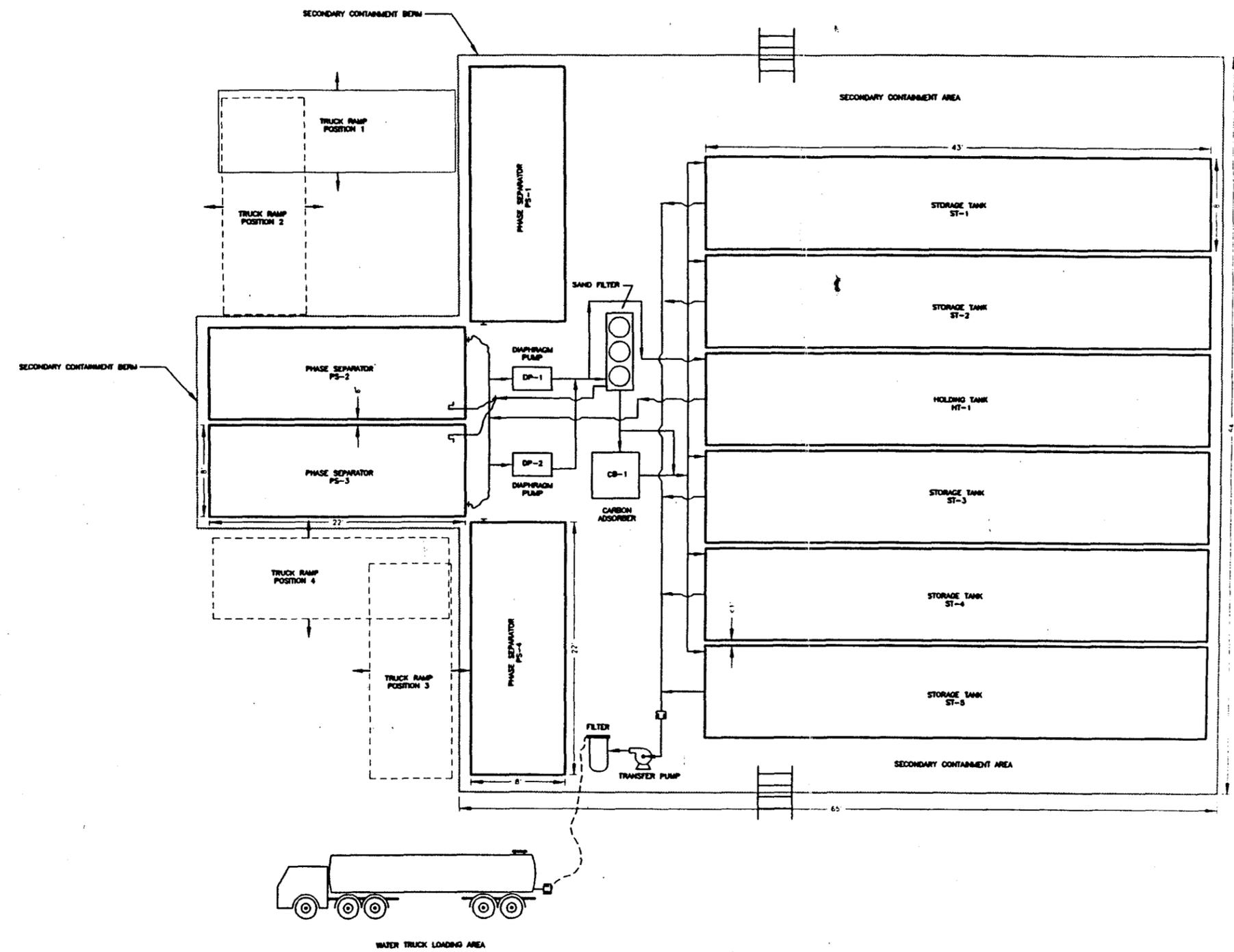
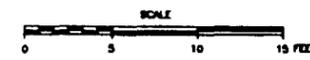


FIGURE 2
SITE PLAN
TEMPORARY STORAGE AND TREATMENT AREA
 STORM DRAIN SYSTEM - DELIVERY ORDER 0041
 ALAMEDA NAVAL AIR STATION
 ALAMEDA, CALIFORNIA



DESIGNED BY	CHECKED BY	DATE	5/17/96	DRAWING NO	763517-B4	SHEET	1
DRAWN BY	MAP	APPROVED BY	SR 5/17				

REV	DATE	BY	CHECKED	APPROVED	DESCRIPTION
1	5/17/96				ISSUED FOR COMMENT



- NOTES:
1. VALVES NOT SHOWN FOR CLARITY.
 2. AREA OF SECONDARY CONTAINMENT IS 4800 SQUARE FEET.
 3. TRANSFER PUMP, FILTER, WATER TRUCK, AND TRUCK RAMP NOT DRAWN TO SCALE (SIZE UNKNOWN).

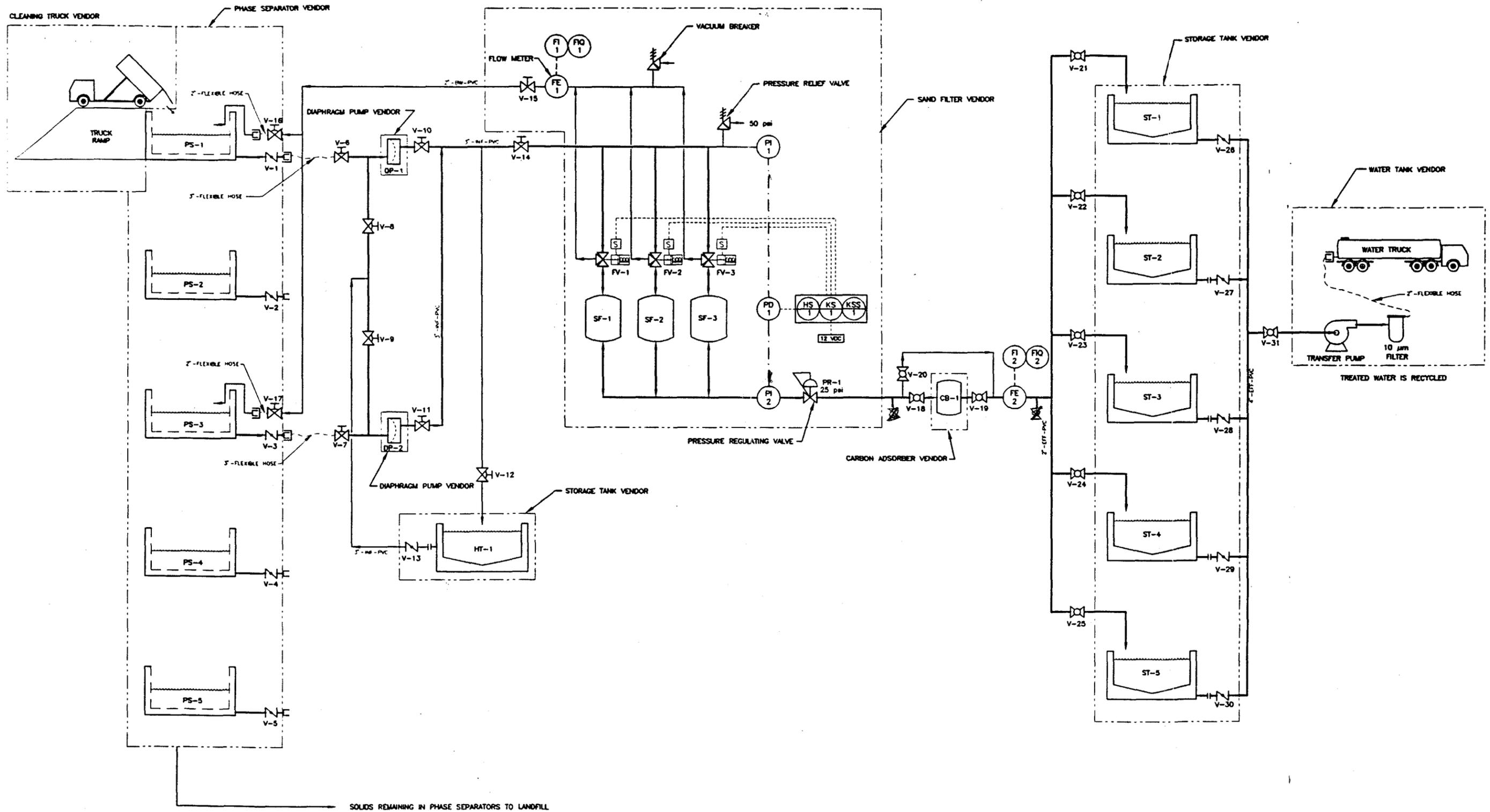
**FIGURE 3
EQUIPMENT LAYOUT
WATER FILTRATION SYSTEM SITE 18**

STORM DRAIN SYSTEM - DELIVERY ORDER 0041
ALAMEDA NAVAL AIR STATION
ALAMEDA, CALIFORNIA

ITC INTERNATIONAL TECHNOLOGY CORPORATION

DESIGNED BY	SRM	CHECKED BY	SEA 5/17	SHEET
DRAWN BY	MAP	APPROVED BY	SEA 5/17	1
DATE	3/17/96	DRAWING NO.	763517-E34	

REV	DATE	BY	CHECKED	APPROVED	DESCRIPTION
1	5/17/96	MAP			ISSUED FOR COMMENT



SOLIDS REMAINING IN PHASE SEPARATORS TO LANDFILL

PS-1/2/3/4/5
 PHASE SEPARATORS (5)
 100 µm FILTER CLOTH
 LIQUIDS/SOLIDS CAPACITY = 30 cu. yds
 ROLL-OFF BOX DESIGN

DP-1/2
 DIAPHRAGM PUMPS (2)
 SKID MOUNTED, DIESEL POWERED
 50 gpm @ 40 psi

HT-1
 HOLDING-TANK (1)
 21,000 GALLONS
 COATED CARBON STEEL CONSTRUCTION
 SLOPED "V" SHAPE FLOOR

SF-1/2/3
 SAND FILTER (3)
 SKID-MOUNTED, EACH VESSEL: 24" I.D.
 CARBON STEEL CONSTRUCTION
 4 cu. ft. #20 SAND PER VESSEL
 SERVICE FLOW = 18 gpm PER VESSEL
 MAX OPERATING PRESSURE = 100 psi
 BACKWASH FLOW = 47 gpm

CB-1
 CARBON ADSORBER (1)
 2,000 lbs. ACTIVATED CARBON
 MAX OPERATING PRESSURE = 50 psi
 SERVICE FLOW = 50 gpm

ST-1/2/3/4/5
 STORAGE TANKS (5)
 21,000 GALLONS
 COATED CARBON STEEL CONSTRUCTION
 SLOPED "V" SHAPE FLOOR

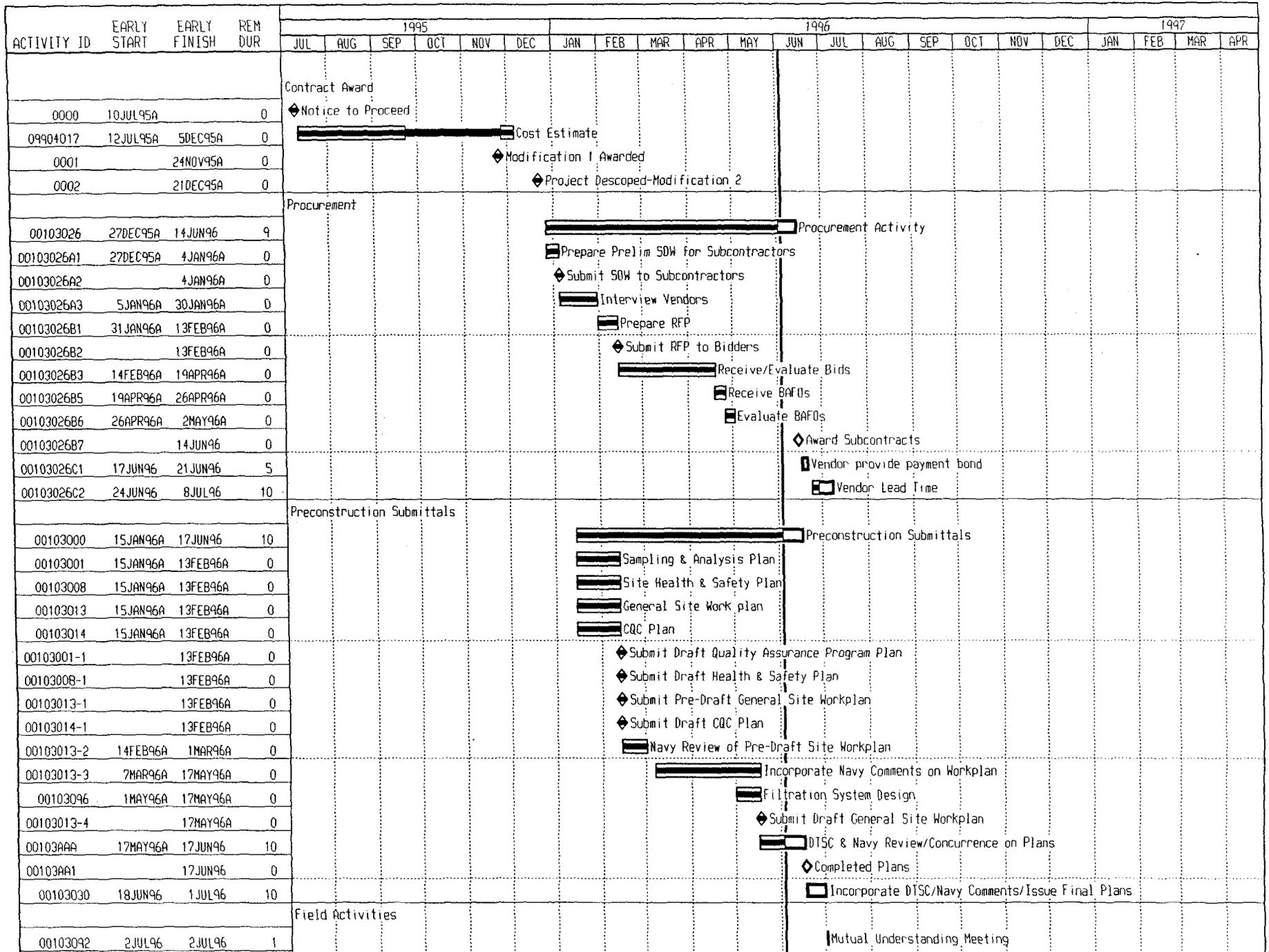
FIGURE 4
PIPING AND INSTRUMENTATION DIAGRAM
WATER FILTRATION SYSTEM SITE 18

STORM DRAIN SYSTEM - DELIVERY ORDER 0041
 ALAMEDA NAVAL AIR STATION
 ALAMEDA, CALIFORNIA



**INTERNATIONAL
 TECHNOLOGY
 CORPORATION**

DESIGNED BY	S. MULLER	CHECKED BY	SRM 9/7	SHEET
DRAWN BY	SCHAEFFER	APPROVED BY	SRM 9/7	1



Plot Date 1JUL96
 Data Date 4JUN96
 Project Start 1JUL95
 Project Finish 22APR97

Activity Start/End Date
 Original Activity
 Program Log Activity

EFA WEST - ALAMEDA
 Storm Drain System-Site 18
 PROJECT NO. 763517 D.O. 0041

Sheet 1 of 2

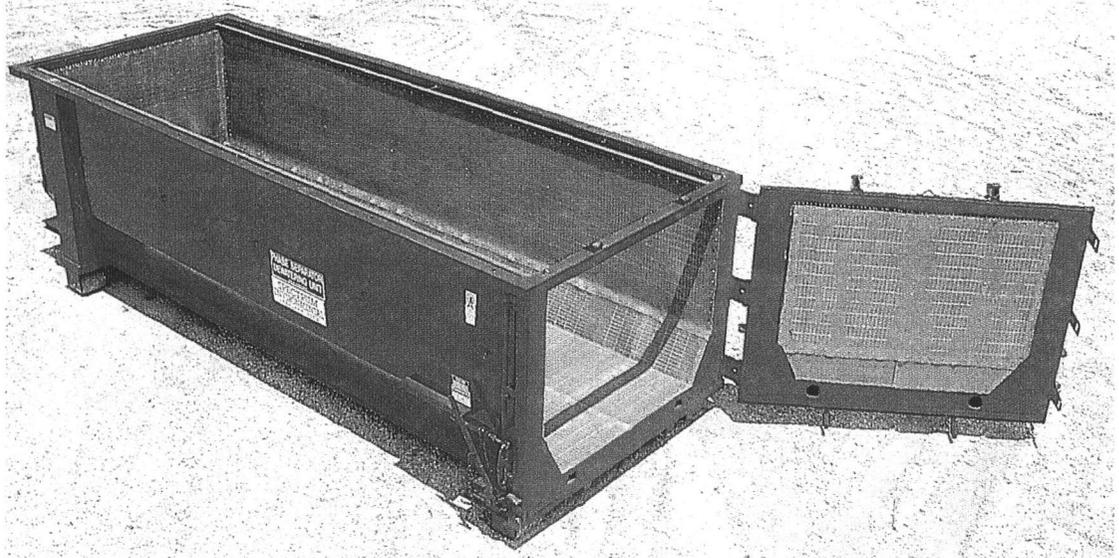
Date	Revision	Checked	Approved

APPENDICES

Phase Separator

At Last...

The Phase Separator

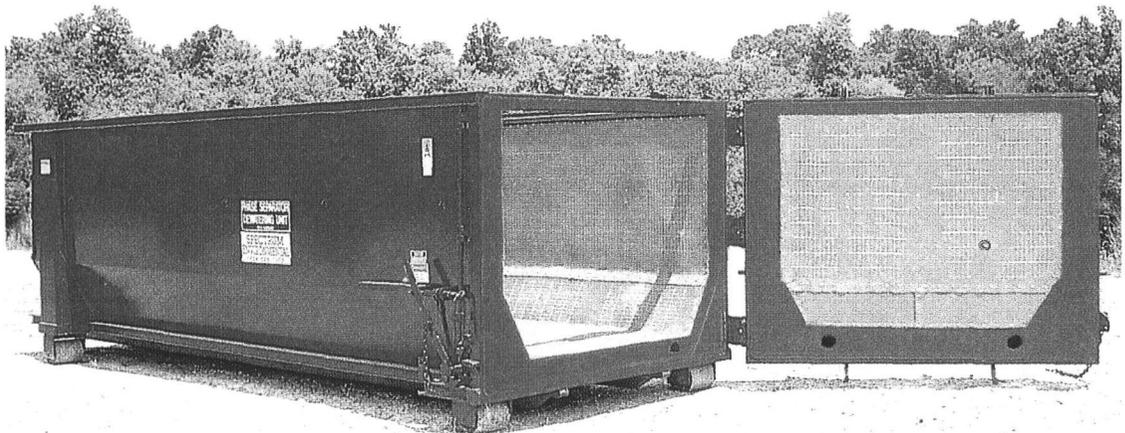


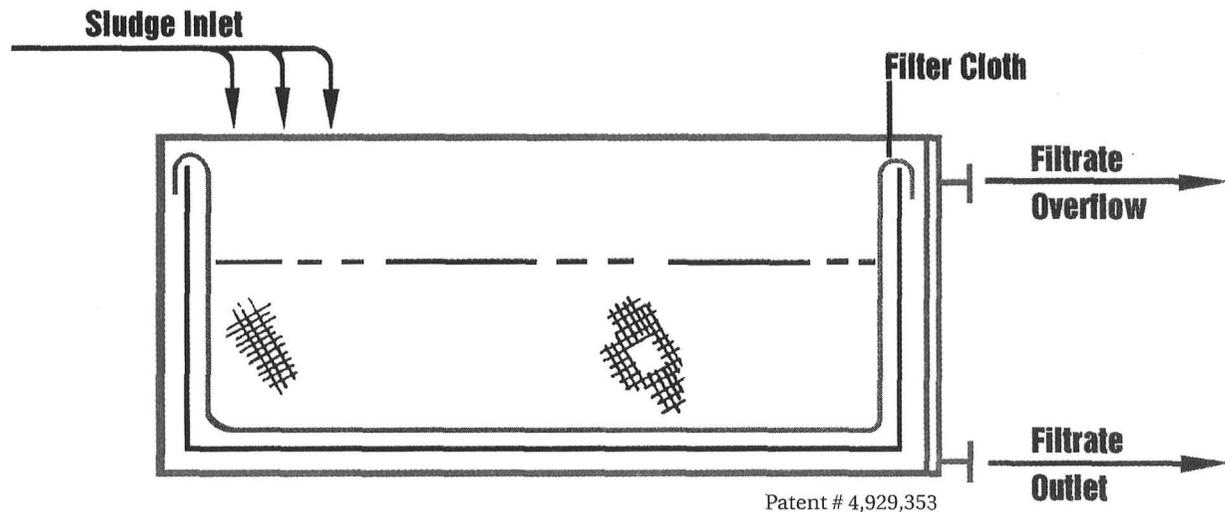
Patent # 4,929,353

A dewatering device that is:

- Simple
- Effective
- Inexpensive
- Safe

The phase separator is a roll off container or trailer with a stainless steel screen covering the entire inside of the container. The screen is supported by steel bracing and grating, so that there is a space between the wall to the container and the screen. The same is true for the bottom. The bottom also has a 3 inch slope from front to rear to facilitate draining liquids toward the rear door where there are two 4 inch drains at floor level. A polypropylene felt or other type of filter cloth is installed in the container, covering the entire surface of the screen. This filter cloth is inexpensive, disposable, incinerable, nontoxic and nonhazardous.



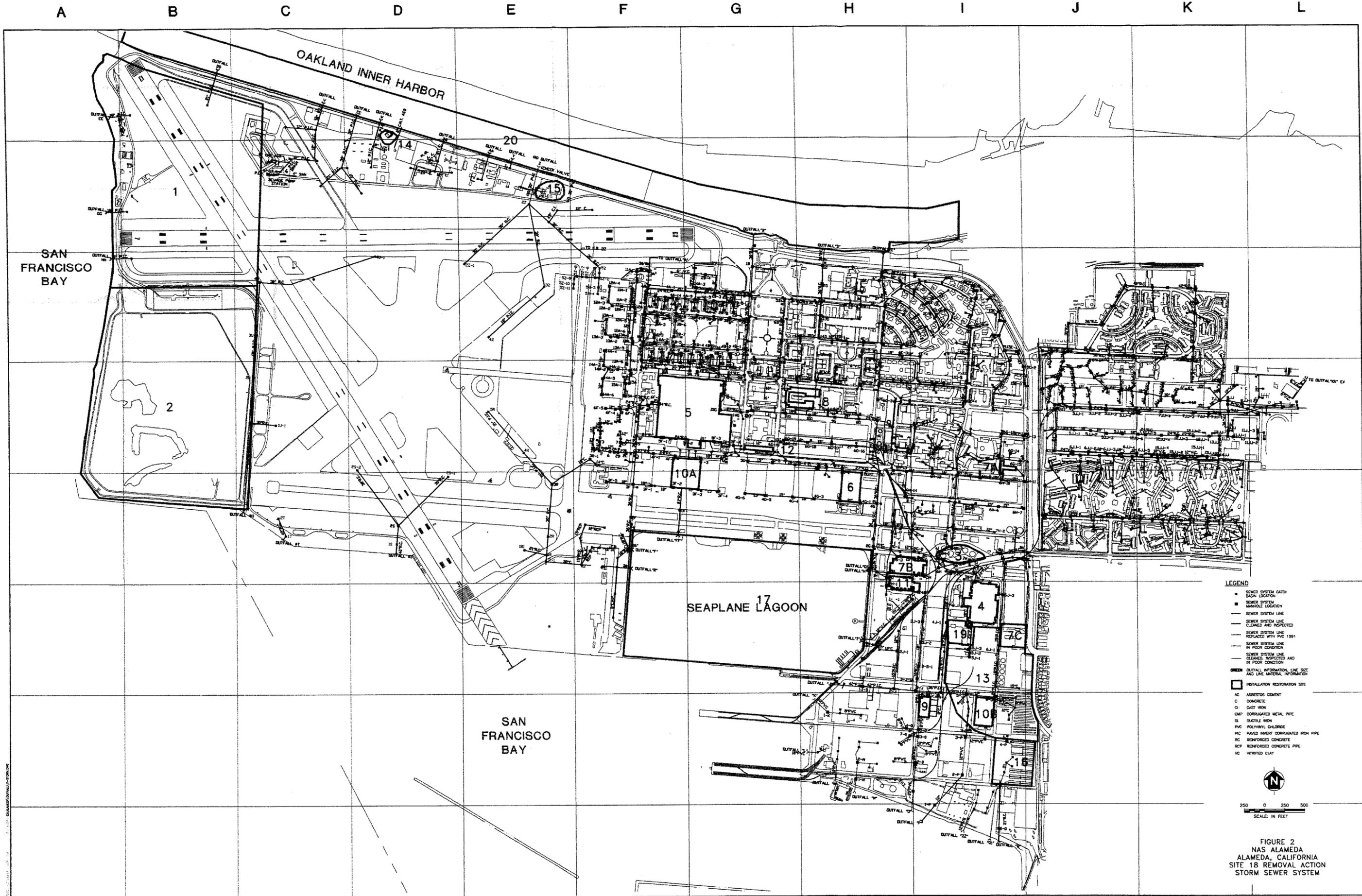


Five Outstanding Advantages...

1. Unitized to facilitate handling of quantities from a few cubic feet to thousands of cubic yards.
2. Unit design facilitates dewatering materials that cannot be pumped due to lumps, chunks or extraneous material inclusions. Works well on materials that might be dug and loaded for dewatering and drying.
3. Units are available in many sizes and may be custom designed or modified to be compatible with customers' needs. Standard units are 25 yd. and 30 yd. roll off containers and 25 yd. and 30 yd. dump trailers. These units are available in carbon steel, stainless steel and coated steel.
4. Unit minimizes treatment and handling of materials before and after dewatering or drying. Solids are retained in unit and are ready to be transported.
5. Unit may be used to recover product or process solids for reclaim, direct shipping, dewatering, drying, etc. ... This eliminates some additional handling, intermediate packaging and contamination.



28109 Charlie Watts Road • Livingston, LA 70754
504.686.1003 • FAX 504.686.1016



- LEGEND**
- SEWER SYSTEM CATCH BASIN LOCATION
 - SEWER SYSTEM MANHOLE LOCATION
 - SEWER SYSTEM LINE
 - SEWER SYSTEM LINE CLEANED AND INSPECTED
 - SEWER SYSTEM LINE REPLACED WITH PVC 1991
 - SEWER SYSTEM LINE IN POOR CONDITION
 - SEWER SYSTEM LINE CLEANED, INSPECTED AND IN POOR CONDITION
 - DUTFALL INFORMATION, LINE SIZE AND LINE MATERIAL INFORMATION
 - INSTALLATION RESTORATION SITE
 - AC ASBESTOS CEMENT
 - C CONCRETE
 - CI CAST IRON
 - CMF CORRUGATED METAL PIPE
 - DI DUCTILE IRON
 - PVC POLYVINYL CHLORIDE
 - PVC PAVED RIVER CORRUGATED IRON PIPE
 - RC REINFORCED CONCRETE
 - RCF REINFORCED CONCRETE PIPE
 - VC VITRIFIED CLAY

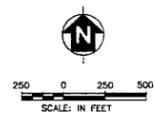
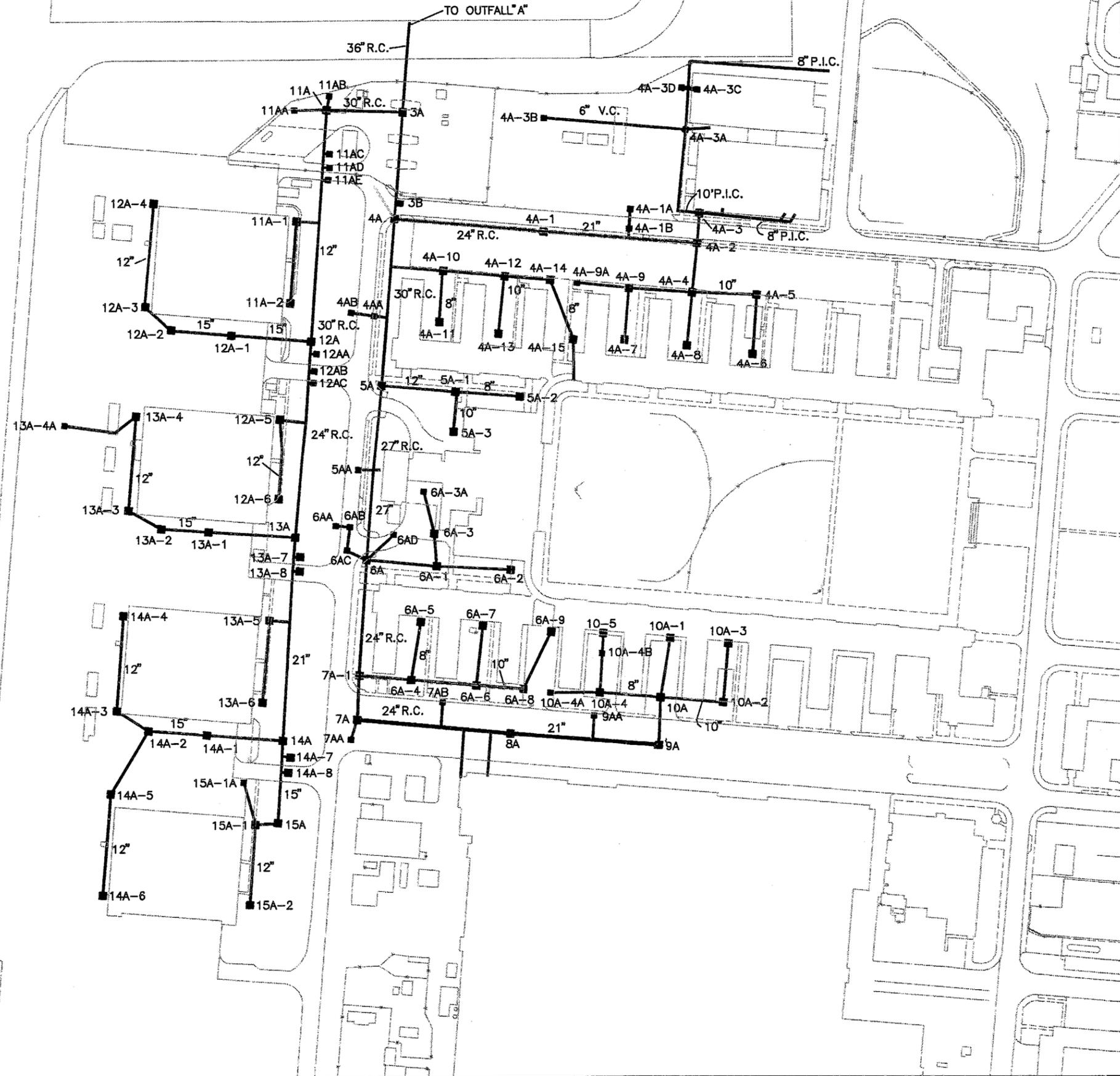


FIGURE 2
 NAS ALAMEDA
 ALAMEDA, CALIFORNIA
 SITE 18 REMOVAL ACTION
 STORM SEWER SYSTEM

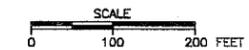
DRAWING NUMBER 763517-E1

CHECKED BY [Signature] APPROVED BY [Signature]
DRAWN BY B. JENSEN 4-15-96



LEGEND

- SEWER SYSTEM CATCH BASIN LOCATION
- SEWER SYSTEM MANHOLE LOCATION
- SEWER SYSTEM LINE
- SEWER SYSTEM LINE CLEANED AND INSPECTED
- SEWER SYSTEM LINE REPLACED WITH PVC 1991
- SEWER SYSTEM LINE IN POOR CONDITION
- SEWER SYSTEM LINE CLEANED, INSPECTED AND IN POOR CONDITION
- BLACK OUTFALL INFORMATION, LINE SIZE AND LINE MATERIAL INFORMATION
- INSTALLATION RESTORATION SITE
- AC ASBESTOS CEMENT
- C CONCRETE
- CI CAST IRON
- CMP CORRUGATED METAL PIPE
- DI DUCTILE IRON
- PVC POLYVINYL CHLORIDE
- PIC PAVED INVERT CORRUGATED IRON PIPE
- RC REINFORCED CONCRETE
- RCP REINFORCED CONCRETE PIPE
- VC VITRIFIED CLAY



OUTFALL - A
PREPARED FOR
ALAMEDA NAVAL AIR STATION
ALAMEDA, CALIFORNIA



**INTERNATIONAL
TECHNOLOGY
CORPORATION**

**CONTRACTOR QUALITY CONTROL PLAN
TIME CRITICAL REMOVAL ACTION
SITE 18 - STORM DRAIN SYSTEM
NAVAL AIR STATION
ALAMEDA, CALIFORNIA**

**CONTRACT NO. N62474-93-D-2151
DELIVERY ORDER NUMBER 0041**

Submitted to:

Department of the Navy
Engineering Field Activity West
Naval Facilities Engineering Command
900 Commodore Drive
San Bruno, California 95814-2922

Submitted by:

IT Corporation
4585 Pacheco Boulevard
Martinez, California 94553

Revision 0

July, 1996

Issued to: _____ Date: _____

Copy #: _____ Controlled Uncontrolled

CONTRACTOR QUALITY CONTROL PLAN
TIME CRITICAL REMOVAL ACTION
SITE 18 - STORM DRAIN SYSTEM
NAVAL AIR STATION
ALAMEDA, CALIFORNIA

CONTRACT NO. N62474-93-D-2151
DELIVERY ORDER NUMBER 0041

Revision 0

July, 1996

Approved by: Thomas A Davis Date: 7/5/96
Robert Swatek *for*
IT Program Contractor Quality
Control Manager

Approved by: Gary Elston Date: 7/8/96
Gary Elston
IT Delivery Order
Project Manager

Approved by: Valerie Crooks Date: 07/08/96
Valerie Crooks, P.E.
IT Program Manager

Introduction

This Contractor Quality Control Plan (CQCP) has been prepared to describe those QC actions which will be implemented during the time critical removal of solids from the Storm Drain System Site 18, at NAS Alameda for delivery order 0041.

The CQCP will be used in conjunction with the Program Contractor Quality Control Plan (PCQCP), Revision 1, and Standard Quality Procedures (SQP)/Standard Operating Procedures (SOP), as applicable and described below:

Program Contractor Quality Control Plan

Section 0.0 - Policy Statement; Applicable in its entirety

Section 1.0 - Introduction; Applicable in its entirety

Section 2.0 - Organization and Responsibilities; Applicable in its entirety

Section 3.0 - Quality Control Management; Applicable in its entirety

Section 4.0 - Personnel Training and Qualification; Applicable in its entirety

Section 5.0 - Instructions, Procedures and Drawings; Applicable in its entirety

Section 6.0 - Document Control; Applicable in its entirety

add Section 6.8.1, Weekly Reports: A text only report summarizing the production and quality control activities will be submitted by the CQC Manager to the RPM on a weekly basis.

Section 7.0 - Procurement; Applicable in its entirety

Section 8.0 - Data Quality Objectives; Not applicable

Section 9.0 - Field Activities; Applicable with the following modifications:

add to 9.3: Field QC samples will be collected and analyzed in accordance with the Sampling and Analysis Plan

add to 9.4.1: Samples collected and delivered to a laboratory within four hours of collection will be exempt from the temperature requirement providing all other collection and handling procedures were implemented.

Section 10.0 - Analytical Activities; Applicable in its entirety

Section 11.0 - Report Preparation; Applicable in its entirety

Section 12.0 - Review of Work Activities; Applicable in its entirety

Section 13.0 - Inspections; Applicable in its entirety

Section 14.0 - Calibration and Maintenance of Measuring and Test Equipment; Applicable in its entirety

Section 15.0 - Test Control; Applicable in its entirety

Section 16.0 - Nonconformance Control and Corrective Actions; Applicable in its entirety

Section 17.0 - Change Control; Applicable in its entirety

Section 18.0 - Audits and Surveillance; Applicable with the following modification:

delete subsections 18.1 through 18.8

Section 19.0 - Records Management; Applicable in its entirety

Standard Quality Procedures

The following Standard Quality Procedures (SQP) have been determined to be applicable:

SQP 1.1 Contractor Quality Control Program

SQP 3.2 Indoctrination and Training

SQP 4.1 Document Control

SQP 4.2 Records Management

SQP 5.1 Preparation, Revision and Approval of Plans and Procedures

SQP 7.1 Quality Inspections and Inspection Records

SQP 8.2 Calibration and Maintenance of Measuring and Test Equipment

SQP 10.1 Nonconformance Control

SQP 10.2 Corrective Action

SQP 10.3 Stop Work Order

- SQP 11.1 Field Work Variance/Request For Information
- SQP 12.2 Management Assessment
- SQP 12.3 Quality Surveillances
- SQP 13.1 Coordination of Subcontracted Analytical Laboratories

Standard Operating Procedures_____

The following Standard Operating Procedures (SOP) have been determined to be applicable:

- SOP 1.1 Chain of Custody
- SOP 2.1 Sample Handling, Packaging and Shipping
- SOP 3.1 Surface and Shallow Subsurface Soil Sampling
- SOP 6.1 Sampling Equipment and Well Material Decontamination
- SOP 6.2 Drilling and Heavy Equipment Decontamination
- SOP 17.1 Sample Labeling
- SOP 17.2 Sample Numbering
- SOP 18.1 Field QC Sampling
- SOP 19.1 On-Site Sample Storage

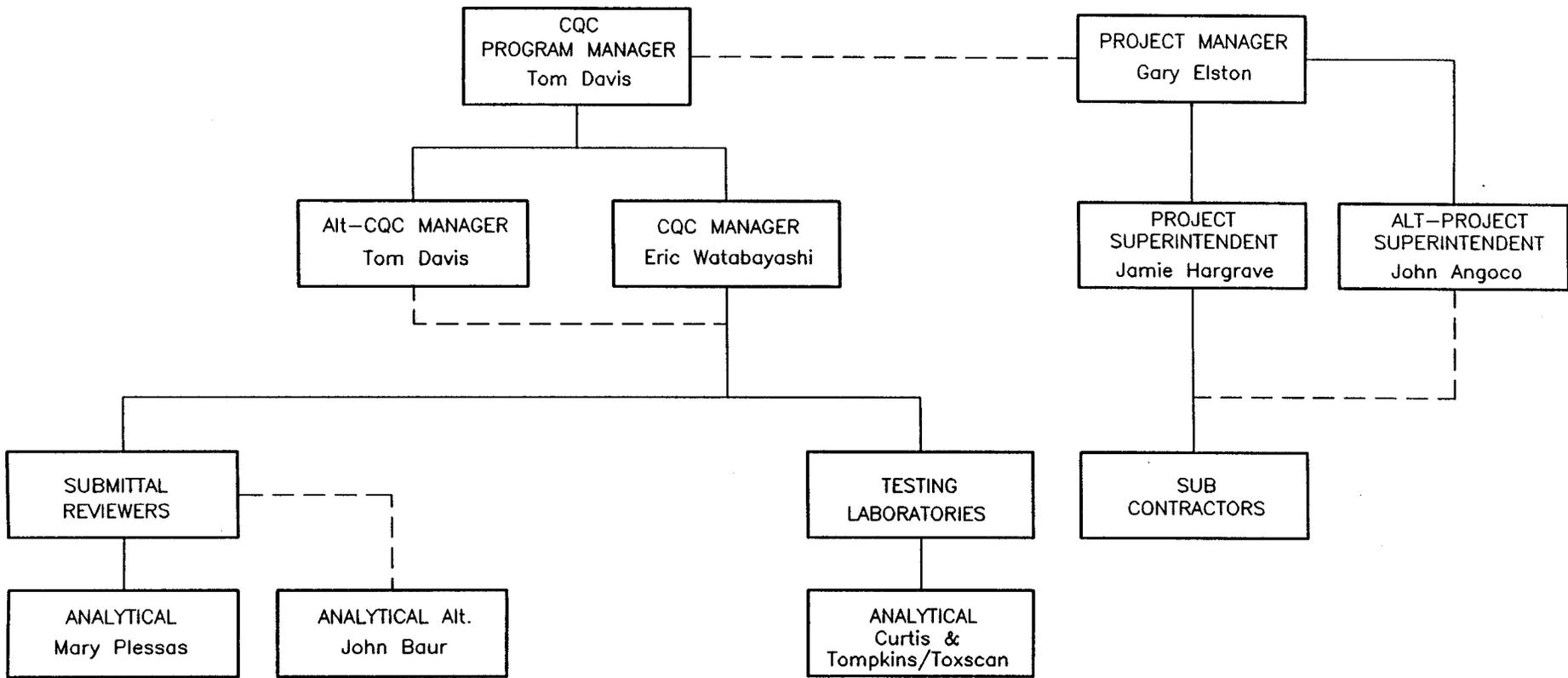


FIGURE 1
QUALITY CONTROL ORGANIZATIONAL CHART

TIME CRITICAL REMOVAL ACTION
SITE 18 STORM DRAIN SYSTEM
NAS ALAMEDA
DELIVERY ORDER #0041
PREPARED FOR
DEPARTMENT OF THE NAVY
EFA WEST



**TIME CRITICAL REMOVAL ACTION
SITE 18 STORM DRAIN SYSTEM
NAVAL AIR STATION
ALAMEDA, CALIFORNIA
DELIVERY ORDER 0041**

**CQC MANAGER
LETTER OF DESIGNATION**

July 5, 1996

Mr. Eric Watabayashi:

This letter will serve to assign you as IT Corporation's site CQC Manager for the above captioned delivery order. In the case where you are not able to perform the CQC Manager's duties, Mr. Tom Davis will serve as your alternate CQC Manager. In the role of CQC Manager you have the responsibilities and authorities designated in Section 2.1.3 of the Program Contractor Quality Control Plan, Revision 1. Additionally, you are granted Stop Work authority and will exercise this authority consistent with the Program CQC Plan, Section 16.4 and SQP 10.3. You are granted the authority to approve submittals which have been certified by qualified submittal reviewers as identified in the CQC organization chart for this delivery order and as necessary to ensure the quality of the work, and direct the removal and/or replacement of nonconforming materials or work. In this capacity you will report directly to me and will administer the established requirements of the delivery order CQC Plan.

If you have any questions or require additional information, please contact me at (510) 372-9100.

Sincerely,
IT CORPORATION



Robert Swatek *for*
Program CQC Manager

**TIME CRITICAL REMOVAL ACTION
SITE 18 STORM DRAIN SYSTEM
NAVAL AIR STATION
ALAMEDA, CALIFORNIA
DELIVERY ORDER 0041**

**ALTERNATE CQC MANAGER
LETTER OF DESIGNATION**

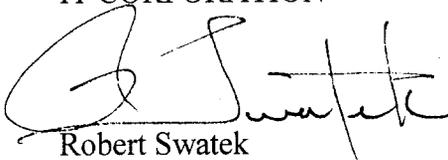
July 5, 1996

Mr. Tom Davis:

This letter will serve to assign you as IT Corporation's alternate site CQC Manager for the above captioned delivery order. In the case where the designated CQC Manager, Mr. Eric Watabayashi, is unable to perform the CQC Manager's duties, you will serve in that capacity. In this role, you will have the responsibilities and authorities designated in Sections 2.1.3 of the Program Contractor Quality Control Plan, Revision 1. Additionally, you will have Stop Work authority and will exercise this authority consistent with the Program CQC Plan, Section 16.4 and SQP 10.3. You are granted the authority to approve submittals which have been certified by qualified submittal reviewers as identified on the CQC Organization Chart for this delivery order and as necessary to ensure the quality of the work, and direct the removal and/or replacement of nonconforming materials or work. You will be authorized to act as an alternate for 14 consecutive working days or 30 nonconsecutive working days at a maximum. In the case where it is believed that these time periods will be exceeded, you must notify me so that I may arrange with EFA-West and the ROICC to have this position replaced. You will report directly to me and will administer the established requirements of the delivery order CQC Plan.

If you have any questions or require additional information, please contact the undersigned at (510) 372-9100.

Sincerely,
IT CORPORATION



Robert Swatek
Program CQC Manager

TESTING PLAN AND LOG

CONTRACT NO. N62474-93-D-2151 DELIVERY ORDER NO. 0041			PROJECT TITLE AND LOCATION TIME CRITICAL REMOVAL ACTION, SITE 18 - STORM DRAIN SYSTEM NAVAL AIR STATION ALAMEDA, ALAMEDA, CALIFORNIA					CONTRACTOR IT Corporation	
SPECIFICATION SECTION AND PARAGRAPH NUMBER	TEST PROCEDURE	TEST NAME	LABORATORY NAME	SAMPLED BY	LOCATION OF TEST ON OFF SITE SITE	FREQUENCY	DATE COMPLETE	DATE FORWARDED TO CONTR. OFF	REMARKS *
SAP 3.1 & 5.1 Table 2, 3, 4-1	EPA 8240	Volatile Organic Compounds	C&T	IT	Off Site	Per SAP			Solid
SAP 3.1 & 5.1 Table 2, 3, 4-1	EFA 8270	Semivolatile Organic Compounds	C&T	IT	Off Site	Per SAP			Solid
SAP 3.1 & 5.1 Table 2, 3, 4-1	EPA 8080	Organochlorine Pesticides and PCB	C&T	IT	Off Site	Per SAP			Solid
SAP 3.1 & 5.1 Table 2, 3, 4-1	WET, EPA 6010/7000	STLC CAM 17 Metals	C&T	IT	Off Site	Per SAP			Solid
SAP 3.1 & 5.1 Table 2, 3, 4-1	EPA 418.1	TRPH	C&T	IT	Off Site	Per SAP			Solid
SAP 3.1 & 5.1 Table 2, 3, 4-1	Ch. 7, SW-846	RCI	C&T	IT	Off Site	Per SAP			Solid
SAP 3.2 & 5.2 Table 2, 3, 4-2	EPA 624	Volatile organic compounds	C&T	IT	Off Site	Per SAP			Waste Water
SAP 3.2 & 5.2 Table 2, 3, 4-2	EPA 625	Semivolatile Organic Compounds	C&T	IT	Off Site	Per SAP			Waste Water
SAP 3.2 & 5.2 Table 2, 3, 4-2	EPA 608	Organo-chlorine Pesticides and PCB	C&T	IT	Off Site	Per SAP			Waste Water
SAP 3.2 & 5.2 Table 2, 3, 4-2	EPA 6010/7000	Total Metals	C&T	IT	Off Site	Per SAP			Waste Water
SAP 3.2 & 5.2 Table 2, 3, 4-2	EPA 335.3	Cyanide (Total)	C&T	IT	Off Site	Per SAP			Waste Water
SAP 3.2 & 5.2 Table 2, 3, 4-2	EPA 9070	Oil and Grease	C&T	IT	Off Site	Per SAP			Waste Water
SAP 3.2 & 5.2 Table 2, 3, 4-2	EPA 9065	Phenolic Compounds	C&T	IT	Off Site	Per SAP			Waste Water
SAP 3.2 & 5.2 Table 2, 3, 4-2	CA LUFT	Organic Lead	C&T	IT	Off Site	Per SAP			Waste Water

SPECIFICATION SECTION AND PARAGRAPH NUMBER	TEST PROCEDURE	TEST NAME	LABORATORY NAME	SAMPLED BY	LOCATION OF TEST ON SITE OFF SITE	FREQUENCY	DATE COMPLETE	DATE FORWARDED TO CONTR. OFF	REMARKS *
SAP 3.2 & 5.2 Table 2, 3, 4-2	Batelle Oceanic Sciences	Organotin Compounds	Toxscan	IT	Off Site	Per SAP			Waste Water
SAP 3.2 & 5.2 Table 2, 3, 4-2	EPA 9040	pH	C&T	IT	Off Site	Per SAP			Waste Water

DEFINABLE FEATURES OF WORK MATRIX

**CONTRACTOR QUALITY CONTROL PLAN
TIME CRITICAL REMOVAL ACTION
SITE 18 - STORM DRAIN SYSTEM
NAVAL AIR STATION
ALAMEDA, CALIFORNIA**

DELIVERY ORDER No. 0041

Spec. Section	Para. No.	Feature of Work	Prep		Initial		Followup	Remarks
			Req	Date	Req	Date	Req	
Work Plan	11.0,13.0	Video Logging	✓		✓		✓	
Work Plan	12.0	Storm Sewer Line Cleaning	✓		✓		✓	
Work Plan	5.0,7.0,8.0, 9.0,10.0	Filtration System Assembling	✓		✓		✓	
Work Plan	6.0	Waste On-site Transporting	✓		✓		✓	
SAP	3.0,4.0,5.0, 6.0	Sampling and Analysis	✓		✓		✓	

SUBMITTAL REGISTER

CONTRACT NO.
N62474-93-D-
2151
D.O. No. 0041

TITLE AND LOCATION

Time Critical Removal Action, Site 18 - Storm Drain System, Naval Air Station, Alameda, California

CONTRACTOR

IT Corporation

SPECIFICATION SECTION
Basic Contract

TRANS-MITTAL NO. a	ITEM NO. b	SPECIFICATION PARAGRAPH NO. c	DESCRIPTION OF ITEM SUBMITTED d	TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS ⁽¹⁾ y										
				DATA e	DRAWINGS f	INSTRUCTIONS g	SCHEDULES h	STATEMENTS i	REPORTS j	CERTIFICATES k	SAMPLES l	RECORDS m	INFORMATION ONLY n	GOVERNMENT APPROVED o	REVIEWER p	SUBMIT q	APPROVAL NEEDED BY r	MATERIAL NEEDED BY s	CODE t	DATE u	SUBMIT TO GOVERNMENT v	CODE w	DATE x											
	001	2.1/6.14.5 (also Work Plan 15.0)	Close-out Report (including As-Built Records and Drawings), SD-04		X					X				X																				Submit within 15 days of completion of field work
01	002	3.2.2	Site Health & Safety Plan, SD-06			X								X						HS	2/13/96	N/A	N/A	A	2/13/96	2/13/96								Submit within 21 days of D.O. award
001	003	6.3.1.1	CQC Plan, SD-06			X									X					QC	2/13/96	N/A	N/A	A	2/13/96	2/13/96								Submit within 21 days of D.O. award
	004	6.4/6.14.4	Rework Items List, SD-18												X	X				QC													Initial - 30 days after mob./Subsequent - monthly	
	005	6.4	Test Result Summary, SD-18												X	X				QC													Submit monthly	
001	006	7.3.1	Submittal Status Log, SD-18											X		X				QC	2/13/96	2/13/96	2/13/96	A	2/13/96	2/13/96							Submit 15 days after D.O. & monthly thereafter	
	007	4.9.5	Manifests, SD-18											X	X					PS													Government Signs	
001	008	5.4.1	Work Plan, SD-06			X														PM	2/13/96	2/13/96	2/13/96	A	2/13/96	2/13/96							Submit within 21 days of D.O. award	
	009	6.4/6.14.3	Testing Plan and Log, SD-18												X		X			QC													Submit Monthly	
	010	6.13.3	QC Completion Certification, SD-13													X				QC													Submit upon completion of work	
001	011	NA	Sampling & Analysis Plan, SD-06			X														QC	2/13/96	2/13/96	2/13/96	A	2/13/96	2/13/96							Submit within 21 days of D.O. award	

⁽¹⁾Days are based on five-day work week.

**SAMPLE AND ANALYSIS PLAN
TIME CRITICAL REMOVAL ACTION
SITE 18 - STORM DRAIN SYSTEM
NAVAL AIR STATION
ALAMEDA, CALIFORNIA**

**Contract No. N62474-93-D-2151
Delivery Order No. 0041**

Submitted to:

Department of the Navy
Engineering Field Activity, West
Naval Facilities Engineering Command
900 Commodore Drive, Building B-103
San Bruno, California 94066-2402

Submitted by:

IT Corporation
4585 Pacheco Boulevard
Martinez, California 94553

Revision 0

July, 1996

Issued to: _____ Date: _____

Copy #: _____ Controlled Uncontrolled

**SAMPLE AND ANALYSIS PLAN
TIME CRITICAL REMOVAL ACTION
SITE 18 - STORM DRAIN SYSTEM
NAVAL AIR STATION
ALAMEDA, CALIFORNIA**

**Contract No. N62474-93-D-2151
Delivery Order No. 0041**

Revision 0

July, 1996

Approved by: Thomas A. Davis
Robert Swatek *for*
IT Contractor Quality Control
Program Manager

Date: 7/5/96

Approved by: Gary Elston
Gary Elston
IT Project Manager

Date: 7/3/96

Approved by: Valerie Crooks
Valerie Crooks, P.E.
IT Program Manager

Date: 07/08/96

Table of Contents

1.0 Site Background	1
2.0 Sampling Objectives	1
3.0 Sample Location and Frequency	2
3.1 Solids Samples	2
3.2 Wastewater Samples	2
3.3 QA/QC Samples	4
4.0 Sample Designation	4
5.0 Sampling Equipment and Procedures	4
5.1 Solids Samples	5
5.2 Wastewater Samples	5
6.0 Sample Handling and Analysis	5

1.0 Site Background

Site 18 is the storm sewer system at Alameda NAS. Historically this system has received untreated industrial wastewater from plating shop baths and paint shops, pesticides and herbicides, cleaning solvents, polychlorinated biphenyls (PCBs), oil and grease, and fuel hydrocarbons. Currently the system only receives storm water runoff from the base.

Approximately 150,000 linear feet of sewer lines will be cleaned using high pressure jetting to remove accumulated solids and debris. It is estimated that 269 cubic yards of solids will be removed from the sewer lines. Recent analyses indicate that chlorinated solvents, petroleum hydrocarbons, polynuclear aromatic compounds (PNAs) and metals are present at concentrations which require the solids to be managed as a hazardous waste. Organotin and organic lead compounds have also been identified as contaminants of concern.

2.0 Sampling Objectives

Sampling and analysis of the materials generated during the cleaning procedure will be performed to determine proper disposal of both the solid and liquid wastes. Solid wastes will be characterized for disposal at an appropriate offsite landfill. The analytical results will be evaluated to determine the most cost effective offsite disposal facility. Liquid wastes, composed primarily of the water from the high pressure jetting operations, will be analyzed to check contamination levels for reuse of the water in the cleaning operation, and to ensure compliance with the IWTP's Part B permit acceptance criteria and EBMUD's wastewater discharge limits for disposal to the IWTP (reference Table A).

The analytical data will be reviewed by the project manager and designated technical personnel to determine whether the water may be reused, and if not, the proper disposal method for the generated wastes. This data will be available to operations personnel at the IWTP, regulatory agencies and offsite landfill personnel.

Since results of the sampling and analysis will be used to determine the ultimate disposition of the generated waste, definitive (as opposed to screening) data is required. Only a Navy and IT

approved analytical laboratory will be subcontracted to perform the required analyses. Analytical results will be submitted to IT in a standard laboratory report as described in Section C.1, Task 8.0 of IT's Navy RAC Analytical Services subcontract, Feb. 1995.

3.0 Sample Location and Frequency

The material removed from the sewer system will be separated into solid and liquid fractions as outlined in the project work plan. The solid waste, including spent sand and carbon from the filtration process, will be accumulated in modified roll-off bins (Phase Separators) and wastewater will be stored in up to five (5) 21,000 gallon Baker tanks.

3.1 Solids Samples

Representative samples are required for wastes intended for landfills. A four point composite (four individual grab samples composited at the laboratory into one sample) generally satisfies the requirements for representativeness. One composite sample must be collected and analyzed per roll-off bin. Results of these analyses will be compared to the Landfill Acceptance Criteria, Table B to determine the proper offsite landfill to be used.

Solids from the sewer line cleaning operations are anticipated to accumulate at a rate of approximately 5 cubic yards per day. Since rental of the Phase Separators is relatively expensive, two-day turnaround time for analytical results is required to minimize the number of Phase Separators which must be rented.

Solids samples will be analyzed for total recoverable petroleum hydrocarbons (TRPH) by EPA Method 418.1, volatile organic compounds, including benzene, toluene, ethyl benzene and xylenes (BTEX), by EPA Method 8240, semivolatile organic compounds by EPA Method 8270, pesticides and PCBs by EPA Method 8080, soluble California regulated metals (STLC CAM 17) by the CA waste extraction test (WET) and EPA Method 6010/7000, and reactivity, corrosivity and ignitability (RCI) according to SW-846 Chapter 7.

3.2 Wastewater Samples

Up to five Baker tanks will be available for storage of wastewater at the site. It is anticipated that approximately 1,000,000 gallons of wastewater will be processed through the filtration system at

a rate of 10,000 to 15,000 gallons per day (3 or 4 Baker tanks per week). From the tanks, most of the water will be recycled for use in the sewer line cleaning operation. Due to the recycling, there may be a gradual increase in the concentrations of contaminants. These concentrations will be monitored to ensure the levels of contamination are within the limits acceptable for treatment of the water at the IWTP.

Samples will be taken weekly. For the first few weeks, a two-day T/A on samples will be required until an approximate rate of increase in contaminant concentrations can be determined. It is expected that most contaminants will remain in the sediment, and the contaminant concentrations in the water will be; 1) well within the IWTP's acceptable limits and 2) will increase very slowly. If this expectation is confirmed by sampling during the first few weeks, the frequency of sampling may be adjusted to reduce analytical costs.

If analytical results indicate the concentration of any contaminant exceeds 50% of the IWTP's acceptable limit for that contaminant as shown in Table A, water stored in the Baker tanks will not be recycled further. Fresh potable water will be used in the line cleaning operations and the spent water will be sent to the IWTP.

Wastewater samples will be analyzed for total metals (arsenic, cadmium, chromium, copper, iron, lead, mercury, nickel, silver and zinc) by EPA Method 6010/7000, cyanide (total) by 335.3, oil and grease by EPA Method 9070, pH by EPA Method 9040, phenolic compounds by EPA Method 9065, volatile organic compounds by EPA Method 624, semivolatile organic compounds by EPA Method 625, and pesticides/PCBs by EPA Method 608. The temperature of the water will be taken in the field prior to discharge into the IWTP, (*EBMUD Wastewater Discharge Permit, Terms and Conditions, Naval Air Station -Alameda*).

In addition to the above analyses, wastewater will be tested for organic lead and organotin compounds since they are suspected contaminants at this site. There are no EPA methods for the analysis of these compounds; however, the CA LUFT field manual (1989) and Batelle Ocean Sciences report N-0519-6100 (Uhler & Durell, 1989) contain appropriate procedures for the analysis of organic lead and tributyltin, respectively. These methods have been followed for previous work at NAS Alameda under Delivery Order No. 14.

3.3 QA/QC Samples

One Source Blank (Field Blank) and one Rinsate Blank shall be collected during the first soil sampling event. If the first Rinsate Blank confirms that adequate decontamination procedures are being implemented, one Rinsate Blank shall be collected every tenth sampling event. If the Rinsate Blank indicates inadequate equipment decontamination, then the problem must be corrected and a Rinsate Blank collected during the subsequent sampling event.

Trip blanks shall be included in any sample shipment that includes more than one sample.

Replicate samples (Field Duplicates) shall be collected at a frequency of 10% for both solids and wastewater samples.

QA lab split samples will not be collected for this project since the primary sampling objective is to characterize the generated wastes for disposal.

The approximate number of field samples and QC samples (including Rinsate Blanks, Source Blank, Trip Blanks, and Replicate Samples) is outlined in Table 1.

4.0 Sample Designation _____

Samples will be uniquely designated using the following numbering system: solids will be sequentially numbered beginning with 41SS001, 41SS002, etc. and wastewater samples will be sequentially numbered beginning with 41SW001.

Sample numbers will be documented and sample containers labeled in accordance with IT SOPs 17.1 and 17.2.

5.0 Sampling Equipment and Procedures _____

Decontamination of all reusable sampling equipment used during the project will be performed before initial use on site and between each use at distinct sample locations. Sampling equipment decontamination will be performed per IT SOP 6.1.

5.1 Solids Samples

Solids samples will be collected from the roll-off bins using a stainless steel hand auger and as described in IT SOP 3.1. The solids are transferred from the collection device into decontaminated sample containers (8oz glass jars). The sample container should be completely filled so that minimal headspace exists.

5.2 Wastewater Samples

Water samples will be collected from a sampling port located within the influent line to the series of Baker tanks shown in Figure 4 of the Workplan. The sample water is collected directly from the sampling port into the appropriate sample containers. Sample containers for volatile and semivolatile compounds should be filled first. Sample containers will be completely filled so that no headspace exists.

6.0 Sample Handling and Analysis _____

Sample containers, preservatives and holding times will be observed as indicated in Tables 2 and 3. The sample chain of custody will be implemented in accordance with IT SOP 1.1.

Samples will be packaged and placed in coolers with ice for shipment to the laboratory according to IT SOP 2.1.

Specific analytical methods and required quantitation limits for each analyte of interest are outlined in Tables 4-1 and 4-2. These methods shall be performed in accordance with IT's Statement of Work, Navy RAC Analytical Services subcontract, Feb. 1995.

**TABLE 1
ESTIMATED SAMPLE QUANTITY**

Parameters	Method No.	Original Samples	Field Duplicates 10%	Source Blanks	Rinsate Blanks	Trip Blanks	Total Samples
SOLIDS DISPOSAL (4 point composite sample)							
Volatile Organic Compounds	EPA 8240	7	1	1	1	1	11
Semivolatile Organic Compounds	EPA 8270	7	1	1	1		10
Organochlorine Pesticides and PCBs	EPA 8080	7	1	1	1		10
STLC CAM 17 Metals	WET, EPA 6010/7000	7	1	1	1		10
Total Recoverable Petroleum Hydrocarbons (TRPH)	EPA 418.1	7	1	1	1		10
Reactivity, Corrosivity, Ignitability (RCI)	Ch. 7, SW-846	7	1				8
WASTEWATER							
Volatile Organic Compounds	EPA 624	20	2			2	24
Semivolatile Organic Compounds	EPA 625	20	2				22
Organochlorine Pesticides and PCBs	EPA 608	20	2				22
Metals (As, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Ag, Zn)	EPA 6010/7000	20	2				22
Cyanide (Total)	EPA 335.3	20	2				22
Oil and Grease	EP 9070	20	2				22
Phenolic compounds	EPA 9065	20	2				22
Organic Lead	CA LUFT	20	2				22
Organotin compounds	Batelle Ocean Sciences	20	2				22
pH	EPA 9040	20	2				22

**TABLE 2
SAMPLE CONTAINERS**

Analysis	Soil Containers per Sample¹	Water Containers per Sample²
VOC	8-oz. jar ³	3 x 40 mL vials ^{4,5}
SVOC	8-oz. jar ³	2 x 1 L ambers ⁶
Pesticides/PCBs	8-oz. jar ³	2 x 1 L ambers ⁶
Metals	8-oz. jar ³	1 x 1 L polyethylene ⁷
Cyanide	NA	1 x 500 mL polyethylene ⁸
Oil and Grease	NA	2 x 1 L ambers ^{5,6}
TRPH	8-oz. jar ³	NA
Phenolic compounds	NA	1 x 500 mL polyethylene ⁹
Organic Lead	NA	1 x 500 mL polyethylene
Organotin compounds	NA	1 x 1 L polyethylene
Percent Moisture	8-oz. jar ³	NA
Ignitability/Flashpoint	8-oz. jar ³	NA
pH	NA	1 x 100 mL polyethylene
Reactivity	8-oz. jar ³	NA
Corrosivity (as pH)	8-oz. jar ³	NA
WET	8-oz. jar ³	NA

Notes:

oz.=Ounce

mL=Milliliter

L=Liter

NA=Not applicable

¹=Total soil sample containers shall be provided with a 15 percent additional allotment for field duplicates and matrix spikes

²=Total water sample containers shall be provided with a 20 percent additional allotment for field duplicates and matrix spikes

³=All glass jars shall have Teflon-lined lids; a maximum of two 8-ounce jars per sample shall be required; for certain projects, glass jars of different sizes may be requested. Brass sleeves may be supplied by the field and used in place of 8-oz glass jars

⁴=All vials shall have caps with Teflon-lined septa

⁵=Preserved with HCL

⁶=All ambers shall have Teflon-lined caps

⁷=Preserved with HNO₃

⁸=Preserved with NaOH

⁹=Preserved with H₂SO₄

TABLE 3

REQUIRED HOLDING TIMES¹

Analysis	Soil	Water
VOC	14 days	14 days
SVOC	14 days/40 days ²	7 days/40 days ²
Pesticides/PCBs	14 days/40 days ²	7 days/40 days ²
Metals	Hg-28 days, Others-6 months	Hg-28 days, Others-6 months
Cyanide	14 days	14 days
Oil & Grease	NA	28 days
TRPH	28 days	NA
Phenolic compounds	NA	28 days
Organic Lead	NA	7 days/40 days ²
Organotin compounds	NA	28 days
Percent Moisture	14 days	NA
Ignitability/Flashpoint	NA	NA
pH	NA	2 hours
Reactivity	14 days	NA
Corrosivity (as pH)	2 days	NA
WET	PHT/PHT/AHT ³	NA

Notes:

NA = Not applicable

PHT = Preparation holding time from appropriate analytical method

AHT = Analytical holding time from appropriate analytical method

¹ = From the date of sample collection

² = x days/y days = x days for sample extraction (or leaching)/y days for analysis of extracts (or leachate)

³ = a days/b days/c days = a days for leaching/b days for leachate/c days for analysis of extracts

TABLE 4-1**ANALYTICAL METHODS AND QUANTITATION LIMITS - SOIL**

Analysis	Method Reference	Quantitation Limit Soil
Volatile Organic Compounds (VOC)	EPA 8240*, SW-846	Method Limits
Semivolatile Organic Compounds (SVOC)	EPA 8270*, SW-846	Method Limits
Organochlorine Pesticides and PCBs	EPA 8080*, SW-846	Method Limits
STLC CAM 17 Metals*	WET, CCR Title 22, EPA 6010/7000, SW-846	Method Limits
Total Recoverable Petroleum Hydrocarbons (TRPH)	EPA 418.1, MCAWW	100 mg/Kg
Reactivity, Corrosivity as pH, Ignitability (RCI)	Chapter 7, SW-846	Method Limits

TABLE 4-2**ANALYTICAL METHODS AND QUANTITATION LIMITS - WATER**

Analysis	Method Reference	Quantitation Limit Water
Volatile Organic Compounds (VOC)	EPA 624*, SW-846	Method Limits
Semivolatile Organic Compounds (SVOC)	EPA 625*, SW-846	Method Limits
Organochlorine Pesticides/PCBs	EPA 608*, SW-846	Method Limits
Metals: As, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Ag, Zn*	EPA 6010/7000, SW-846	Method Limits
Cyanide (Total)*	EPA 335.3, MCAWW	.01 mg/L
Oil and Grease (Total)*	EPA 9070, SW-846	5 mg/L
Phenolic Compounds*	EPA 9065, SW-846	0.1 mg/L
Organic Lead*	CA LUFT field manual	0.1 mg/L
Organotin compounds*	Batelle Ocean Sciences report N-0519-6100	Method Limits
pH*	EPA 9040, SW-846	N/A
Temperature	N/A	N/A

Table A

**Wastewater Acceptance Criteria
Alameda IWTP No. 5**

Parameters	Limit
Arsenic	5.0 mg/L
Barium	100.0 mg/L
Beryllium	0.75 mg/L
Cadmium	NT
Chromium	NT
Cobalt	80 mg/L
Copper	25.0 mg/L
Lead	NT
Mercury	0.2 mg/L
Molybdenum	350 mg/L
Nickel	20 mg/L
Selenium	1.0 mg/L
Silver	5 mg/L
Thallium	7.0 mg/L
Vanadium	24 mg/L
Zinc	250 mg/L
pH	>5.5 S.U.
Oil and Grease	100 mg/L
Cyanide (total)	5 mg/L
Phenolic Compounds	100 mg/L
TICH ¹	0.5 mg/L
TTO ²	2.13 mg/L

NT = No Threshold Limit

1 = Total Identifiable Chlorinated Hydrocarbons (EPA 8240)

2 = Total Toxic Organics (EPA 8240, 8270, and 8080)

Table B
Offsite Landfill
Solid Waste Acceptance Criteria

Solid Waste Acceptance Criteria*			
Parameters	BFI Vasco Road Class III	BFI Keller Canyon Class II	Chem Waste Mngnt Kettleman Class I
418.1 TRPH	1000 mg/kg	-	-
Benzene	0.4 mg/L	10.0 mg/L	-
Toluene	16 mg/L	-	-
Ethlybenzene	12.0 mg/L	-	-
Xylene	8.0 mg/L	-	-
8270	see table D**	see table D**	-
8080	see table D**	see table D**	-
reactive Sulfide	<100 mg/kg	<500 mg/kg	-
reactive Cyanide	<10 mg/kg	<250 mg/kg	-
Corrosivity	pH range 5 to 10	pH range 2.0 to 12.5	-
Ignitability	Flashpoint >140 °F	Flashpoint >140 °F	-
STLC Metals	See table C***	See table C***	

- No requirement, must provide data.

* Criteria based upon BFI Industrial Waste Services, Waste Acceptance Guidelines for The Vasco Road Sanitary Landfill, and The Keller Canyon Landfill. In the event an alternative disposal site is chosen, the acceptance criteria will be ammended.

** Total Threshold Limit Concentration (TTLC) must be 20 times greater than the TCLP limit and or 10 greater than the STLC limit.

*** If results are above TTLC limits run STLC.

Table C

**Inorganic Constituents: California Code of Regulations 17 Metals
Solid Waste Acceptance Criteria
Vasco Road Class III**

Keller Canyon Class II

	Soluble Thresholds (W.E.T.) mg/L	Dilution Factor TTLc mg/kg *	California Total Results Thresholds (TTLC)	Soluble Thresholds (W.E.T.) mg/L	Dilution Factor TTLc mg/kg *	California Total Results Thresholds (TTLC)
Anitmony	0.35	3.5	3.5	15	150	500
Arsenic	0.35	3.5	3.5	5	50	500
Barium	70	700	700	100	1000	10000
Beryllium	0.07	0.7	0.7	0.75	7.5	75
Cadmium	0.35	3.5	3.5	1	10	100
Chromium	3.5	35	35	5	50	500
Cobalt	3.5	35	35	80	800	8000
Copper	14	140	140	25	250	2500
Lead	1.05	10.5	20	5	50	1000
Mercury	0.006	0.06	0.06	0.2	2	20
Molybdenum	0.7	7	7	350	3500	3500
Nickel	7	70	70	20	200	200
selenium	0.7	7	7	1	10	100
Silver	3.5	35	35	5	50	500
Thallium	0.14	1.4	1.4	7	70	700
Vanadium	1.4	14	14	24	240	2400
Zinc	140	1400	1400	250	2500	5000

* - Dilution factor TTLc limits are based upon 10 times the STLC limit

Step 1- If laboratory total results are less than dilution factor TTLc criteria - acceptable for disposal factor TTLc criteria - run STLC

Step 2 - If laboratory results are less than California TTLc criteria but greater than then the Dilution then If STLC results are greater than threshold criteria for both Keller and Vasco - dispose class I

**SITE HEALTH AND SAFETY PLAN
NAVAL AIR WEAPONS STATION ALAMEDA
SITE 18 - STORM DRAIN SYSTEM
ALAMEDA, CALIFORNIA**

**CONTRACT NO. N62474-93-D-2151
Delivery Order No. 41**

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San Bruno, California 94066-2402

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4585 Pacheco Boulevard
Martinez, California 94553

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SITE HEALTH AND SAFETY PLAN
NAVAL AIR WEAPONS STATION ALAMEDA
SITE 18 - STORM DRAIN SYSTEM
ALAMEDA, CALIFORNIA

Revision 0

July, 1996

Approved by: *Louis E. Stout*
Louis E. Stout
IT Program Manager

Date: 07/08/96

Approved by: *William J. Hetrick*
William Hetrick
IT Program CIH

Date: 7/3/96

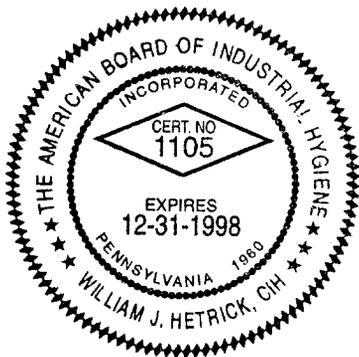


Table of Contents

List of Tables	v
List of Appendices	vi
List of Acronyms	vii
Project Health and Safety Plan Acknowledgment	ix
Disclaimer	x
1.0 Introduction	1-1
1.1 Objective	1-1
1.2 General Site Description	1-1
1.3 Policy Statement	1-2
1.4 References	1-2
2.0 Responsibilities	2-1
2.1 All Personnel	2-1
2.2 Senior Project Engineer/Manager	2-1
2.3 Program Certified Industrial Hygienist (CIH)	2-3
2.4 Project Superintendent	2-4
2.5 Site Health and Safety Officer	2-5
2.6 Subcontractor Management and Personnel	2-7
2.7 On-Site Personnel and Visitors	2-9
3.0 Project Hazard Analysis	3-1
3.1 Scope of Work	3-1
3.2 Activity Hazard Analysis	3-1
3.2.1 Materials Handling	3-2
3.2.2 Vehicle Traffic	3-3

Table of Contents (continued)

3.2.3	Maintenance/Troubleshooting	3-3
3.2.4	Hand Tools	3-7
3.2.5	Power Tools	3-7
3.2.6	Use of Torches	3-8
3.2.7	Pressure Washing	3-10
3.2.8	Confined Space Entry	3-10
3.2.9	Noise	3-11
3.2.10	Heat and Cold Stress	3-12
3.2.10.1	Heat Stress	3-12
3.2.10.2	Cold Stress	3-15
3.2.11	Fire Prevention	3-17
3.2.12	Environmental Hazards	3-18
3.2.12.1	Ticks	3-19
3.2.12.2	Spiders	3-19
3.2.12.3	Insects	3-20
3.2.12.4	Snakes	3-21
3.2.13	Dust	3-21
3.2.14	Slip, Trip and Fall Hazards	3-21
3.2.15	Sanitation	3-22
3.2.16	Portable Electric Equipment	3-23
3.2.17	Other Safe Work Practices	3-24
3.3	Hazardous and Toxic Materials	3-24
3.4	Exposure Standards	3-25
4.0	Buddy System	4-1
5.0	Personal Protective Equipment	5-1
5.1	Respiratory Protection	5-1
5.2	Levels of Protection	5-1
5.2.1	Level A Protection	5-1
5.2.2	Level B Protection	5-1
5.2.3	Level C Protection	5-2

Table of Contents (continued)

5.2.4	Level D Protection	5-3
5.3	Activity Specific Levels of Protection	5-4
5.4	Donning/Doffing PPE	5-5
6.0	Site Control	6-1
6.1	Hazard Briefing	6-1
6.2	Documentation of Certification	6-1
6.3	Entry Log	6-2
6.4	Entry Requirements	6-2
7.0	Decontamination	7-1
7.1	Personnel Decontamination	7-1
7.2	Equipment Decontamination	7-1
7.3	Personal Protective Equipment Decontamination	7-1
8.0	Site Monitoring	8-1
8.1	Air Monitoring	8-1
8.1.1	Locations to be Monitored	8-1
8.1.2	Frequency	8-2
8.1.3	Monitoring Equipment Maintenance and Calibration	8-2
8.2	Noise Monitoring	8-2
8.3	Heat Stress	8-3
8.4	Safety Reviews	8-3
8.5	Monitoring Records	8-3
8.6	Notification	8-4
9.0	Employee Training	9-1
9.1	General	9-1
9.1.1	Tailgate Safety Meetings	9-1
9.1.2	Material Safety Data Sheets	9-2
9.1.3	Site-Specific Health and Safety Plan	9-2
9.2	Site Workers' Basic Course	9-2

Table of Contents (continued)

9.3 Supervisors' Course Content	9-3
9.4 Site-Specific Training	9-3
9.5 First Aid and Cardiopulmonary Resuscitation (CPR)	9-3
9.6 Instructors	9-3
10.0 Medical Surveillance Program	10-1
10.1 Physical Examinations	10-1
10.1.1 Preplacement Examination	10-2
10.1.2 Annual Examination	10-2
10.1.3 Exit Examination	10-2
10.2 First-Aid and Medical Treatment	10-2
10.3 Medical Restriction	10-3
10.4 Medical Records	10-3
11.0 Emergency Response Plan and Contingency Procedures	11-1
11.1 Personnel Roles/Lines of Authority	11-1
11.2 List of Emergency Contacts and Notification	11-2
11.3 Medical Emergency Response	11-3
11.4 Personal Exposure or Injury	11-4
11.5 Fire Control	11-5
11.6 Spills or Control	11-6
11.7 Site Evacuation Procedures	11-7
11.8 Emergency Decontamination Procedures	11-8
11.9 Adverse Weather Conditions/Natural Disasters	11-10
11.10 Critique and Follow-Up of Emergency Procedures	11-11
12.0 Summary and Checklist	12-1
12.1 Summary	12-1
12.2 Checklist	12-1

List of Tables

Table	Title
3-1A	Maximum Concentrations of Health Significant Contaminants Detected in Storm Sewer Samples
3-2	Proposition 65 Warning and Notification
3-3	Hazardous and Toxic Material
3-4	Exposure Guidelines for Identified Health Significant Site Contaminants
3-5	Minimum Clearance from Energized Overhead Electric Lines
8-1	Action Levels
11-1	Emergency Phone Numbers

List of Appendices

Appendix

Title

- | | |
|---|--|
| A | Site and Hospital Location Maps |
| B | Material Safety Data Sheets and Occupational Health Guidelines |
| C | Jobsite Postings, Permits, and Forms |
| D | Activity Hazard Analysis |

List of Acronyms

ABIH	American Board of Industrial Hygiene
AIDS	Acquired Immune Deficiency Syndrome
AIHA	American Industrial Hygiene Association
ANSI	American National Standards Institute
ATSDR	Agency for Toxic Substances and Disease Registry
bpm	Beats Per Minute
BCSP	Board of Certified Safety Professionals
°C	Degrees Celsius
Cal/EPA	California Environmental Protection Agency
Cal/OSHA	California Department of Industrial Relations, Division of Occupational Safety and Health
CCR	California Code of Regulations
CET	Certified Environmental Trainer
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CPR	Cardiopulmonary Resuscitation
CSP	Certified Safety Professional
CRZ	Contamination Reduction Zone
dBA	Decibels, A-weighted
DOT	Department of Transportation
DTSC	Department of Toxic Substances Control
EFA	Engineering Field Activity
EKG	Electrocardiogram
EMR	Medical Provider
EPA	Environmental Protection Agency
EZ	Exclusion Zone
°F	Degrees Fahrenheit
FADL	Field Activity Daily Log
FID	Flame Ionization Detector
FM	Factory Mutual
FR	Federal Register
GFCI	Ground Fault Circuit Interrupter
HAZWOPER	Hazardous Waste Operations and Emergency Response
HBV	Hepatitis B Virus
HEPA	High Efficiency Particulate
HIV	Human Immunodeficiency Virus
HS	Health and Safety
IDLH	Immediately Dangerous to Life and Health
IIPP	Injury and Illness Prevention Plan
IT	IT Corporation

List of Acronyms (Continued)

LEL	Lower Explosive Limit
MSDS	Material Safety Data Sheet
NIOSH	National Institute of Occupational Safety and Health
NOSC	Navy On-Scene Coordinator
NOSCDR	Navy On-Scene Commander
NRR	Noise Reduction Rating
OSHA	Occupational Safety and Health Administration
OVA	Organic Vapor Analyzer
PEL	Permissible Exposure Limit
PHSP	Program Health and Safety Plan
PID	Photoionization Detector
PPE	Personal Protective Equipment
ppm	Parts per Million by Weight
PS	Project Superintendent
ROICC	Resident Officer in Charge of Construction
SEIR	Supervisor's Employee Injury Report
SHSO	Site Health and Safety Officer
SHSP	Site Health and Safety Plan
SIR	Safety Inspection Report
SPM	Senior Project Engineer/Manager
TBA	To be Announced
TSM	Tailgate Safety Meeting
UL	Underwriter's Laboratory
USA	Underground Services Alert
USACE	U.S. Army Corps of Engineers
USN	U.S. Navy
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WBG	Wet Bulb Globe Temperature

Disclaimer

This Site Health and Safety Plan was developed with the goal of providing the best available and most current industrial health, safety and regulatory information. The recommendations and guidance provided herein are based on currently accepted industrial hygiene principles and safety practices. All such advice and instruction is intended to reflect the present level of health and safety efforts consistent with prevailing professional standards. This representation is in lieu of all warranties either expressed or implied, and no responsibility is assumed for the misapplication of any materials, advice or instruction provided herein.

Any reference contained in the Site Health and Safety Plan to products and manufacturers is intended only for purposes of illustration and is not meant to be, and should not be, construed as an endorsement by IT or its subsidiaries.

1.0 Introduction

1.1 Objective

The objective of this Site Health and Safety Plan (SHSP) is to ensure that safe working conditions exist during the time-critical removal activities at Naval Air Station, Alameda, California. The safety procedures outlined have been established based on preliminary analysis of potential hazards within the site. This SHSP describes the health and safety requirements and procedures to be used while conducting field work and includes:

- Responsibilities of persons on site;
- Training Program;
- Medical Surveillance Program;
- Activity Hazard Analysis;
- Hazard Control Program;
- Personal Control Program;
- Decontamination Procedures;
- Emergency Response Plan
- Spill Containment Program
- Industrial Hygiene Monitoring Program; and
- Certain Specific Work Procedures.

This document, in combination with IT's Corporate Health and Safety Policy manual, also serves as the company's Injury and Illness Prevention Plan (IIPP) and Code of Safe Work Practices.

1.2 General Site Description

NAS Alameda is an active military air station located on the island of Alameda, California, which is on the east side of San Francisco Bay. It is bordered on three sides by open water. The land boundary abuts the City of Alameda in the east. The facility is located on former marshland that has been gradually filled in starting in the early 1900s to the late 1950s. Other facilities reportedly located on the site have included a rail terminal, an oil refining company, and a yacht harbor.

Site 18 is NAS Alameda's storm sewer system. This system consists of approximately 194,000 linear feet of storm sewer lines ranging from 4 inches to 42 inches in diameter. These lines empty directly into the Sea Plane Lagoon, Oakland Inner Harbor and the San

Francisco Bay. The storm drain system received industrial wastewater from plating shop baths, paint shops, pesticide/herbicide mixing and disposal areas, and cleaning shops as well as PCBs prior to the inception of the Clean Water Act.

1.3 Policy Statement

It is the policy of IT Corporation (IT) to provide a safe and healthful work environment for all its employees and subcontractors. IT considers no phase of operation or administration to be of greater importance than injury or illness prevention. Safety takes precedence over expediency or shortcuts, and every reasonable step to reduce the possibility of injury, illness, or accident will be taken.

This SHSP prescribes the procedures that must be followed during field work associated with the Naval Air Station Alameda project. Operational changes which could affect the health or safety of personnel, the community, or the environment will not be made without the prior approval of the IT Senior Project Engineer/Manager, and the Program Certified Industrial Hygienist (CIH).

The provisions of this SHSP are mandatory for all IT personnel and subcontractors assigned to the project. IT requires all visitors to the work site to abide by the requirements of this SHSP. The Program CIH will provide written revisions to this SHSP when changes warrant. No changes to the plan will be implemented without prior approval of the Program CIH or his authorized representative.

1.4 References

This SHSP complies with Federal Occupational Safety and Health Administration (OSHA), California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA), United States Environmental Protection Agency (EPA), California Environmental Protection Agency (Cal/EPA), and California Department of Toxic Substances Control (DTSC), and U.S. Army Corps of Engineers (USACE) regulations. This SHSP follows the guidelines established in the following documents:

- Standard Operating Safety Guidelines (EPA, June 1992);

- Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities; Department of Health and Human Services (DHHS) [National Institute for Occupational Safety and Health (NIOSH)] Publication No. 85-115.
- Title 29 of the Code of Federal Regulations (CFR), Parts 1910 and 1926 including Parts 1910.120/1926.65 or in California Title 8 California Code of Regulations (T8CCR) (Cal/OSHA Construction and General Industry Safety Orders) including Section 5192 (Hazardous Waste Operations and Emergency Response);
- U.S. Army Corps of Engineers Safety and Health Requirements Manual (USACE EM 385-1-1, October 1992).
- IT Corporate Health and Safety Procedures.

The requirements of each applicable corporate health and safety policy apply to the work conducted on this project. All IT employees and subcontractors must follow the Base's fire, safety and traffic regulations as well as all applicable federal, state, local and USACE EM 385-1-1 safety regulations.

2.0 Responsibilities

2.1 All Personnel

Each person is responsible for his/her own health and safety, for completing tasks in a safe manner and for reporting any unsafe acts or conditions to his/her supervisor and the Project Superintendent (PS). All persons on-site are responsible for continuous adherence to health and safety procedures during the performance of any project work. In no case may work be performed in a manner which conflicts with the intent of, or the inherent safety precautions expressed in, this SHSP. After due warning, persons who violate procedure and work rules may be dismissed from the site, terminated, or have their contract revoked. Blatant disregard or repeated infractions of health and safety policies are grounds for disciplinary action up to, and including, dismissal, and/or removal from the work area.

All IT and subcontractor personnel are required to read and acknowledge their understanding of this SHSP. All project personnel are expected to abide by the requirements of this SHSP and cooperate with project management in ensuring a safe and healthful work site. Site personnel are required to immediately report any of the following to the PS:

- Accidents and injuries, no matter how minor;
- Unexpected or uncontrolled release of chemical substances;
- Any signs or symptoms of chemical exposure;
- Any unsafe or malfunctioning equipment; and
- Any changes in site conditions which may affect the health and safety of project personnel.

2.2 Senior Project Engineer/Manager

The Senior Project Engineer/Manager (SPM) has overall responsibility for the health and safety of all personnel on the project. His/her responsibility with regard to health and safety is to maintain company policy and resolve health and safety issues with the assistance and guidance of the Program CIH. The SPM will provide the Program CIH with the company name and representatives of those contractors being considered for hire, as well as those hired, to allow required preliminary information to be collected in a timely manner.

The SPM is responsible to:

- Notify the Program CIH when field operations begin so that field support can be scheduled;
- Ensure that the SHSP is read and signed by all field personnel on the project, including subcontractors. The SHSP must also be signed by the Program CIH and the SPM;
- Ensure that all provisions of the SHSP are followed. Contact the Program CIH for any variances or modifications desired;
- Demonstrate a personal commitment to safety on the project;
- Ensure that tailgate safety meetings are conducted daily, signed by all field workers and reviewed by the PS and the SPM. The SPM must have completed the Hazardous Waste Supervisor Course;
- Ensure that Field Activity Daily Log (FADL) forms are completed for each day of operations, signed and dated by the author, and that all persons listed have signed the SHSP and tailgate form;
- Have supervisors inspect the project at least weekly, with inspections and corrective actions documented on FADL forms. The SPM is to inspect the project for safety hazards periodically;
- Ensure correction of any reported or observed safety hazard;
- Report all near-miss, injury, illness and vehicle accident incidents to the Program CIH and Resident Officer in Charge of Construction (ROICC) within 24 hours and ensure that a Supervisor's Employee Injury Report (SEIR) form is initiated;
- Notify the Program CIH when field work lasts more than six months so that the SHSP can be reviewed and updated as needed;
- Immediately notify the Program CIH upon receiving notice of any regulatory agency inspection; and
- Ensure that the project files receive copies of:
 - all internal and external HS correspondence
 - all air sampling records (including "none-detected")
 - all accident reports and Accident Review Board documentation
 - documentation of audits and corrective actions

- air monitoring equipment calibration records
- all FADLs.

The SPM will lead at least one site safety audit team per quarter while field activities are conducted and will ensure that all accidents, incidents and/or near-misses are investigated in a timely manner. The SPM will ensure that management performs an investigation of all incidents or accidents which had the potential to cause a lost-time or hospitalization incident or fatality within 24 hours of the incident.

The SPM for this delivery order is Gary Elston.

2.3 Program Certified Industrial Hygienist (CIH)

The Program CIH is responsible for the preparation and modification (as necessary) of this SHSP. The Program CIH will approve changes and update the SHSP as warranted by altered site conditions and shall have the only authorization to effect such changes (except those changes outlined in the Emergency Response Plan). The Program CIH will advise the SPM on health and safety issues which may have an impact on project operations. In addition, the Program CIH is responsible to:

- Oversee and review the work of the Site Health and Safety Officer (SHSO);
- Administer the general health and safety program;
- Provide technical assistance to the SPM and the PS;
- Investigate significant accidents, illnesses and near-misses. Recommend corrective actions as appropriate. Review all Accident/Incident Investigation Reports;
- Establish the required personal protective equipment for each work area;
- Assist the PS and SHSO in establishing decontamination area locations;
- Evaluate and approve contractors regarding health and safety compliance both prior to accepting the contract and upon completion of the project, as appropriate; and
- Establish proper employee exposure monitoring and assess the appropriateness of protective measures.

The Program CIH is William Hetrick. Mr. Hetrick is certified by the American Board of Industrial Hygiene (ABIH).

2.4 Project Superintendent

The Project Superintendent (PS) reports to the SPM and is responsible for field enforcement of the SHSP. This includes communicating project health and safety requirements to all on-site project personnel (both IT and subcontractor personnel), consulting with the Program CIH regarding changes to the SHSP, and conducting periodic health and safety inspections with the SHSO. The PS is responsible for informing the Program CIH and the SPM of any changes to the workplan, prior to implementation, so that health and safety issues introduced by those changes may be properly addressed. The PS will be on-site during all project related activities or will delegate his responsibilities to qualified supervisory personnel [i.e., person(s) having 8-hours of hazardous waste operations supervisory training per 29 CFR 1910.120 (e) (4)/1926.65(e)(4)], as appropriate. The PS shall coordinate all Site 18 removal operations with the ROICC at NAS Alameda prior to the start of actual work.

Other responsibilities include:

- Reading and being familiar with the Project SHSP, as well as appropriate IT Policies and Procedures;
- Directing work so as to ensure personnel safety and protection of property and the environment;
- Presenting tailgate safety meetings (a responsibility shared with the SHSO);
- Providing all required safety supplies to work crews prior to each task;
- Demonstrating a personal commitment to safety on the project;
- Observing project personnel for signs of chemical or physical trauma;
- Conducting jobsite safety audits with the SHSO at least weekly;
- Immediately notifying the SPM and Program CIH upon receiving notice of any jobsite inspection by a regulatory agency;
- Correcting any hazards disclosed by project workers or the SHSO;

- Rendering appropriate disciplinary action to individuals who do not strictly adhere to the project SHSP;
- Immediately notifying the SPM, SHSO, and Program CIH of any illnesses, accidents, injuries, or near-misses related to the project, and submitting appropriate documentation to the Program CIH with 24 hours.
- Assist the Program CIH and/or SHSO in establishing appropriate site control zones.

The Project Superintendent is Jaimie Hargrave. A qualified alternate supervisor will be available in case the PS is temporarily away from the jobsite (due to illness or other emergency). The qualified alternate PS that will be available on site in the absence of the PS will be the lead foreman.

2.5 Site Health and Safety Officer

The Site Health and Safety Officer (SHSO) will represent the Program CIH on-site during field activities. As such, he/she will be responsible for providing independent surveillance of the routine implementation of the project SHSP. The SHSO may not, however, authorize changes to or variances from the SHSP. Any modifications of the project SHSP must be approved by the Program CIH with the written concurrence of the Contracting Officer.

Other duties of the SHSO include:

- Immediately stopping work if Immediately Dangerous to Life or Health (IDLH) or other extremely hazardous conditions are encountered.
- Verifying that all personnel have the necessary training and medical clearance prior to entering the site;
- Identifying all site personnel with medical restrictions to the PS;
- Determining that monitoring equipment is properly calibrated and used, and that results are properly recorded and filed;
- Informing the Program CIH of significant changes in either the environment or work procedures which may require modification of the SHSP;
- Observing work party members for symptoms of on-site exposure or stress;

- Overseeing implementation of the SHSP, reporting any deviations from the Plan to the PS and the Program CIH;
- Immediately notifying the PS of any unsafe conditions observed, and providing technical guidance to the PS for the correction of the condition;
- Recording daily maximum and minimum temperatures;
- Conducting employee exposure monitoring for workplace contaminants, noise and/or heat stress as outlined in Section 8;
- Monitoring the use of required protective clothing and safe work practices;
- Assisting the Project Administrator in purchasing safety-related equipment;
- Determining and posting routes to capable medical facilities and emergency telephone numbers (including poison control facilities), and arranging emergency transportation to medical facilities;
- Notifying local public emergency officers of the nature of the operations, and posting of their telephone numbers in an appropriate location;
- Conducting and documenting required project specific training;
- Conducting job site safety audits at least daily;
- Ensuring that training and medical records are maintained on-site for all IT and subcontractors personnel;
- Monitoring project personnel to ensure ongoing compliance with the SHSP;
- Assisting the PS in establishing appropriate Work Zones;
- Presenting tailgate safety meetings (a responsibility shared with the PS) and maintaining attendance records;
- Monitoring that decontamination procedures are meeting established criteria;
- Acting as Project Hazard Communication Coordinator as required by 29 CFR 1910.1200 or in California T8CCR 5194;
- Responding to employee's/contractor's health and safety concerns; and

- Periodically auditing subcontractor qualifications to ensure only properly qualified personnel are allowed in the work area.
- Ensure employees are trained on the hazards of any hazardous substances used. MSDSs must be on-hand for all hazardous materials (other than wastes) and containers must be properly labelled;
- Ensure that project safety equipment is inspected regularly (monthly for fire extinguishers).

The Site Health and Safety Officer (SHSO) for this field work is Jim Heringer. The SHSO shall designate another qualified project worker to serve as alternate SHSO during periods when the SHSO cannot be on site (due to illness or other emergency). This person has been tentatively identified as the project superintendent, Jaimie Hargrave.

2.6 Subcontractor Management and Personnel

Subcontractor management is responsible for the compliance of their personnel with this Project SHSP. Since subcontractors are hired for their specific expertise, they must assume primary responsibility for the health and safety of their personnel. The subcontractor's Field Supervisor or Crew Leader will also be responsible for performing a weekly safety inspection of their operations. A copy of this inspection must be submitted to the PS each week. The subcontractor's Field Supervisor must have successfully completed 8 hours of Supervisory training per 29 CFR 1910.120 (e)(4)/1926.65(e)(4) or in California T8CCR Section 5192(e)(4) if the subcontractor personnel will be performing work within either the Exclusion Zone (EZ) or Contamination Zone (CRZ).

Subcontractors must also:

- Comply with all applicable Occupational Safety and Health Administration (OSHA) regulations as defined in Title 29 Code of Federal Regulations Parts 1910 and 1926 or in compliance with applicable Cal/OSHA standards, found in Title 8 of the California Code of Regulations (T8CCR), as well as the United States Army Corps of Engineers "Safety and Health Requirements Manual" (EM 385-1-1).
- Perform all work in accordance with this SHSP.
- If work will be performed in the EZ or CRZ, provide documentation for each on-site worker of successful completion of either 24 or 40 hours training (depending on the work to be conducted) in health and safety practices for hazardous waste

operations per 29 CFR 1910.120/1926.65 or in California T8CCR 5192. This must be received prior to the employee arriving on-site.

- For work in the EZ or CRZ, provide documentation for each on-site worker of a doctor's approval for the worker to perform hazardous waste remediation work based on an annual medical exam and work history review prior to the worker arriving on site.
- Provide updated documentation as on-site individuals complete annual HAZWOPER refresher training and/or receive annual medical examinations for workers entering the EZ or CRZ. Such documentation must be provided prior to the expiration date of the previous year's training/physical examination.
- Provide their own basic personal protective equipment (including safety boots, safety glasses, hard hats, and the like).
- Report all incidents/accidents/injuries/near-misses immediately to the PS. Provide input to IT's investigation of any mishap or near miss. Provide documentation to IT of the subcontractor's internal investigation of the mishap/near miss.
- Provide proof of additional (non-HAZWOPER) training upon request (e.g., documentation of forklift training).
- Submit to the Program CIH a task-specific hazard analysis for their anticipated work.
- Provide awareness level training to affected IT workers regarding any material, equipment or operation which may pose a hazard to the IT employees.
- Provide a Material Safety Data Sheet (MSDS) to IT for all materials used on the project which are regulated by the Hazard Communication Standard (29 CFR 1910.1200) or in California T8CCR 5194. MSDSs shall be approved by IT Corporation prior to the material being brought on site.
- Notify IT in writing prior to bringing any radioactive materials or devices (e.g., nuclear density gauges) onto the jobsite. Such notification must identify by name the subcontractor's Radiation Safety Officer and list the company's radioactive material license number.
- Provide own first aid kits and first aid trained individual.
- Submit personnel to "reasonable cause" drug and alcohol testing when directed to do so by the Senior Project Engineer/Manager (in accordance with IT Policy

HS101). Results of such testing are to be provided to IT Corporation immediately upon receipt.

- Remove any worker from the project who tests positive for either drugs or alcohol.
- Have in place an active and effective Drug free Workplace Program in compliance with the Federal Drug-free Workplace Act.
- Provide written notification to subcontractor's own employees of the results of any industrial hygiene monitoring conducted by IT on those employees.
- Immediately inform the IT Project Superintendent of the presence, or anticipated presence, of regulatory agency officials at the jobsite. Provide documentation to IT of any citations or notices of violation issued to the subcontractor for work on, or associated with the project. Such documentation shall include a copy of the written citation and a summary of the subcontractor's corrective action plan.

2.7 On-Site Personnel and Visitors

No visitor will be allowed within the Work Zones without authorization from the SPM and the PS. Visitors requesting authorization to enter the Contamination Reduction Zones (CRZs) or Exclusion Zones (EZs) must meet the requirements established for Project Personnel, including appropriate medical exams and training. On-site Navy personnel will also be held to these requirements.

3.0 Project Hazard Analysis

3.1 Scope of Work

This removal action will consist of removing solids and debris from approximately 150,000 linear feet of the system and associated manholes.

Solids and debris will be removed from the system by high pressure jetting. The solids, debris and wastewater generated by the high pressure jetting will be removed by vacuum trucks from the nearest downstream manhole or catch basin. The vacuum trucks will transport the waste material to a filter press system temporarily established in a designated area within NAS Alameda. From the filter press, solids will be stockpiled in a lined and bermed area, liquids will be stored in 21,000 gallon holding tanks and debris will be stored in roll-off bins. Each of these materials will be analyzed to allow determination of the most appropriate method of disposition. All lines will be videoed before and after use of the high pressure jet. If warranted, some lines may be subjected to high pressure jetting a second time, followed by a third videoing of the line.

3.2 Activity Hazard Analysis

The activity hazard analysis identifies potential safety, health, and environmental hazards and provides for the protection of personnel, the community, and the environment for each task to be performed. Because of the complexity and constant change of remediation projects, supervisors must continually inspect the work site to identify hazards which may harm site personnel, the community, or the environment. The PS must be aware of these changing conditions and discuss them with the SPM and the Program CIH. The Project PS will keep supervisors for subcontractors informed of the changing conditions. Changes to the activity hazard analysis may be originated by the SHSO, but must be approved by the Program CIH. Appendix D contains an activity hazard analysis for each of the following major tasks associated with this project:

- Mobilization/Site preparation
- Removal operations/Video Survey
- Sampling of liquids and solids

- Soil/debris separation
- Setup and operation of filter press equipment
- Equipment decontamination (filter press and associated equipment)
- Equipment decontamination

All the following sections are supplements for these activity hazard analysis.

3.2.1 Materials Handling

Loading and unloading materials and setting up and dismantling equipment presents a variety of hazards. These include cuts, abrasions and lacerations from sharp objects; back injuries from poor lifting techniques; crushing injuries from falling or moving loads; pinch points; and being struck by moving equipment or loads.

Site operations shall be organized to minimize the amount of drum and container movement. All employees involved in the transfer of drums or containers shall be warned of the potential hazards associated with the contents of the drums or containers during tailgate safety meetings prior to beginning transfer operations. Tailgate safety meetings should also include information on safe handling techniques, including:

- Proper lifting techniques;
- Safe handling of visqueen in high winds;
- Procedures and equipment used to minimize sources of ignition during transfer operations; and
- Positioning of roll-off bins to minimize obstruction of the work site.

Employees are not to stand upon or work from the roll-off bins at any time.

U.S. Department of Transportation (DOT) specified salvage drums or containers and suitable quantities of proper absorbent shall be kept available and utilized in areas where spills, leaks or ruptures may occur. Containers that cannot be moved without rupture, leakage or spillage shall be emptied into a sound container using a device classified for the material being transferred.

3.2.2 Vehicle Traffic

The project worksite is located within an active military base with both industrial and personal vehicle traffic nearby. Work in such areas presents a risk of being stuck by a vehicle. Collisions between vehicles are also possible unless safe driving practices are used.

All IT employees who will be driving restricted-visibility vehicles (e.g., trucks, vans and pick-ups) at the project site shall have successfully completed IT's Safe Driver Training Course. Vehicle operators will check carefully for nearby traffic before proceeding at a cautious pace on facility roadways. Unless otherwise marked, speeds should be held to 15 mph or less while on site.

Care should be taken to ensure that trucks, equipment and materials are placed in a manner that keeps obstruction of local traffic to a minimum. During work activities, it may become necessary to move equipment in order to accommodate traffic and site activities.

Work will be conducted in active traffic areas. Workers will wear bright orange safety vests, and the work area will be marked with lighted barricades, cones or flags to warn traffic.

Where traffic control is necessary, base representatives will be contacted to ensure minimal disruption of base activities. When the base cannot provide traffic control officers, project workers will do so using high visibility road vests, hand-held stop signs and traffic cones.

3.2.3 Maintenance/Troubleshooting

Equipment and machinery maintenance and troubleshooting work can expose project workers to contaminated materials and other hazards. Troubleshooting electrical and mechanical equipment can expose workers to shock hazards, and crushing or pinch hazards.

Whenever employees or subcontractors are working on equipment or in areas where the activation of the equipment or the charging of hazardous materials lines might endanger the worker's safety, lockout and tagout procedures (IT Policy HS315) are required. Should the project extend more than 30 days with lockout/tagout planned for more than seven calendar days, or when locking/tagging out specialized equipment having its own lockout requirements, the Program CIH shall be notified for an addendum to this SHSP.

General Lockout/Tagout Requirements

Lockout and tagout procedures are required during maintenance of powered tools or equipment, during valve changeouts and other work on hazardous waste or materials lines, and during confined space entries. Other tasks may also required lockout and tagout procedures if use of nearby equipment or material transfer lines could harm employees. The requirements of lockout and tagout include:

- Locks and tags are to be used when a machine, equipment or piping system is capable of being locked out. Tags alone are allowed only when the equipment will not accept locks.
- Authorized padlocks shall be assigned to each authorized employee. Each group's lock will be individually keyed and the shift supervisor shall maintain the master keys.
- All new equipment installed must be designed to accept a lockout device.
- Where multiple items must be locked out, a group lock box must be used.
- Where multiple locks must be placed on an item, a multiple lock hasp must be used.
- Only the protected employee may remove his/her personal lock. When the employee is no longer present and the lock must be removed, only that employee's immediate supervisor may remove the lock and tag, and only after ensuring that the employee is out of harm's way.
- All locks must be accompanied by a tag indicating the name of the employee applying the lock, the date the lock was applied, equipment name or number, the reason for the lockout and a warning against the potential hazard of activation.
- A legend must be displayed warning against activation and stating that the lock and tag may be removed only by authorized personnel.
- Tags must be single-use, hand-attachable, legible and designed to withstand the environment where they are in use. Tags must be self-locking and non-releasable with a minimum unlocking strength of 50 pounds.
- A "Lockout Log" (HS315 Attachment 3) shall be maintained by the site supervisor as part of the SHSP.

- The SPM or PS is responsible for informing the client of the lockout/tagout procedure to be used at the jobsite. This must be documented on Field Activity Daily Logs (FADLs).
- Subcontractors are to use IT's lockout/tagout procedure. Their own procedure may be used only after it has been reviewed and approved by the Project CIH.
- If the client has their own lockout/tagout requirements, these shall be implemented only after IT's requirements have been met.
- The SPM and PS shall assure that locks, hasps and other equipment and site specific training are provided.

Lockout/tagout procedures are not required when work is conducted on equipment where an employee has direct control over the cord(s) or plug(s) connected to the associated equipment.

Lockout/Tagout Checklist

Where lockout/tagout procedures are required, the following steps shall be followed:

- Check equipment file for specific lockout/tagout procedures.
- Determine the requirements for lockout. Document each energy source to the equipment.
- Conduct a survey to locate and identify all isolation devices that apply to the equipment.
- Use the equipment type-specific procedures if applicable (HS315 Attachments 4-7). Complete the "Lockout/Tagout Procedure for Specific Equipment" form (HS315 Attachment 8), logging all data, and return to supervisor.
- Shut off energy source(s) to affected equipment.
- Affix lock(s) and tag(s) to each energy source controlling the device.
- Identify work on process lines or vessels and determine isolation requirements.
- Blind, blank, disconnect or double-valve and vent all hazardous materials lines (including steam). Identify isolation points with tags.

- When a tag only is used because the equipment can't be locked out, complete the following:
 - Remove fuses, block machine, etcetera.
 - Complete HS315 Attachment 8 and give to site supervisor.
- Relieve all stored energy (e.g., capacitor banks, springs, compressed air, hydraulic and steam).
- Verify that isolation of energy has occurred by attempting to activate equipment at the on/off switch.
- Return the control switch to the off position before proceeding.

Before returning any equipment to service following lockout and tagout, the following procedures are required:

- Ensure that all nonessential items (e.g., tools and cleaning rags) are removed from the equipment.
- Ensure that equipment components are intact.
- Check work area to ensure that all employees are safely positioned or removed from the area.
- Notify all affected employees and site supervisor before re-energizing the equipment.
- Remove lockout/tagout device.
- Re-energize equipment or open valves and restore flow in process line; place back into service.

Where equipment must be locked out for longer than one work shift, the individual lock(s) of the outgoing shift working on equipment will be removed and replaced by the on-coming shift's individual lock(s). The authorized employees of the on-coming shift must inspect and "try" the system to ensure de-energization. The site supervisor shall re-audit the system as necessary.

3.2.4 Hand Tools

Use of hand tools may expose workers to cuts, lacerations or puncture wounds if inadequate hand protection is worn or tools are improperly stored. Damaged hand tools may also expose employees to injuries from shattered tools and flying debris.

The following safe work practices apply to the use of hand tools:

- Only use a tool for its designed use.
- Do not use damaged tools.
- Driving faces of hammers, chisels, drift pins, bars, and similar tools must be inspected to eliminate mushroomed heads, broken faces and other defects.
- Tools must be returned to their proper storage place.
- Sharp tools must not be carried in pockets.
- Wood handles must be sound and securely wedged or fastened to the tool. Tape must not be used to cover defects such as cracks.
- When hand tools are being used overhead, those working or standing below must be notified.
- Pipe wrenches must be inspected regularly. Replace the heel and jaw sections if found to be defective or worn out.
- Pipe wrenches must not be used to bend, raise or lift pipe.
- Always wear safety glasses to protect the eyes.

3.2.5 Power Tools

Power tools present many potential hazards, including shock and electrocution, injuries from accidental activation and injuries from using damaged or malfunctioning equipment.

When using power tools, the following precautions shall be followed:

- Power tools will be inspected and their operation tested prior to being placed in service.

- Eye protection (safety glasses or goggles) must be worn whenever operating power tools.
- Power tools must be grounded or of the double-insulated type.
- Power tools shall not be used in wet locations.
- All power tools must be protected by a Ground Fault Circuit Interrupter (GFCI).
- Splicing, cutting or "repairing" electrical wire by unauthorized personnel is prohibited.
- Plugs and cords must be protected from damage.
- Grounding plugs are never to be removed.
- Electrical tools are not to be used inside a confined space without prior approval by the SHSO or Program CIH.
- All electrical tools must be turned off before connecting or disconnecting the power supply.
- Extension cords must be visually inspected each time they are used. Cords must be disconnected from the power source before coiling for storage.
- Extension cords used with portable electric tools shall be of three-wire type and shall be rated for hard or extra-hard usage (Types S, ST, SO, STO, SJ, SJO, SJT, or SJTO).

3.2.6 Use of Torches

Personnel using torches may be exposed to metal fumes and burns from hot equipment or the torch itself. Operating torches increases the potential for fires and also presents an explosion hazard. Additionally, the use of torches exposes nearby personnel to potential eyesight damage.

To prevent injuries and fires, the following rules apply to the use of torch.

- Any use of a torch requires that an IT Hot Work Permit be completed in accordance with IT Procedure HS314 "Hot Work in Hazardous Locations" and posted in the immediate area. The fire department must also be contacted for any required base hot work permits.

- No cutting or welding is allowed when combustible vapor concentrations exceed 10 percent LEL.
- All combustibles (including plastic sheeting) in the area must be removed or protected from sparks, flames and/or slag.
- A designated fire watch with a charged fire extinguisher rated 5A: 30 BC (minimum) must be in the immediate vicinity during all hot work. The fire watch must remain after hot work completion to check for flare-ups.
- Hot work is not allowed inside any confined space without prior approval of the SPM and Program CIH.
- Torch operators must wear, at a minimum:
 - nonflammable gloves with gauntlets
 - steel-toed work boots
 - leather aprons and shirts with sleeves and collars
 - hard hats
 - properly shaded eye protection
 - respiratory protection (see Chapter 5.0)
 - hearing protection.
- Torches will be lighted using sparking devices not by open flames.
- Flash screens must be provided to protect the eyes of bystanders.
- Fuel gas and oxygen hoses must be distinguished from each other.
- Couplings must not disconnect by means of a straight-pull motion.
- Oil or grease must never come in contact with oxygen equipment.
- Never use leaking equipment.
- Never use oxygen from a system without a pressure regulation device.
- Gas cylinders must be protected against heat.
- Gas cylinders must not be placed where they might form a part of any electrical circuit.
- Backflow preventors must be used on all oxygen and fuel gas supply lines.

- Gas cylinders in service must be secured upright and placed so they will not fall or be knocked over.
- Gas cylinders must be handled in suitable cradles with valve caps installed; they must never be lifted by magnet, rope, or chain.
- Oxygen cylinders in storage must be separated from fuel gas cylinders a distance of 20 feet or by a noncombustible barrier 5 feet high.
- Valve stem wrenches must be left in place while cylinders are in use.

3.2.7 Pressure Washing

The solids and debris accumulated in the lines will be removed by high pressure water jetting equipment. Pressure washers will also be used for activities such as equipment decontamination and tank cleaning. Due to the significant hazard of cutting and injecting water into the body refer to HS-303 Pressurized Water Cleaning and Cutting Equipment.

Training and providing the proper PPE is extremely important prior to using high pressure washing. Although HS-303 defines high pressure as 1,000 psig, lower pressures can also cause significant injury.

3.2.8 Confined Space Entry

Certain tasks required under this project may require entry into a confined space. A confined space is defined as an enclosure which is large enough for an employee to enter, but which has limited means of access and egress and is not designed for continuous employee occupancy. All confined spaces are initially considered permit required. Prior to the start of any work requiring confined space entry, the project superintendent and SHSO shall coordinate entry with the Alameda Fire Department to arrange rescue services prior to job scheduling.

All work within manholes and waste water holding tank must be conducted in accordance with IT Policy HS300, "Confined Spaces, Industrial." Key provisions of this policy include:

- Combustible gas and oxygen levels shall be measured at the confined space opening and inside the confined space prior to entry and continuously during

occupancy. The person conducting the monitoring must have completed IT's Qualified Person (QP) training.

- Oxygen levels must be at least 20 percent at all times during occupancy.
- Combustible gas readings must not exceed 10 percent of the LEL at any time during occupancy.
- A confined space entry permit must be completed, reviewed, and approved by the SHSO and posted outside the confined space entrance prior to entry.
- The entrant must have successfully completed Confined Space Entry training. Training records will be maintained on-site by the SHSO.
- At a minimum, modified Level D protection must be worn by all confined space entrants.
- An attendant trained in Confined Space Entry shall be posted outside the manhole entrance at all times during occupancy and shall remain in contact with the entrant. A second attendant must be nearby.
- Communications signals shall be established prior to entry. See Section 12.3.
- All confined space entry must be supervised by a QP on site.
- All appropriate lockout/tagout procedures must be implemented prior to entry and must remain in effect until operations inside the space have been completed.
- Additional requirements regarding confined space entry are found in IT Policy HS 300 and in the USACE Safety Manual. Copies of both of these documents must be maintained on-site and enforced by the SHSO.

3.2.9 Noise

Some of the equipment used on the project generates loud noise. Exposure to sound levels above 85 dBA can cause temporary impairment of hearing. Prolonged and repeated exposure to sound levels above 85 dBA can cause permanent hearing damage. The risk and severity of hearing loss increases with the intensity and duration of the exposure. In addition to damaging hearing, noise can impair voice communication, thereby increasing the risk of incidents.

All on-site IT and subcontractor personnel shall wear hearing protection, with a Noise Reduction Rating (NRR) of at least 25, when noise levels exceed 85 dBA (or wherever voices must be raised in order to be understood at arms length). The SHSO will perform sound level monitoring or noise dosimetry on operations which require hearing protection. All site personnel who may be exposed to noise shall also receive baseline and annual audiograms and training as to the causes and prevention of hearing loss, in accordance with IT Procedure HS402.

Whenever possible, equipment that does not generate excessive noise levels will be selected for this project. If the use of noisy equipment is unavoidable, wherever possible, barriers or increased distance will be used to minimize worker exposure to noise.

Blasting or use of explosives is not permitted without written permission from the Navy's Contracting Officer and the Program CIH, and then only during designated times.

3.2.10 Heat and Cold Stress

3.2.10.1 Heat Stress

Wearing personal protective equipment (PPE) can put site personnel at considerable risk of heat stress and heat related illnesses if proper precautions are not implemented. Heat related illnesses range from transient heat fatigue to heat stroke and death. Heat related illnesses are caused by a number of interacting factors which include environmental conditions, clothing, work load, and characteristics of the individual worker.

Individuals vary in their susceptibility to heat stress. Factors that influence an individuals tolerance for heat include physical fitness, diet, alcohol/drug use, sleeping habits, acclimation, genetics, medical condition, age and weight.

The signs of heat stress disorders are given below.

Heat Cramps. Heat cramps are caused by heavy sweating and inadequate electrolyte replacement. Signs and symptoms include muscle spasms and pain in the hands, feet and abdomen.

Heat Exhaustion. Heat exhaustion occurs from increased stress on various body organs.

Signs and symptoms include:

- Pale, cool, moist skin;
- Heavy sweating;
- Dizziness, nausea; and/or
- Fainting.

Heat Stroke. Heat stroke is the most serious form of heat stress and should always be treated as a medical emergency. The body's temperature regulation system fails, and the body temperature rapidly rises to critical levels. Immediate action must be taken to cool the body before serious injury or death occurs. Take person to a shower or cool bath or use ice packs. Monitor for drowning potential if the victim is cooling down in a bath tub or any type of container with enough water to drown if unconsciousness develops. Do not give anything to drink in case person vomits. Signs and symptoms of heat stroke include:

- Red, hot unusually dry (sometimes moist) skin;
- Lack of, or reduced perspiration;
- Nausea;
- Dizziness and confusion;
- Strong, rapid pulse and/or
- Coma.

Sunburn. Operations will require IT and subcontractor employees to work outside during daylight hours, typically seven to nine hours per day. Under these conditions, workers are at great risk for developing sunburn on unprotected skin.

Sunburn is a burn to the skin caused by overexposure to ultra-violet light (sunshine). The symptoms of exposure are not usually apparent until two to four hours after the exposure ceases. Depending upon the severity of the exposure the symptoms can range from reddening of the skin accompanied by mild discomfort, to painful deep burns and blisters. Although light-haired, fair-skinned, blue-eyed personnel are at the greatest risk of sunburn, all complexion types can develop sunburn if the exposure is long and intense enough.

Sunscreen products with sun protection factor ratings of 15 or higher will be available to project personnel. Areas of primary concern include; nose, cheeks, ears and the back of the neck. Sunscreen will be applied as necessary and reapplied after each break.

Prevention

Heat stress is a major hazard to personnel working in impermeable protective clothing.

Therefore, measures will be taken in preventing heat stress, including:

- Site workers will be encouraged to drink plenty of water throughout the day. Each worker should drink at least 16 oz. of water before going on site regardless if they are thirsty or not.
- On-site drinking water will be kept cool to encourage personnel to drink frequently.
- All personnel will be advised of the dangers and symptoms of heat stroke, heat exhaustion and heat cramps.
- All employees shall be informed of the importance of adequate rest, acclimation and proper diet in the prevention of heat stress disorders.
- Work/rest schedules will be adjusted by the PS and SHSO to account for the acclimatization of workers upon first encountering heat stress conditions.
- Workers will be instructed to limit their intake of alcohol during hot weather, as alcohol inhibits the body's ability to handle heat by causing dehydration.

One or more of the following control measures can be used to help control heat stress and are mandatory if any site worker has a heart rate (measured immediately prior to rest period) in excess of 110 beats per minute:

- A work regimen that will provide adequate rest periods for cooling down will be established, as required.
- Cooling devices such as vortex tubes or cooling vests must be used when personnel must wear impermeable clothing in conditions of extreme heat.
- Employees must be instructed to monitor themselves and coworkers for signs of heat stress and to take additional breaks as necessary.
- A shaded rest area must be provided. All breaks must take place in the shaded rest area.
- Employees shall not be assigned to other tasks during breaks.

- Employees shall remove impermeable garments during rest periods. This includes white Tyvek-type garments.

Monitoring Program

For each day of field operations, the daily maximum and minimum temperatures on-site will be recorded. Additional heat stress monitoring shall be initiated by the SHSO whenever ambient temperatures on site exceed 85 °F (or 70 °F when workers are wearing impermeable clothing). At the discretion of the Program CIH, environmental and/or physiological monitoring will be carried out. Environmental monitoring shall consist of the determination of Wet Bulb Globe Temperatures (WBGTs) when ambient temperatures exceed the values listed above. Physiologic monitoring may consist of pulse rate and/or body temperature determinations. Monitoring and interpretation of monitoring results will be in accordance with IT Procedure HS400, "Working in Hot Environments."

Reporting

Individuals experiencing the symptoms of heat stress shall notify the PS. The distressed individual shall immediately halt field activities and be treated for heat stress. Early detection and treatment of heat stress will prevent further serious illness or injury and lost work-time. Proper and effective heat stress treatment can prevent the onset of more serious heat stroke or exhaustion conditions. Individuals having progressed to heat exhaustion or stroke become more sensitive and predisposed to additional heat stress situations. Regardless of ambient temperature, physiological monitoring will be implemented if heat stress is experienced.

If symptoms of heat stress are observed, the following procedures will be implemented:

- Instruct the affected person to lie down in a cool, shaded area or air-conditioned room and elevate feet. Abbreviated decontamination procedures may be followed.
- Summon medical support, if appropriate. This is required in all cases of heat stroke or unconsciousness.

3.2.10.2 Cold Stress

Cold stress is not anticipated to be encountered during the execution of this project. If cooler than expected conditions are encountered (e.g. $\leq 45^{\circ}\text{F}$) during the work hours, a revision to this SHSP will be developed. However, workers should be aware that most cold-related worker fatalities have resulted from failure to escape low environmental air temperatures, or

from immersion in low temperature water. The single most important aspect of life-threatening hypothermia is a fall in the deep core temperature of the body.

In the event that the weather becomes unusually cold (temperatures below 45°F) project workers should be protected from exposure to cold so that the deep core temperature does not fall below 36 degrees Celsius (°C). Lower body temperatures will very likely result in reduced mental alertness, reduction in rational decision making, or loss of consciousness with the threat of fatal consequences.

Due to the moderate climate at the job site, cold stress is not a serious concern; however, all personnel must be aware that prolonged exposure to cold without proper clothing may impair their ability to work safely. To prevent such occurrence, the following measures must be implemented:

- Project workers must wear warm clothing, such as mittens, heavy socks, etc., when the air temperature is below 45°F. Protective clothing, such as Tyvek or other disposable coveralls, may be used to shield employees from the wind.

- When the air temperature is below 35°F, clothing for warmth, in addition to chemical protective clothing, shall be worn by employees. This should include:
 - Insulated suits, such as whole body thermal underwear
 - Wool socks or polypropylene socks to keep moisture off the feet
 - Insulated gloves
 - Insulated boots
 - Insulated head cover such as hard hat, winter liner, or knit cap
 - Insulated jacket, with wind and water resistant outer layer.

- At air temperatures below 35°F, the following work practices must be implemented:
 - If the clothing of a site worker might become wet on the job site, the outer layer of clothing must be water impermeable.
 - If a project worker's underclothing becomes wet in any way, the worker must change into dry clothing immediately. If the clothing becomes wet from sweating (and the employee is not uncomfortable), the employee may finish the task at hand prior to changing into dry clothing.
 - Project workers must be provided with a warm (65°F or above) break area.

- Hot liquids such as soups or warm, sweet drinks shall be provided in the break area. The intake of coffee and tea should be limited, due to their circulatory and diuretic effects.
- The buddy system shall be practiced at all times on site. Any site worker observed with severe shivering shall leave the work area immediately.
- Project workers should dress in layers, with thinner lighter clothing worn next to the body.
- Project workers should avoid overdressing when going into warm areas or when performing strenuous activities.
- Employees handling liquids with a high vapor pressure, such as gasoline, methanol, or hexane, shall take special precautions to avoid soaking of gloves and clothing with those materials.

3.2.11 Fire Prevention

Where VOC levels are high, both a fire and explosion hazard exist. Sparks from operating equipment, or even contact with hot catalytic converters can cause ignition.

Smoking or open flames including matches or lighters are prohibited except in designated smoking areas. Vehicles and equipment will not be left idling or parked in or around areas where catalytic converters may cause a fire. Equipment and vehicles should stay on the paved areas.

All flammable liquids will be stored in Underwriters Laboratory (UL) or Factory Mutual (FM) approved storage cabinets. Small quantities of most flammable liquids (five gallons or less) may be stored in work areas, or carried in vehicles, providing those materials will be used that day and will be contained in a safety can or other approved container. Class IA flammable liquids should be limited to two gallons in an approved safety can. Any flammable wastes will be stored or disposed of in metal containers, clearly marked as containing flammable materials. Storage of combustible materials, in work areas, will be kept to a minimum.

Portable dry-chemical fire extinguishers must be provided to each project site as follows:

MINIMUM RATING	REQUIRED LOCATION
1A, 5BC	Each Company Owned or Leased Vehicle
2A, 10BC	Each Trailer
2A, 20BC	Each Fuel-dispensing Vehicle
3A, 40BC	Solvent Storage Areas

Portable fire extinguishers shall be inspected monthly, and serviced at least annually by a person licensed or registered by the State Fire Marshal.

Within occupied trailers, only UL approved electrical extension cords may be used. When outdoors, only double insulated or grounded electrical power tools may be used.

An IT Hot Work permit must be completed and posted prior to any hot work (such as welding or cutting) on site, including hot work performed by subcontractors. The Naval Air Station Alameda Fire Department should also be contracted to determine if other permits are required prior to hot work.

In case of a fire on the site, the PS or the SHSO will assess the situation and determine the proper response. All personnel NOT trained in the use of fire extinguishers shall evacuate the area involved. Only IT personnel trained in the use of extinguishers may attempt to extinguish the fire with available extinguishers, if safe to do so. If these trained employees do not wish to make the attempt, they are to evacuate also. In the event of any fire, IT will call the Base Fire Department at the number listed in Section 12.6 and notify the ROICC immediately. Fire fighting is a job for the fire department. No property or equipment is so important as to risk an employee's life.

3.2.12 Environmental Hazards

Poisonous or stinging insects, spiders and/or snakes may be a concern for project personnel some site activities. Disease vectors, such as ticks, may also be present. Physical hazards are also posed by native vegetation in the area, including thistles and other thorny weeds.

Site workers should inspect protected areas (e.g., manholes, pits and storage areas) prior to reaching into them or entering them in any way. Portable toilets have been the source of spider and snake bites. They should be inspected prior to each use. Stinging insects and their nests shall be avoided wherever possible, and workers shall wear long pants and gloves if necessary to protect them from insect bites and sharp or irritating plants.

3.2.12.1 Ticks

Ticks are vectors of many different diseases including rocky mountain spotted fever, Q fever, tularemia, Colorado tick fever, and lyme disease. They attach to their host's skin and intravenously feed on its blood creating an opportunity for disease transmission. Covering exposed areas of the body and the use of tick repellent are two ways to prevent tick bites. Periodically during the workday, employees will inspect themselves for the presence of ticks. If a tick is discovered, the following procedure should be used to remove it:

- Do not try to detach a tick with your bare fingers; bacteria from a crushed tick may be able to penetrate even unbroken skin. Fine-tipped tweezers should be used.
- Grip the tick as close to your skin as possible and gently pull it straight away from you until it releases its hold.
- Do not twist the tick as you pull and do not squeeze its bloated body. That may actually inject bacteria into your skin.
- Thoroughly wash your hands and the bite area with soap and water. Then apply an antiseptic to the bite area.
- Save the tick in a small container with the date, the body location of the bite, and where you think the tick came from.
- Notify the SSHO of any tick bites as soon as possible.

Recently, lyme disease has been the most prevalent type of disease transmitted by ticks in the United States.

3.2.12.2 Spiders

Black Widow spider (*Latrodectus* spp.) is a sedentary, web spider found in most warm parts of the world. Only the females bite, and then only if threatened or molested. The spider's perception of threat may be different than your intent. The bite may go unnoticed and may

not hurt. But the subsequent severe abdominal pain from a Black Widow's bite resembles appendicitis. There is pain also in muscles and in the soles of the feet, but usually no swelling at the site of the bite. Alternately, the saliva flows freely, then the mouth is dry. The bite victim sweats profusely. The victim should be transported to the closest medical facility immediately.

Brown Spider (also known as brown recluse spider, violin spider) (*Loxosceles* spp.) commonly lives in houses on the floor or behind furniture. Bites occur when a spider has been disturbed. In very severe cases, a red zone appears around the bite, then a crust forms and falls off. The wound grows deeper and does not heal for several months. The spider's venom may cause destruction of red blood cells and other blood changes. The victim may develop chills, fever, joint pains, nausea and vomiting. Brown spider bite victims should be transported to the nearest medical facility immediately.

Scorpions of the family Vejovidae are common throughout Southern California. Vejovid scorpions rarely exceed 3 inches in length. Scorpions feed at night on insects and spiders that are caught with the pincers and sometimes stung. The stinger is in the tip of the tail. Vejovid scorpions burrow in the earth and are sometime found under rocks and other objects laying on the ground. Scorpions sting in self defense. Most stings are not serious, but may produce excruciating pain at the site of the sting. The victim may develop nausea and vomiting and severe abdominal pain. First aid consists of applying cold to the site of the sting and possibly a soothing lotion such as calamine. Sting victims should be transported to the nearest medical facility immediately.

3.2.12.3 Insects

Ants, bees, wasps, hornets, and yellowjackets occasionally cause death. Death from the sting of such creatures is almost always due to acute allergic reaction. The stinging apparatus and venom sac sometimes remain at the site of the sting and must be removed. Some relief from the pain can be obtained by applying cold. Soothing lotions, such as calamine may reduce itching.

If the victim has a history of allergic reactions to insect bites or is subject to attacks of hay fever or asthma, or if he is not promptly relieved of symptoms, call a physician or take the

victim immediately to the nearest location where medical treatment is available. In a highly sensitive person, do not wait for symptoms to appear, since delay can be fatal.

3.2.12.4 Snakes

There are various types of poisonous snakes indigenous to the western United States. The degree of toxicity resulting from snake bites depends on the potency of the venom, the amount of venom injected, and the size of the person bitten. Poisoning may occur from injection or absorption of venom through cuts or scratches.

The most effective way to prevent snake bites is to avoid snakes in the first place. Personnel should avoid walking at night or in high grass and underbrush. Visual inspection of work areas should be performed prior to activities taking place. The use of leather boots and long pants will be required, since more than half of all bites are on the lower part of the leg. No attempt at killing snakes should be made; many people are bitten in such an attempt.

If someone is bitten by a potentially poisonous snake, the following treatment should be initiated:

- Keep patient calm
- Notify emergency medical services
- Wash the wound and keep the affected body part immobile
- Apply direct pressure to site of bite if bleeding is extreme
- Keep the affected area lower than the heart
- Carry a victim who must be transported, or have him/her walk slowly
- Transport to closest medical facility.

3.2.13 Dust

It is not anticipated that removal activities create excessive levels of airborne dust. Nevertheless, periodic monitoring for respirable particulate will be conducted and if dust generation becomes a concern, the program CIH will be contacted if action levels are exceeded.

3.2.14 Slip, Trip and Fall Hazards

Poor housekeeping results in a workplace which is laden with slip, trip and fall hazards. Such accidents can cause serious injuries, including broken bones, contusions, and/or deep lacerations.

To minimize slip, trip and fall hazards caused by poor housekeeping, the following measures shall be taken:

- Work areas shall be inspected daily for adequate housekeeping and findings recorded on daily inspection reports.
- Work on visqueen surfaces will be kept to a minimum.
- Loose or light material shall not be stored or left on roofs or floors that are not closed in, unless safely secured.
- Tools, materials, extension cords, hoses, or debris shall not be placed where they may cause tripping or other hazards.
- Tools, materials, and equipment subject to displacement or falling in manholes shall be adequately secured.

3.2.15 Sanitation

Break Area

A designated break area shall be established in the support zone. The break area shall contain drinking water and be arranged to provide shade to workers during hot weather (>85°F).

Potable Water

The following rules apply for all field operations:

- An adequate supply of potable water shall be provided;
- Portable containers used to dispense drinking water shall be capable of being tightly closed, and equipped with a tap;
- All containers used for drinking water shall be clearly marked and not used for any other purpose; and
- Disposable cups will be supplied; both a sanitary container for unused cups and a receptacle for disposing of used cups shall be provided.

Outlets for nonpotable water shall be identified to clearly indicate that the water is unsafe and is not to be used for drinking or washing. There shall be no cross connection (open or potential) between potable and nonpotable water systems. Nonpotable and potable water systems shall be physically separated so as to minimize confusion and possible cross contamination.

Toilet Facilities

A minimum of one separate toilet facility shall be provided for each 20 employees, or fraction thereof, of each sex. Such facilities may include both urinals and toilets, with the provision

that the number of toilets is at least half of the minimum required number of facilities.

Where there are less than five employees, separate toilet facilities for each sex are not required provided the toilet facilities can be locked from the inside and contain at least one toilet.

Toilet facilities on the site are to be kept clean, maintained in good working order and provided with an adequate supply of toilet paper. Toilets are to be placed only in cleared areas to reduce the chance of becoming home to biting reptiles, insects, spiders, etc. The toilet should be inspected before each use.

Food Handling and Storage

There shall be no handling of food in the contaminated work areas of the work area. Food may be stored in refrigerators, however, those refrigerators may only be used for storage of foods, and beverages. Refrigerators used for sample or chemical storage should be clearly marked as such.

Trash Collection

Trash generated by project personnel will properly be disposed of in trash receptacles. These receptacles will be emptied regularly.

3.2.16 Portable Electric Equipment

Various types of portable electric equipment (including portable generators, ground fault circuit interrupters and flexible cords) may be used during the course of the project. To minimize electric shock hazards, the following rules apply to these pieces of equipment.

Portable and Vehicle-Mounted Generators

All portable and vehicle-mounted generators must be grounded, except under the following conditions:

- (1) The noncurrent-carrying metal parts of equipment located on the vehicle and the equipment grounding conductor terminals of the receptacles are bonded to the generator or vehicle frame, and
- (2) The generator supplies only equipment located on the vehicle or the generator and/or cord - and plug - connected equipment through receptacles mounted on the vehicle or on the generator, and
- (3) The frame of a vehicle-mounted generator is bonded to the vehicle frame, or
- (4) The generator is single-phase, portable or vehicle-mounted, rated not more than 5 KW, and the circuit conductors of the generator are insulated from the generator frame and all other grounded surfaces.

Ground Fault Circuit Interrupters

Ground fault circuit interrupters shall be used on all electrical power lines used at the project site. The ground fault interrupter shall be placed as close to the power source as feasible in each case.

Flexible Cords

Flexible cords and cables shall be protected from accidental damage. Sharp corners and projections shall be avoided. When passing through doorways or other pinch points, protection shall be provided to avoid damage.

3.2.17 Other Safe Work Practices

- Horseplay is not permitted at anytime on the job.
- Workers shall not use equipment on which they have not been trained.
- Eating, drinking, taking of medications, smoking and applying cosmetics are allowed only in clean areas.

3.3 Hazardous and Toxic Materials

This section discusses the hazards associated with materials that are anticipated to be encountered during site removal activities. The Program CIH will update this section as information developed during this project warrants.

Hazard and Toxic Materials - Site 18

Available analytical data for storm sewer sediment are presented in Table 3-1. Table 3-1 contains the range of concentrations reported for all potentially significant contaminants detected in storm sewer sediment samples. The health significant site contaminants identified were determined from evaluation of the concentrations in the samples and the remediation goals identified. Table 3-2 contains the list of contaminants detected at each pond which are required to be identified under the State of California Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Health effects along with symptoms of exposure for health significant site contaminants are detailed in Table 3-3.

3.4 Exposure Standards

Threshold Limit Values (TLVs) refer to airborne concentrations of substances which represent conditions that nearly all employees may be repeatedly exposed to day after day without adverse effect. These TLVs are prescribed by the ACGIH and are based upon the best available information obtained through industrial experience and animal or human studies. Because of the wide variation in individual susceptibility, a small percentage of workers may experience discomfort from some substances at concentrations below the recommended values. It has been policy to use these guidelines for good hygienic practices; however, whenever applicable, stricter guidelines may be utilized.

Currently, exposure guidelines to pesticides and other chemical substances are regulated by OSHA. These exposures are based upon the time-weighted average (TWA) concentration for a normal 8-hour workday and a 40-hour work week. Several chemical substances have short-term exposure limits (STEL) or ceiling values which allow a maximum concentration to which workers can be exposed continuously for a short period of time without suffering from irritation, chronic or irreversible tissue damage, narcosis of a sufficient degree to result in accidental injury, impaired self-rescue abilities, or substantially reduced work efficiency.

The STEL is defined by the ACGIH as a 15-minute TWA exposure which should not be exceeded at any time during a workday even if the 8-hour TWA is within the TLV-TWA. Exposure above the TLV-TWA up to the STEL should not be longer than 15 minutes and should not occur more than four times per day. There should be at least 60 minutes between successive exposures in this range. An averaging period other than 15 minutes may be recommended when this is warranted by observed biological effects. OSHA requires that a

15-minute "Ceiling" concentration never be exceeded for that chemical constituent. This notation appears as the letter "C" after the chemical name. Table 3-4 contains the exposure guidelines for identified health significant contaminants.

TABLE 3-1

**MAXIMUM CONCENTRATIONS OF HEALTH
SIGNIFICANT CONTAMINANTS DETECTED**

Contaminant	Maximum Concentration (ppm)
1.1.1. - Trichloroethane	1700
Kerosene	2200
Diesel	19700
Motor Oil	11400
Unleaded Gasoline	3300

Metals	Maximum Concentration mg/kg
Barium	3620
Chromium	6470
Copper	4520
Lead	12200
Magnesium	9900
Maganese	2140
Nickel	7430

TABLE 3-2

PROPOSITION 65 WARNING AND NOTIFICATION

As required under the Safe Drinking Water and Toxic Enforcement Act of 1986 (also known as Proposition 65), on February 27, 1987, the Governor published a listing of those chemicals determined by the State of California to cause cancer, birth defects, or other reproductive harm. Proposition 65 requires that businesses that handle any of the listed chemicals notify people in the affected area of that fact. IT Corporation anticipates handling some of the listed chemicals at Site 18, Naval Air Station Alameda.

The chemicals present on sites that have been determined to cause cancer include:

Chemical

- Chromium (Hexavalent)
- Diesel Engine Exhaust
- Gasoline Engine Exhaust
- Lead
- Nickel
- Diesel Fuel
- Gasoline

The following contaminants on site have been determined by the State to cause reproductive harm:

- Lead

**TABLE 3-3
HAZARDOUS AND TOXIC MATERIALS
SITE 18 - STORM SEWER SOLIDS AND DEBRIS REMOVAL**

CONTAMINANT (SYNONYM)	PHYSICAL DESCRIPTION	CHEMICAL & PHYSICAL PROPERTIES	INCOMPATIBILITIES	SOURCES & ANTICIPATED CONCENTRATION	TARGET ORGANS	SYMPTOMS OF EXPOSURE
Chromium	Variable	MW: Varies BP: Varies MP: Varies VP: Varies Sol: Varies FP: N/A LEL: N/A UEL: N/A IP: N/A	Strong oxidizers	Solids and debris	Respiratory system	Fibrosis of lungs; dermatitis.
Gasoline	Clear liquid, may be yellow to red in color, with strong kerosene-like odor	MW: Variable BP: 74-430°F MP: N/A VP: 400 mm Hg Sol: Insoluble FP: -40°F LEL: 1.1% UEL: 7.6% IP: Not est.	Strong oxidizers	Solids and debris	Skin, eyes, respiratory system, CNS	Irritation of skin, eyes, respiratory system; headache, nausea, dizziness, coma, death; pulmonary edema, bronchitis.
Magnesium	Finely divided white particulate as magnesium oxide	MW: 40.3 (MgO) BP: 6512°F MP: 5072°F VP: 0 mm Sol: .009% FP: N/A LEL: N/A UEL: N/A IP: N/A	Chlorine Trifluoride Penta	Solids and debris	Respiratory	Irritation to eyes, respiratory system
Diesel Fuel and Motor Oil	Brown, slightly viscous liquid	MW: Varies BP: 340 to 675°F MP: Varies VP: Varies Sol: Insoluble FP: 125°F LEL: 0.6% UEL: 7.5% IP: Varies	Strong oxidizers	Solids and debris	CNS, skin and mucous membrane	Headache, nausea, CNS, depression, anorexia, pulmonary edema, kidney and liver damage

Kerosene (kerosene Oil)	Colorless liquid	MW: Varies BP: 175-325 °C MP: Varies VP: .23 mm @ 20 °C Sol: Insoluble FP: 81 °C LEL: 0.70% UEL: 5.0% IP: Varies	Strong oxidizers, strong acids, strong bases, amines	Solids and debris	Lungs	Tremors, dyspnea, cyanosis, acute pulmonary edema, hallucinations, convulsions, coma, respiratory stimulation
Lead	Metal: a heavy, ductile, soft gray solid	MW: 207.2 BP: 3164 °F MP: 621 °F VP: 0 mm Sol: Insoluble FP: N/A LEL: N/A UEL: N/A IP: N/A	Strong oxidizers, hydrogen peroxide, active metals (sodium, potassium)	Solids and debris	Kidneys, blood, gastro- intestinal tract, CNS	Pallor, blue gums, lethargy; colic, abdominal pain, constipation; anemia, weight loss
Barium	Yellow-white slightly lustrous lumps	MW: 137.3 BP: 160 °C MP: 710 °C VP: N/A Sol: N/A FP: N/A LEL: N/A UEL: N/A IP: N/A	None	Solids and debris	Eyes, skin, respiratory system	Burn skin, eyes, nose, throat irritation, coughing, difficult breathing
Benzene	Colorless liquid with aromatic odor	MW: 78 BP: 176 °F MP: 42 °F VP: 75 mm Hg Sol: 0.18% FP: 12 °F LEL: 1.3% UEL: 7.1% IP: 9.25 eV	Chlorine, bromine with iron; strong oxidizers	Solids and debris	Blood, bone marrow, eyes, skin, respiratory system, CNS	Irritation of eyes, nose respiratory system; headache, nausea, dizziness; fatigue, anorexia; dermatitis; abdominal pain, bone marrow depression

Copper	Red lustrous ductile metal. Green carbonate oxidation product	MW: 63.55 BP: 2595 °C (4703 °F) MP: 1083 °C (1981 °F) VP: N/A Sol: Negligible FP: N/A LEL: N/A UEL: N/A IP: N/A	Strong acids, active halogen compounds, chlorine	Solids and debris	Eyes, skin, respiratory system	Irritation of eyes, skin, cough, sneezing, dermatitis, nausea, vomiting, headache, dizziness, gastrointestinal irritation
Manganese	Silvery white metal	MW: 54.93 BP: 2095 °C MP: 1244 °C VP: 0 mm Sol: Insoluble FP: N/A LEL: N/A UEL: N/A IP: N/A	Acids, bases, moisture, halogens, sulfur oxides	Solids and debris	Nerves, lungs, liver, kidney	Poor appetite, weakness, sleepiness, changes in speech, balance and personality
1,1,1-Trichloroethane (Methyl chloroform, TCA)	Colorless liquid with a mild chloroform-like odor	MW: 133 BP: 165 °F MP: -36 °F VP: 100 mm Hg Sol: 0.07% FP: None LEL: 7% UEL: 16% IP: N/A	Strong caustics, strong oxidizers, chemically active metals (aluminum, magnesium powder, sodium, potassium)	Solids and debris	Skin, CNS, eyes, cardiovascular system	Eye irritation, dermatitis, headache, lassitude, CNS, depression, irregular heartbeat
Nickel	Silvery-white, hard, malleable, and ductile metal	MW: 58.71 BP: 4946 °F MP: 2651 °F VP: 1 mm Hg Sol: Insoluble FP: N/A LEL: N/A UEL: N/A IP: N/A	Oxidants, fluorine, ammonium nitrate, selenium, sulfur, ammonia, hydrazine, phosphorus	Contaminated groundwater/soil	Nasal cavities, lungs, skin	Upper respiratory tract irritation, metal fume fever, asthma, eye irritation, nausea, vomiting, diarrhea

MW: Molecular weight
 BP: Boiling point at 1 atmosphere pressure, in degrees Fahrenheit (°F)
 MP: Melting Point in °F
 VP: Vapor pressure at 1 atmosphere pressure and 68 °F
 Sol: Solubility in water at 68 °F, as percentage (%) by weight
 FP: Flash point, closed cup method, in °F
 LEL: Lower explosive limit in air, as % by volume
 UEL: Upper explosive limit in air, as % by volume
 IP: Ionization potential, in electron-volts (eV)
 CNS: Central nervous system
 mm Hg: Millimeters of mercury

ppm: Parts per million
 mg/m³: Milligrams per cubic
 µ/l: Micrograms per liter
 >: Greater than
 <: Less than
 N/A: Not applicable
 °F: Degrees Fahrenheit
 eV: Electron volts

TABLE 3-4

EXPOSURE GUIDELINES
SITE 18 - STORM SEWER SOLIDS AND DEBRIS REMOVAL

Contaminant (Synonyms)	OSHA PEL		ACGIH TLV		IDLH	Warning Properties
	8-hr TWA	15-min STEL	8-hr TWA	15-min STEL		
Gasoline	None	None	300 ppm	500 ppm	Not established	Odor Thresh: Not established Eye Irr Lvl: Variable
1,1,1-Trichloroethane (Methyl chloroform)	350 ppm	450 ppm	350 ppm	450 ppm	1,000 ppm	Odor Thresh: \cong 100 ppm Eye Irr Lvl: \cong 500 ppm
Nickel	1 mg/m ³	-	0.5 mg/m ³	-	Suspected or confirmed human carcinogen	Odor Thresh: N/A Eye Irr Lvl: not established
Petroleum Distillates (Kerosene, Diesel, Motor oil)	500 ppm	-	100 ppm - 500 ppm	500 ppm (gasoline)	-	Odor thresh: Not established Eye Irr Lvl: Not established
Barium	0.5 mg/m ³	-	0.5 mg/m ³	-	50 mg/m ³	Odor Thresh: Odorless Eye Irr Lvl: Not established
Copper	1.0 mg/m ³	-	1.0 mg/m ³	-	100 mg/m ³	Odor Thresh: Odorless Eye Irr Lvl: Not established
Magnesium	None	-	None	-	750 mg/m ³ (as fume)	Odor Thresh: Odorless Eye Irr Lvl: Not established
Manganese	-	5 mg/m ³ ceiling	0.2 mg/m ³	-	500 mg/m ³	Odor Thresh: Odorless Eye Irr Lvl: Not established
Benzene	1 ppm	-	10 ppm	-	Suspected or confirmed human carcinogens	Odor Thresh: Not established Eye Irr Lvl: Not established

Chromium (as Cr VI)	-	.1 mg/m ³	0.5 mg/m ³	-	15 mg/m ³ (As Cr VI) suspected human carcinogen	Odor Thresh: Odorless Eye Irr Lvl: Not established
Lead	0.5 mg/m ³	Action level: .3 mg/m ³	0.5 mg/m ³		100 mg/m ³	Odor Thresh: N/A Eye Irr Lvl: Not established

- MW: Molecular weight
 BP: Boiling point at 1 atmosphere pressure, in degrees Fahrenheit (°F)
 MP: Melting Point in °F
 VP: Vapor pressure at 1 atmosphere pressure and 68°F
 Sol: Solubility in water at 68°F, as percentage (%) by weight
 FP: Flash point, closed cup method, in °F
 LEL: Lower explosive limit in air, as % by volume
 UEL: Upper explosive limit in air, as % by volume
 IP: Ionization potential, in electron-volts (eV)
 CNS: Central nervous system
 mm Hg: Millimeters of mercury
 eV: Electron volts
 °F: Degrees Fahrenheit
- ppm: Parts per million
 mg/m³: Milligrams per cubic meter
 µ/l: Micrograms per liter
 >: Greater than
 <: Less than
 N/A: Not applicable

TABLE 3-5

MINIMUM CLEARANCE FROM ENERGIZED OVERHEAD ELECTRIC LINES

Nominal System Voltage	Minimum Required Clearance
0 - 50 kV	10 feet
51 - 100 kV	12 feet
101 - 200 kV	15 feet
201 - 300 kV	20 feet
301 - 500 kV	25 feet
501 - 750 kV	35 feet
751 - 1000 kV	45 feet

4.0 Buddy System

Project staffing during hazardous waste operations shall meet the requirements and intent of the "buddy system," which requires that at least two persons are required to be at the work area when work is conducted in the exclusion zone which might result in worker contamination.

The buddy system is a method of organizing employees into work groups and is designed to provide those employees with assistance when needed. Each employee in a work group is designated to be observed by at least one other person. Assignment of designated partners should take place during the Tailgate Safety Meeting (TSM).

The responsibility of the buddy is to:

- Provide assistance if needed;
- Maintain line of sight contact or verbal contact with workers in the EZ;
- Observe for signs of chemical or physical trauma or heat/cold stress such as:
 - changes in complexion and skin discoloration,
 - changes in coordination or demeanor,
 - excessive saliva and pupillary response,
 - changes in speech pattern;
- Periodically verify the integrity of all protective clothing; and
- Notify the SHSO if emergency help is needed.

Entry to or exit from the EZ under the conditions described earlier without a designated partner is prohibited.

The buddy system shall be used whenever workers enter the Exclusion Zones or whenever confined space entry or hot work is performed.

5.0 Personal Protective Equipment

5.1 Respiratory Protection

Respiratory protective equipment shall be NIOSH-approved and respirator use shall conform to American National Standards Institute (ANSI) Z88.2, OSHA 29 CFR 1926.103, and 29 CFR 1910.134 requirements. IT Procedure HS601 further defines the respiratory protection program which details the selection, use, inspection, cleaning, maintenance, storage, and fit testing of respiratory protective equipment. This procedure complies with the requirements contained within 29 CFR 1926.103 and will be maintained in the SSHO's site office along with the rest of IT's Health and Safety Policies and Procedures.

All personnel (including visitors) performing on-site activities and using an air purifying respirator must have successfully passed a qualitative respirator fit test in accordance with OSHA 29 CFR 1926.103 within the last 12 months. Documentation of fit testing is the responsibility of each employer. Fit testing and any training related to respiratory protection for IT personnel will be documented on the IT Respiratory Training Completion Form.

5.2 Levels of Protection

The following is a brief description of the PPE which may be required during various phases of the project. The EPA terminology for protective equipment will be used; Levels A, B, C, and D. At a minimum, four sets of appropriate PPE will be maintained at the site for USN visitor usage. IT procedure HS 600 further defines IT's PPE program. IT procedure HS303 (pressurized water cleaning) specifies detailed PPE requirements including the use of metatarsal guards and leg guards and must be observed for all pressurized water cleaning >1000 psi or where risk of injury has been identified at pressures < 1000 psi.

5.2.1 Level A Protection

Level A protection use is not anticipated during this project.

5.2.2 Level B Protection

Level B Protection is required when airborne concentrations of hazardous materials exceed or are expected to exceed twice the OSHA permissible exposure limit (PEL) in confined spaces or when action level criteria established in Table 8-1 require Level B to be used. Prior to

implementing Level B protection, the Program CIH must be notified for review and approval of the intended upgrade. The following equipment will be used for Level B Protection:

- Full face, pressure demand, supplied air respirator, either self-contained or airline with an egress bottle.
- Surgical scrubs
- Steel-toed PVC* boots with steel shank
- Saranax* coated Tyvek coveralls with elastic hood, wrists and ankles
- Latex gloves (inner)
- Nitrile* gloves (outer)
- Hearing protection (muffs or plugs as determined from noise monitoring)
- Hard-hat
- Duct tape openings (ankles, wrists, and respirator)

*Or other materials of construction as appropriate and approved by the Program CIH

5.2.3 Level C Protection

Level C protection shall be used when:

- The types of air contaminants have been identified, concentrations have been measured, and an air-purifying respirator (APR) is available that can remove contaminants
- The substance has adequate warning properties and all criteria for the use of an APR has been met.

Level C protective equipment at a minimum shall consist of:

- Full-face APR with NIOSH/Mine Safety and Health Administration (MSHA)-approved cartridges
- Combination filter/cartridge providing protection against:

- Not more than 1,000 parts per million (ppm) organic vapors, chlorine, chlorine dioxide, hydrogen chloride, sulfur dioxide, and escape only from hydrogen sulfide
- Dusts, fumes, and mists having a TWA less than 0.05 milligrams per cubic meter (mg/m³)
- Asbestos-containing dusts and mists
- Radionuclides
- Surgical scrubs
- Steel-toed PVC* boots with steel shank
- Poly-coated tyvek coveralls with elastic hood, wrists and ankles
- Latex gloves (inner)
- Nitrile* gloves (outer)
- Hearing protection (if necessary)
- Hard-hat
- Duct tape openings (ankles, wrists, and respirator).

*Or other materials of construction as appropriate and approved by the Program CIH.

5.2.4 Level D Protection

Level D PPE shall be used when:

- Work functions preclude significant splashes, immersions, or the potential for unexpected inhalation of, or contact with, hazardous concentrations of harmful chemicals
- Atmospheric concentrations of contaminants are less than one-half the TLV/PEL and consistent with the action level established in Table 8-1.

Level D PPE at a minimum shall consist of:

- Standard work uniform or coveralls

- Steel-toed work boots with steel shank
- Safety glasses
- Hearing protection (if necessary)
- Splash shield (if necessary)
- Hard-hat
- Leather palm gloves (if necessary).

Level D-modified PPE at a minimum shall consist of:

- Standard work uniform or coveralls
- Steel-toed PVC* boots with steel shank
- Tyvek* coveralls with hoods and elastic wrists and ankles
- Latex gloves (inner)
- Nitrile gloves (outer)
- Hearing protection (if necessary)
- Splash shield (if necessary)
- Hard-hat
- Safety glasses
- Duct tape openings (ankles, wrists).

* or other materials of construction as appropriate

5.3 Activity Specific Levels of Protection

The required level of protection is specific to the activity being conducted. At the NAS China Lake project site, the initial levels of PPE are as follows:

Task	Activity	Initial Level of PPE
1	Mobilization/site preparation/equipment setup	D
2	Removal operations/video survey	C*
3	Sampling of liquids and solids	Modified D
4	Solid debris and liquid disposal/separation	C*
5	Operation of filter press equipment	C*
6	Equipment decontamination	Modified D
7	Demobilization	D

* Initial activities will require Level C PPE until evaluation of exposure has provided documentation to allow downgrade of PPE

As site activities progress, levels of PPE are subject to change or to modification. Upgrading of PPE can occur when action levels are exceeded or whenever the need arises to protect the safety and health of site personnel. Proposed entry to any subsurface structure will require a review by the site Health and Safety Officer. Levels of PPE will not be downgraded without prior approval from the Program CIH. Upgrade of PPE to Level B is not authorized unless approved by the Program CIH.

5.4 Donning/Doffing PPE

All persons entering an EZ shall put on the required PPE in accordance with the requirements of this SSHP. When leaving the EZ, PPE will be removed in accordance with the procedures listed in Section 7.1, in order to minimize the spread of contamination.

6.0 Site Control

The project area will be divided into three work zones: exclusion zone (EZ), a contamination reduction zone (CRZ), and a support zone. The PS and Program CIH or SHSO shall together be responsible for designation of the work zones.

The EZ will include any area where contact with chemical contaminants may occur and will be marked with barrier tape or other means to warn personnel of the hazards.

Immediately adjacent to the EZ, a CRZ with a decontamination area for equipment and personnel will be established. This area will also be delineated with traffic cones and/or barrier tape.

The remainder of the IT project area will be designated as the support zone. No special markings or warning labels are required for this area.

Only personnel who have completed 40 hours of hazardous waste operations as defined under 29 CFR 1910.120/ or in California 8CCR 5192, have completed their 40-hour training or refresher training within the past 12 months, have been certified as fit for hazardous waste operations by a physician within the past 12 months and are wearing the proper PPE shall be allowed within the EZ or CRZ. Personnel without such training may only enter the designated support zone. Only properly trained personnel will be allowed within the EZ or CRZ.

6.1 Hazard Briefing

No person will be allowed on the site during site operations without first being given a site hazard briefing. In general, the briefing will consist of a review of the tailgate safety meeting. All persons on the site, including visitors, must sign the site-specific tailgate safety meeting form. Tailgate safety meetings shall be held daily, involving all personnel on site.

6.2 Documentation of Certification

A subcontractor training and medical file will be established for the project and kept on site during all site operations. The 40-hour training, update, and specialty training (first-

aid/cardiopulmonary resuscitation [CPR] certificates, as well as the current annual medical clearance for all subcontractor personnel, will be maintained within that file. All IT and subcontractor personnel must provide their training and medical documentation to the SHSO prior to the start of field work. At the completion of the project, documentation will be maintained at the project home office.

6.3 Entry Log

The SHSO at the site shall record on their Field Activity Daily Log (FADL) the names of all personnel who enter the EZ. These FADLs shall be incorporated into the project file.

6.4 Entry Requirements

In addition to the entry requirements listed above, no personnel will be allowed in any EZ or CRZ unless they are wearing the minimum PPE as described in Chapter 5.0.

7.0 Decontamination

7.1 Personnel Decontamination

All personnel working in the EZ must undergo personal decontamination prior to entering the support zone. The personnel decontamination area shall consist of the following steps.

Step 1. Personnel leaving the contaminated zone will remove any gross contamination from their outer clothing and boots.

Step 2. Personnel will remove their Tyvek coveralls and outer gloves. Personnel will remove hard hats, boots, and respirators last (if used).

Step 3. Personnel will thoroughly wash their hands and face before leaving the decontamination zone. Respirators will be sanitized and then air dried. Respirators are to be stored in a clean plastic ziplock bag.

7.2 Equipment Decontamination

Any vehicles with detectable contamination will be decontaminated prior to leaving the decontamination zone. If the level of contamination is low, decontamination for vehicles will be limited to rinsing of tires with water. The SHSO or Program CIH will determine if steam cleaning or pressure washing of vehicles and equipment will be required. decontamination.

7.3 Personal Protective Equipment Decontamination

Whenever possible, single use, external protective clothing shall be used for work within the EZ or CRZ. This protective clothing shall be disposed of in marked containers.

Reusable protective clothing will be rinsed at the site with detergent and water.

8.0 Site Monitoring

8.1 Air Monitoring

Air monitoring is essential to ensure that all field personnel are adequately protected from airborne contaminants. The levels of organic vapors in the work area will be monitored using a photoionization detector (PID), colorimetric detector tubes, or other appropriate equipment as determined by the SHSO and the Program CIH.

Combustible gas and oxygen shall be measured in the work areas if flammable contaminants are anticipated or confined space entry requirements are necessary. Respirable particulate will be monitored using an MIE mini-ram; both VOC and particulate monitoring will be conducted by the SHSO.

All air monitoring results shall be documented in project logs and the SHSO shall inform all employees affected of the results of exposure monitoring.

The Program CIH may direct the SHSO to conduct integrated personal exposure monitoring. Integrated air samples will be analyzed through a laboratory accredited by the American Industrial Hygiene Association (AIHA).

Air monitoring results will be used to determine the effectiveness and/or need for dust control methods and to trigger action levels as specified in Table 8-1.

8.1.1 Locations to be Monitored

All personal, integrated air monitoring samples and direct reading instrumentation readings taken for the purpose of determining appropriate health and safety precautions shall be collected/taken in the approximate "breathing zone" of site personnel.

If confined space entry will be necessary, combustible gas, oxygen, and total organics readings will be collected and recorded from the top, middle, and bottom of the storage tank prior to initial entry. Once the IT entry supervisor and/or SHSO has reviewed this information, determined the PPE necessary for entry, and the entry has been initiated, readings shall be taken in the approximate "breathing zone" of the IT employee(s) working

within the confined space. Readings may also be taken in other locations to determine areas of localized contamination or combustibility within the confined space. Work shall stop and all personnel shall exit the confined space when readings exceed acceptable values at any location within the space.

8.1.2 Frequency

Breathing zone air monitoring must be conducted periodically throughout the day while work is being performed in the EZ regardless of the level of protection being worn. Such readings must be documented on FADL forms even if contaminant concentrations show no meter response. EZ monitoring for respirable dust and VOCs will be continuous or no less frequent than hourly when in Level C PPE based on determination by the SHSO. Level D PPE use will require employee monitoring no less frequently than 4 times per shift.

8.1.3 Monitoring Equipment Maintenance and Calibration

All air monitoring equipment (e.g., combustible gas/oxygen meters and aerosol monitors) will be maintained and calibrated in accordance with the specific manufacturers' procedures.

All sampling equipment shall be calibrated in accordance with OSHA sampling protocols and NIOSH methods for the analyte of interest.

All direct reading instrumentation calibrations will be conducted according to manufacturer's instructions before and after each period of use. All air monitoring equipment calibrations and maintenance activities shall be documented on the IT FADL, or equivalent.

When applicable, only manufacturer-trained and/or authorized IT personnel will be allowed to perform instrument repairs or preventive maintenance.

8.2 Noise Monitoring

Noise monitoring may be performed by the SHSO under the direction of the Program CIH if high noise levels are routinely encountered. Hearing protection is mandatory for all employees in noise hazardous areas.

On-site personnel will wear monitoring equipment when directed by the Site Supervisor. The primary noise hazard at this site is from the heavy equipment, such as excavators, graders and

loaders. All site personnel within 25 feet of operating equipment shall wear hearing protective devices (either muffs or plugs) until the results from the noise monitoring have been evaluated; at that time, the Site Supervisor will inform site personnel whether continued use of hearing protection is required. Personnel will wash their hands with soap and water prior to inserting ear plugs to avoid initiating ear infections.

8.3 Heat Stress

Heat stress monitoring shall be initiated whenever ambient temperatures on site exceed 85°F. At the discretion of the Program CIH, environmental and/or physiologic monitoring will be carried out. Environmental monitoring shall consist of the determination of Wet Bulb Globe Temperatures (WBGTs). Physiologic monitoring may consist of pulse rate and/or body temperature determinations.

8.4 Safety Reviews

Jobsite safety reviews (audits) shall be conducted by all levels of project management. Specifically:

- The SHSO shall inspect the jobsite at least daily. Findings shall be documented on FADLs and communicated to the PS.
- The PS shall conduct a safety audit with the SHSO at least weekly. Findings shall be documented on FADLs and communicated to project workers, the SPM and Program CIH.
- The SPM shall conduct an on-site safety audit at least monthly. Findings shall be documented on Safety Inspection Report (SIR) forms and copied to the Program CIH. Whenever possible, the Program CIH shall be included in these audits.
- The Program CIH may conduct unannounced jobsite safety audits at anytime. Findings will be documented on SIRs and copied to the SPM and Program Manager.

8.5 Monitoring Records

The SHSO shall ensure that site monitoring records are complete and incorporated into the project file. Any personnel or area air monitoring results will be incorporated into the host office health and safety files. The Program CIH will be responsible for establishing,

maintaining, and forwarding to other IT offices (as necessary) all required monitoring information as described below for placement in individual employee files:

- Employee name, social security number, payroll number
- The date, time, pertinent task information, exposure information
- Description of the analytical methods, equipment used, and calibration data
- Type of PPE worn
- Engineering controls used to reduce exposure.

8.6 Notification

The Program CIH will ensure that each employee is informed in writing of the results which represent that employee's exposure. Monitoring results representative of an employee's exposure shall be reported in writing to the affected employee, with copies retained in the project file and the employee's medical file.

Whenever the results indicate that the representative employee exposure exceeds the Permissible Exposure Limit (PEL), the notification shall state that the PEL was exceeded, and shall provide a description of the corrective action taken to reduce exposure to a level below the PEL.

IT may conduct industrial hygiene monitoring on subcontractor employees. Notification of subcontractor personnel of industrial hygiene monitoring results is the responsibility of the subcontractor.

Table 8-1

Action Levels

When in Level D PPE

Analyte	Action Level	Required Action ¹
Dust	≥ .5 mg/m ³ above background	Upgrade to Level C ²
Unknown VOCs	> 5 ppm above background	Detector tube for Benzene; continue work if no Benzene
O ₂	≥ 23.5% or ≤ 20%	Stop work; determine cause
LEL	≥ 10% of LEL	Stop work; determine cause
Benzene	> 1 ppm ≤ 5 ppm	Upgrade to Level C
	> 5 ppm	Stop work; contact CIH

When in Level C PPE

Analyte	Action Level	Required Action ¹
Dust	≥ 1.0 mg/m ³ above background	Stop work; initiate dust suppression ²
Unknown VOCs	≥ 50 ppm above background in BZ	Stop work; detector tube for benzene; if no benzene continue in Level C
O ₂	≥ 23.5% or ≤ 20%	Stop work; determine cause
LEL	≥ 10% of LEL	Stop work; determine cause
Benzene	> 10 ppm	Stop work; determine cause; contact CIH

When in Level B PPE

Analyte	Action Level	Required Action ¹
Dust	≥ 5.0 mg/m ³ above background	Stop work; contact CIH ²
Unknown VOCs	≥ 100 ppm above background in BZ	Stop work; detector tube for benzene; contact CIH
O ₂	≥ 23.5% or ≤ 20%	Stop work; determine cause
LEL	≥ 10% of LEL	Stop work; determine cause

¹Frequency of air monitoring may be adjusted by the CIH after sufficient characterization of site contaminants has been completed or tasks are modified.

²Four instantaneous peaks in any 15 minute period or a sustained reading for 5 minutes in excess of the action level will trigger a response

TABLE 8-2

AIR MONITORING FREQUENCY AND LOCATION

WORK ACTIVITY	INSTRUMENT	FREQUENCY ¹	LOCATION
Mobilization/ demobilization	PID or FID Miniram O ₂ /LEL Meter Detector tube benzene	N/A N/A N/A N/A	N/A N/A N/A N/A
Site preparation	PID or FID Miniram O ₂ /LEL Meter Detector tube for benzene	N/A N/A N/A N/A	N/A N/A N/A N/A
Removal operations/ camera survey	PID Miniram O ₂ /LEL Meter Detector tube for benzene	Initially and periodically Periodically Periodically Per Action Levels	BZ of employees BZ of employees Manway entries BZ of employees
Equipment decontamination (filter press)	PID Miniram O ₂ /LEL Meter Detector tube for benzene	Periodically N/A N/A Per Action Levels	BZ of employees N/A N/A BZ of employees
Equipment decontamination	PID Miniram O ₂ /LEL Meter Detector tube for benzene	Periodically N/A Periodically Per Action Levels	BZ of employees N/A Decon work area BZ of employees
Set up and operation of filter press equipment	PID Miniram O ₂ /LEL Meter Detector tube for benzene	Periodically Periodically N/A Per Action Levels	BZ of employees BZ of employees N/A BZ of employees
Soil/debris separation	PID Miniram O ₂ /LEL Meter Detector tube for benzene	Initially and periodically N/A N/A Per Action Levels	BZ of employees N/A N/A BZ of employees
Sampling of liquids and solids	PID Miniram O ₂ /LEL Meter Detector tube for benzene	Periodically N/A N/A Per Action Levels	BZ of employees N/A Soil surface level BZ of employees

¹Frequency of air monitoring may be adjusted by the CIH after sufficient characterization of site conditions has been completed.

9.0 Employee Training

9.1 General

All personnel entering the EZ or CRZ shall have completed at least 40 (or, for certain tasks, 24) hours of hazardous waste operations-related training, as required by 29 CFR 1910.120/ or in California 8CCR 5192, as well as site specific training prior to performing field work. All field employees must have received a minimum of three days of actual field experience under the direct supervision of a trained, experienced supervisor. Those personnel who completed the 40-hour training more than 12 months prior to the start of the project shall have completed an 8-hour refresher course within the past 12 months. The PS, SPM, and Program CIH shall have completed an additional 8 hours of relevant supervisory health and safety training. With the exception of subcontractor personnel who will be working only in the support zone, subcontractor personnel must meet the above training requirements with subcontractor supervisors also required to have the 8-hour hazardous waste supervisor training.

A copy of each training certificate will be maintained at the project job site. Subcontractors must provide certificates of training for the project file for all employees assigned to the project, if they will be working in either the EZ or CRZ. Training certificates for both subcontractor and IT personnel shall be maintained on-site.

9.1.1 Tailgate Safety Meetings

Prior to the start of the project, all personnel will participate in an initial tailgate safety meeting. During the initial tailgate safety meeting, the SHSP will be discussed. The PS will ensure that the anticipated site hazards are summarized and explained to all personnel, and that those personnel are aware of the precautions they must take to minimize their exposure to those hazards. Tailgate safety meetings will be held at the start of each work shift. All new employees must attend the meeting and be familiar with this SHSP.

Attendance records and meeting notes shall be maintained with the project files.

9.1.2 Material Safety Data Sheets

The SHSP includes MSDS and occupational health guidelines for chemical substances known to be on site (see Appendix B). The SHSP shall be maintained on site, accessible to all site employees. Each employee is required to review and sign the SHSP before starting work on the site. The SHSO will provide training to project personnel covering the hazards of any and all materials for which an MSDS has been obtained.

9.1.3 Site-Specific Health and Safety Plan

The SHSO will present the SHSP (including all attached MSDSs) and discuss it with all personnel assigned to the project. All workers and visitors must read and sign the SHSP acknowledging acceptance of site rules and understanding of site hazards before the start of the site work.

9.2 Site Workers' Basic Course

Each site worker shall have received training in basic 40 hour HAZWOPER or annual 8 hour refresher training as well as site specific training prior to performing field work:

- General site safety
- Physical hazards (fall protection, noise, heat stress, cold stress)
- Names and titles of key personnel responsible for site health and safety
- Safety, health, and other hazards typically present at hazardous waste sites
- Use of PPE
- Work practices by which employees can minimize risks from hazards
- Safe use of engineering controls and equipment on site
- Medical surveillance requirements including recognition of symptoms and signs which might indicate overexposure to hazards
- Worker right-to-know (Hazard Communication, 29 CFR 1910.1200)
- Routes of exposure to contaminants
- Engineering controls and safe work practices

- Components of the site health and safety program
- Decontamination practices for personnel and equipment
- Confined-space entry procedures
- Emergency response plan.

9.3 Supervisors' Course Content

Management and supervisors must receive an additional eight hours of training that includes:

- General site safety and health programs;
- PPE programs;
- Air monitoring techniques;
- Spill containment techniques.

9.4 Site-Specific Training

Site-specific training will be accomplished through an initial review of this SHSP by the SHSO and through the daily tailgate safety meetings. All such training shall include signatures of all attendees and shall be documented to the project files.

9.5 First Aid and Cardiopulmonary Resuscitation (CPR)

At least two employees current in first aid/CPR will be assigned to the project and at least one of these will be on the site whenever operations are ongoing. First aid trained personnel shall also be trained in bloodborne pathogens hazards and precautions as described in IT's Bloodborne Pathogen Exposure Control Plan (IT Health & Safety Procedure HS 512). First aid and CPR training courses are offered to all IT employees. Refresher training in first aid and CPR is required to maintain the currency of the certificate. The SHSO shall be current in first aid/CPR training.

9.6 Instructors

All HAZWOPER training courses for IT employees must either be taught by IT instructors, or by outside firms which have been approved by the Program CIH.

Initial training of project workers on the SHSP shall be conducted by the SHSO or Program CIH.

Daily Tailgate Safety Meetings and other on-the-job training shall be routinely conducted by either the SHSO or the PS. The PS shall not delegate all safety-related training to the SHSO.

10.0 Medical Surveillance Program

10.1 Physical Examinations

All project personnel who may work in the EZ or CRZ shall have completed a comprehensive medical examination, directed by a board certified occupational medicine physician, within the past 12 months that meets the requirements of 29 CFR 1910.120/1926.65 or T8CCR5192.

The annual medical typically includes the following elements:

- Medical and occupational history questionnaire
- Physical examination
- Complete blood count, with differential
- Liver enzyme profile
- Chest X-ray, once every three years, for non-asbestos workers
- Pulmonary function test
- Audiogram
- Electrocardiogram (EKG) for persons older than 35 years of age, or if indicated during the physical examination
- Visual acuity
- Follow-up examinations, at the discretion of the examining physician or the corporate medical director.

The examining physician provides the employer with a letter confirming the worker's fitness for work and ability to wear a respirator. A copy of this letter for all personnel, including subcontractors, will be kept on site during all project site work.

Subcontractors will certify that all their employees have successfully completed a physical examination by a qualified physician on the Certification Form. The physical examinations shall meet the requirements of 29

CFR 1910.120/1926.65, 29 CFR 1910.134 or in California 8CCR 5192, 5144, and IT H&S Policy HS100 and HS101. Subcontractors will supply copies of the medical examination certificate for each on-site employee.

10.1.1 Preplacement Examination

All employees will receive a preplacement medical examination prior to assignment to field operations.

10.1.2 Annual Examination

Each year subsequent to the placement examination, all employees and subcontractors must undergo an annual examination and drug screen similar in scope to the preplacement examination. IT employees hired prior to 1985 are not required to submit to drug screening. Chest X-rays are taken every third year. The medical and occupational history is updated with each examination.

10.1.3 Exit Examination

IT employees receive an exit examination upon leaving the company if they have not been examined within the previous six months. The exit examination consists of the annual examination without drug screen. The employee's immediate supervisor is to notify the Program CIH within a reasonable time before the termination to allow for the necessary arrangements.

10.2 First-Aid and Medical Treatment

All persons on site must report any near-miss incident, accident, injury, or illness to their immediate supervisor or the Field Supervisor. First aid will be provided by the designated site first aider. Injuries and illnesses requiring medical treatment will be accompanied by an "Authorization for Treatment" Form. The employee's supervisor or the Field Supervisor will complete the "Supervisor's Employee Injury Report" and conduct an accident investigation as soon as emergency conditions no longer exist and first-aid and/or medical treatment has been rendered. The investigation should follow the Accident/Injury Investigation Report. These two reports must be completed and submitted to the SHSO within 24 hours after the incident. The ROICC must also be notified of the accident (via submittal of NAVFAC form 5100/20) within 24 hours.

First-aid kits are kept at the CRZ and in all IT vehicles. If treatment beyond first aid is required, the injured should be transported to the medical facility listed in Chapter 12.0 of this SHSP and the PS should immediately contact IT's contract physician, at his location, EMR at (800) 229-3674. The PS should describe to EMR the circumstances leading to the injury or illness. If the injured is not ambulatory or shows any sign of not being in a comfortable and stable condition for transport, then an ambulance/paramedics should be summoned. If there is any doubt as to the injured worker's condition, it is best to let the local paramedic or ambulance service examine and transport the worker.

10.3 Medical Restriction

When a medical care provider identifies a need to restrict work activity, the employee's home office HS Assistant will communicate the restriction to the employee, their supervisor, and the Program CIH. The terms of the restriction will be discussed with the employee and his supervisor. Every attempt will be made to keep the employee working, while not violating the terms of the medical restriction.

10.4 Medical Records

Medical and personal exposure monitoring records will be maintained according to the requirements of 29 CFR 1910.120/1926.65 or in California 8CCR5192 and HS103, and shall be kept for 30 years post employment. Employee confidentiality shall be maintained. Employees and their authorized representatives have access to these records through the HS Assistant.

11.0 Emergency Response Plan and Contingency Procedures

Site personnel must be prepared to respond and act quickly in the event of an emergency or accidental contaminant release. Emergency preparedness and response procedures will aid in protecting site workers and the surrounding environment. Preplanning measures will include employee training, fire and explosion prevention and protection, chemical spill and discharge prevention and protection, and safe work practices to avoid personal injury or exposure.

11.1 Personnel Roles/Lines of Authority

The roles and responsibilities of IT personnel for response to emergencies at the Naval Air Station Alameda project site will be clearly defined and coordinated with IT subcontractors, USN project personnel, and the Naval Air Station Fire Department emergency response team. The Fire Department will evaluate the emergency situation and make the determination whether to involve the Alameda HAZMAT Unit in the response. The responsibilities of specific project individuals and the coordination of the Fire Department are defined as follows:

Project Superintendent. At all times during scheduled work activities, a designated PS shall be present on site. This individual will be responsible for implementing these procedures and determining appropriate response actions. Depending upon the circumstances and time permitting, the PS will review proposed response actions with the SHSO, and the ROICC. Specific responsibilities for the PS include:

- Evaluating and assessing emergency incidents or situations
- Assigning personnel and coordinating response activities on site
- Assuring that field personnel are aware of the potential hazards associated with the site
- Summoning NAS Alameda emergency response team
- Notifying the PM or, in his absence, the Program Manager of an emergency situation

- Coordinating response to an incident with the ROICC
- Assuring that all IT emergency equipment is routinely inspected and functional
- Working with the SHSO regarding the correction of any work practices or conditions that may result in injury to personnel or exposure to hazardous substances
- Assuring that appropriate emergency response agencies are aware of the provisions made herein
- Evaluating the safety of site personnel in the event of an emergency, and providing evacuation coordination if necessary
- Maintaining site facilities and assisting site personnel in accessing those facilities.

The PS will direct all emergency response activities conducted or managed by IT and is responsible for field implementation and enforcement of health and safety policies and procedures. The PS will be fully trained in IT's health and safety policies and procedures. Other responsibilities include overall supervision and management of field activities.

Site Health and Safety Officer. The SHSO is responsible for implementing, communicating, and enforcing health and safety policies and procedures during the course of the project. The SHSO will review the fitness and training records of all field personnel for compliance with the established requirements and will assist in arranging proper training and medical examinations. He will also assist in evaluating health and safety concerns with respect to environmental releases and emergency response actions.

Senior Project Engineer/Manager. The SPM will provide support to emergency responders and dedicate appropriate project resources to the response effort. If required, the SPM will mobilize additional personnel and equipment to the site. The SPM will notify and provide the ROICC with recommendations concerning any additional action(s) to be taken.

11.2 List of Emergency Contacts and Notification

The PS, SPM, and SHSO will be notified immediately in the event of an emergency. The PS will immediately evaluate the incident and, if necessary, notify the Fire Department emergency support services. If not previously notified, the SPM, ROICC, and designated

environmental contact will be advised of the situation. Telephone numbers for emergency contact personnel are listed in Table 11-1. The list will be maintained with current contacts, and telephone numbers will be posted along with other emergency phone numbers at all telephone locations at the site.

The information provided to the notified person should include the nature of the incident and the exact location and suspected contaminants or material involved. Information regarding the incident that should be reported to the emergency operator includes the following:

- Name and telephone number of the individual reporting the incident
- Location and type of incident
- Nature of the incident (fire, explosion, spill, or release) and substances involved
- Number and nature of medical injuries
- Movement or direction of spill/vapor/smoke
- Response actions currently in progress
- Estimate of quantity of any released materials
- Status of incident
- Other pertinent information.

A complete incident report shall be completed by the SHSO and provided to the ROICC, once the urgency of the emergency incident has been resolved.

11.3 Medical Emergency Response

In the event of severe physical or chemical injury, local emergency response personnel shall be summoned for emergency medical treatment and ambulance service. Their response time is estimated to be within 15 minutes upon initial notification. Once an initial assessment is made by the emergency medical technicians, the decision on using ground or air transportation for the victims will be made. Minor injuries will be treated on site by qualified first-aid/CPR providers and if additional treatment beyond first aid is required, the injured personnel will be transported to the Alameda Hospital. Contact IT Corporation Health and Safety, Stacy Shirk, at (510) 372-9100 whenever personnel are provided medical attention to ensure that appropriate services are rendered and that an authorization for treatment form has been completed.

Transportation routes and maps will be posted in the project office and in each site vehicle prior to the initiation of on-site activities. A copy of this map has been provided as Figure 11-1.

11.4 Personal Exposure or Injury

Every precaution will be taken to aid in the prevention of injuries and/or exposure to contaminants. These precautions are detailed in this SHSP and generally consist of the following measures:

- Personnel will be properly trained for their work duties
- Site personnel will wear appropriate PPE for each specific task or work assignment
- Site personnel will follow the proper field safety protocols as defined
- Site controls will be enforced so that only authorized personnel are able to access the work zones
- Site personnel will be made aware of potential environmental and chemical hazards
- Real-time air monitoring will be performed to evaluate the effectiveness of engineering controls and levels of personal protection
- Proper decontamination procedures will be followed for personnel and equipment.

In the event of personal exposure to contaminants, the following general guidelines will be adhered to:

- Contact/Absorption - Copious amounts of potable water will be used to flush, for at least 20 minutes, contaminants from the skin. This activity will occur in the on-site shower trailer. Start flushing while removing contaminated clothing. If irritation persists, repeat flushing. The condition of the individual will be assessed and transport to a medical center arranged if necessary. Do not transport victim unless the recommended flushing period is completed or flushing can be continued during transport.
- Inhalation - The victim will be moved immediately to an area providing fresh air. Decontamination of the victim and artificial respiration will be provided if necessary. The condition of the individual will be assessed and transport to a medical center arranged if necessary.

- Ingestion - Immediately contact local poison control center. The victim will be decontaminated, if necessary, and transported to a medical facility.

11.5 Fire Control

In the event of a fire or explosion, or imminent danger of fire or explosion, all activities shall halt, and the Fire Department shall be notified immediately. If it is safe to do so, site personnel may remove and isolate flammable or other hazardous materials which may contribute to the fire.

Upon arrival of the emergency responders, the PS will advise the fire chief or lead representative of the location, nature, and identification of the hazardous materials on site. Prior to intrusive activities at the site, a tour conducted by the SHSO will be given to the Fire Department and NAS Alameda HAZMAT Unit personnel. Specific hazards inherent with the site will be conveyed at that time.

The following measures will be implemented during site field activities to minimize the risk of fire and/or explosion:

- Smoking is permitted on site only in the designated smoke area
- Good housekeeping procedures will be required on site
- Material storage methods will be in accordance with manufacturers' recommendations
- Flammable liquids will be stored in approved containers and cabinets only
- All storage, handling, or use of flammable and combustible materials shall be conducted by trained personnel
- Entry and exit pathways shall be kept clear of debris or obstacles
- Work areas will be cleared of excess vegetation and obstructions.

Any base-specific guidelines established by the Naval Air Station Alameda will be strictly enforced. Any fire, no matter how small, must be reported to the Fire Department chief.

11.6 Spills or Control

IT will maintain the following equipment and materials in the CRZ for use during spill response activities:

- Absorbent pads
- Granular absorbent material (noncombustible)
- Polyethylene sheeting
- 55-gallon drums
- Shovels and assorted hand tools.

If a hazardous waste spill or material release to the air, soil, or water at the site is observed, IT will immediately notify the ROICC and the Fire Department. An assessment will be made of the magnitude and potential impact of the release. If it is safe to do so, site personnel will attempt to locate the source of the release, prevent further release, and contain the spilled and/or affected materials as follows:

- The spill or release area will be approached cautiously. Real-time air monitoring will be continuously performed in the spill vicinity.
- Hazards will be identified based on available information from witnesses or material identification documents (placards, MSDSs, logs). The potential hazards will be evaluated to determine the proper personal protection levels, methods, and equipment necessary for response.
- If necessary, the release area will be evacuated, isolated, and secured.
- If possible, spill containment will initially be made without entering the immediate hazard area.
- Entry to the release area will be made with the PPE, personnel, methods, and equipment necessary to perform the work. Hazardous spill containment and collection will be performed in four steps as follows:

- Contain the spill with absorbent socks, booms, granules, or construction of temporary dikes.
- Control the spill at the source by plugging leaks, uprighting containers, overpacking containers, or transferring contents of a leaking container.
- Collect the spilled material with shovels or heavy equipment as necessary.
- Store the spilled material for further treatment or disposal. Treatment and/or disposal options of the material will depend on the amount and type of material.

If site personnel cannot safely and sufficiently respond to an environmental release, evacuation of the area may be warranted. The decision to evacuate will depend upon the risk of exposure to SZ personnel and the severity of the release. The ROICC will be notified in the event of a significant spill along with the Fire Department. Upon their arrival at the site, the PS will brief them on the current situation at hand and any potential hazards the team may be faced with.

11.7 Site Evacuation Procedures

The authority to order personnel to evacuate the area rests with the PS and SHSO. In the event that site evacuation is required, a continuous, uninterrupted air horn will be sounded for approximately ten seconds. Air horns will be located in the support area. Radio communication may also be used to alert site workers and provide special instructions.

Personnel working in the EZ or CRZ will immediately make their way to the primary meeting location for a "head count." Depending on the severity of the event and allowable time, personnel exiting the EZ and CRZ may be instructed to forgo or modify decontamination procedures.

Personnel in the SZ will immediately report to the primary meeting location for a "head count" and further instructions. The PS and the SHSO will remain in contact to ensure that evacuation procedures are properly executed. If the primary meeting location is inaccessible,

personnel shall evacuate to an upwind location as determined by the windsock and perform a "head count."

Situations requiring evacuation may include unusually severe weather conditions, fires, or significant chemical spills or releases. In the event of project evacuation, the ROICC, Air Station Fire Department, and Air Station Police Department will be notified immediately. A site emergency map that delineates evacuation routes, emergency air horn locations, first-aid kit locations, rally point, and site contamination control zone perimeters will be developed once an on-site evaluation of conditions and topography is complete.

11.8 Emergency Decontamination Procedures

Treatment of illnesses or injuries to personnel working within the contaminated areas of the site may be more difficult because of protective clothing requirements and the potential for exposure to the contaminants. The SHSO or Emergency Medical Care Provider must quickly assess the extent of the injury or illness of the victim. A determination will be made if lifesaving medical treatment is critical and if personal decontamination procedures will create additional injuries or aggravate the existing condition. Life-threatening injuries must receive immediate medical attention. Decontamination procedures may be modified, simplified, or eliminated completely under such circumstances.

The following guidelines are established for responding to minor emergencies where an individual may have been injured or overcome by exposure to a hazardous substance at the site. If a truly serious injury exists, only portions of these guidelines may be appropriate to ensure prompt medical treatment.

- Notify supervisory and safety personnel, and verify that the area is safe to remain.
- Select an emergency decontamination location upwind and/or uphill from any spills, and determine most effective pathway to emergency vehicles.
- Field decontamination should be performed in two stages: washing with soapy water, followed by a clear water rinse.
- Upon arrival at the injured party, stabilize any life-threatening problems, such as spills or fires, and remove (i.e., brush or blot with absorbency pads) visible, gross contamination. If possible, prevent coming in contact with any contamination

present at the scene. However, do not delay with this task, and be prepared to transport immediately to the decontamination area.

- Have support personnel perform real-time air monitoring.
- Determine type, nature, and extent of exposure or injury based on mechanism.
- Quickly cut or tear first layer of protective clothing (outer suit) off of the injured party and discard. If cutting, always cut away from the body toward the extremities to avoid inflicting further injury.
- Without delay, efficiently move the injured away from the accident scene, possible contamination, or any hazardous substances. Relocate to a nearby "clean" area to expedite removal of respiratory protection and establish communication.
- If the individual is unconscious, evaluate if an adequate airway exists and breathing and circulation are present (ABCs). If absent, commence rescue breathing or CPR without delay.
- Move the injured to the decontamination area and transfer responsibilities to support personnel.
- Using soapy solution, support personnel should carefully wash outer garments as needed and rinse.
- Spray outer protective clothing with clear water.
- Quickly remove tape from the injured's wrists and ankles—assume the individual is injured until an assessment indicates otherwise.
- Carefully, but quickly, cut second layer of protective clothing (inner suit, boots, and gloves) off injured party. Always cut away from the body toward the extremities to avoid inflicting further injury.
- Be prepared to turn emergency care over to Emergency Medical Service personnel. Otherwise, administer appropriate standard first aid to injuries.
- Following stabilization of any injuries, monitor and be on the alert for shock, wrap the injured in a warm blanket or other items to conserve body heat, and be prepared for vomiting.
- Cover any contact surfaces of transport equipment with a protective sheet or plastic.

- Inform all arriving personnel and transport crew of nature and extent of injuries and any potential hazards present.

11.9 Adverse Weather Conditions/Natural Disasters

Adverse weather can take many forms. Thunder and lightning storms, earthquakes, hail, high winds, and tornados are a few examples. Sudden changes in the weather, extreme weather conditions, and natural disasters can create a number of subsequent hazards. Generally, poor working conditions arise, and slip, trip and fall hazards exist. Natural disasters can create many secondary hazards such as release of hazardous materials to the environment, structure failure and fires.

Routinely monitoring weather conditions and reports may help reduce the impact of severe weather and natural disasters. It may be necessary to halt certain hazardous operations or stop work altogether to allow the situation to pass. The SHSO must decide what operations, if any, are safe to perform based on existing conditions and anticipated conditions.

The best protection against most severe weather episodes and natural disasters is to avoid them. This means seeking shelter before the storm hits. Stay away from pipes and electrical equipment should lightning be a threat and watch for damage caused by lightning strikes nearby.

Earthquakes. The following general guidelines will be adhered to in the event of an earthquake:

- If you are indoors, duck or drop down to the floor. Take cover under a sturdy desk, table or other furniture. Hold on to it and be prepared to move with it. Hold the position until the ground stops shaking and it is safe to move. Stay clear of windows, fireplaces, and heavy furniture or appliances. Do not rush outside. You may be injured by falling glass or building parts. Do not try using the stairs or elevators while the building is shaking or while there is danger of being hit by falling glass or debris.
- If you are outside, get into the open, away from buildings and power lines.
- If you are driving - stop if it is safe - but stay inside. Do not stop on or under a bridge, overpass or tunnel. Move your care as far out of the normal traffic pattern as possible. Do not stop under trees, light posts, electrical power lines or signs.

11.10 Critique and Follow-Up of Emergency Procedures

The ROICC shall be verbally notified immediately and receive a written notification via NAVFAC form 5100/20 within 24 hours of all accidents or incidents including releases of toxic chemicals, fires, or explosions. The report shall include the following items:

- Name, organization, telephone number, and location of the Contractor
- Name and title of the person(s) reporting
- Date and time of accident/incident
- Location of accident/incident (i.e., site location, facility name)
- Brief summary of accident/incident including pertinent details such as type of operation ongoing at time of accident
- Cause of accident/incident, if known
- Casualties (fatalities, disabling injuries)
- Details of any existing chemical hazard or contamination
- Estimated property damage, if applicable
- Nature of damage, effect on contract schedule
- Action taken by Contractor to ensure safety and security
- Other damage or injuries sustained (public or private).

The PS and the SHSO will investigate the cause of the incident to prevent its reoccurrence. The investigation should begin as soon as practical after the incident is under control, but not later than the first work day after the incident. Investigations will follow the procedures described below:

- Interview witnesses and participants as soon as possible or practical.
- Determine the chronological sequence of events (opinions as to cause should not be solicited at this time).

- Note the location, movement, displacement, liquid levels, sounds, noises, or other sensory perceptions experienced by the participants or witnesses.
- Obtain weather data.
- Ascertain the location and position of all switches, controls, etc.
- Verify the condition of all safeguards.

After the facts have been collected, causal factors should be identified. Two causal factors typically exist, apparent and contributing; and there may be several of each. Apparent factors are those which are self-evident or readily deduced. Contributing factors usually become apparent by questioning why the apparent causal factor was allowed to exist.

**TABLE 11-1
EMERGENCY TELEPHONE NUMBERS**

Public Agencies

Fire	<u>911</u>
Ambulance	<u>911</u>
Police	<u>911</u>
OSHA	<u>510-568-8602</u>

Key Project and IT Personnel

Program Manager	Louis E. Stout (510) 372-9100
Program CIH	William Hetrick (510) 372-9100 Pager: (510) 988-5979
Project Manager	Gary Elston (510) 372-9100
Project Superintendent	Jaimie Hargrave Pager: (510) 988-5353
Site Health and Safety Officer (SHSO)	Jim Heringer (Pager) (510) 926-2105
Alternate SHSO	Jaimie Hargrave Pager: (510) 988-5353
Occupational Physician:	
Dr. Elaine Theirzaiult (EMR)	(800) 229-3674
Medical Incident Reporting:	
Stacy Shirk (Martinez)	(510) 372-9100
Navy Contact (ROICC)	Bob Pericone (510) 302-5054
Base Health and Safety Office	(510) 236-3395
Agency for Toxic Substance and Disease Registry (ATSDR)	(404) 639-0615

Medical Care Facilities

Hospital Name: Alameda Hospital
Hospital Address: 2070 Clinton Avenue
Hospital Telephone: (510) 523-4357

Other Important Telephone Numbers

Emergency Utility Contact (510) 302-6171

12.0 Summary and Checklist

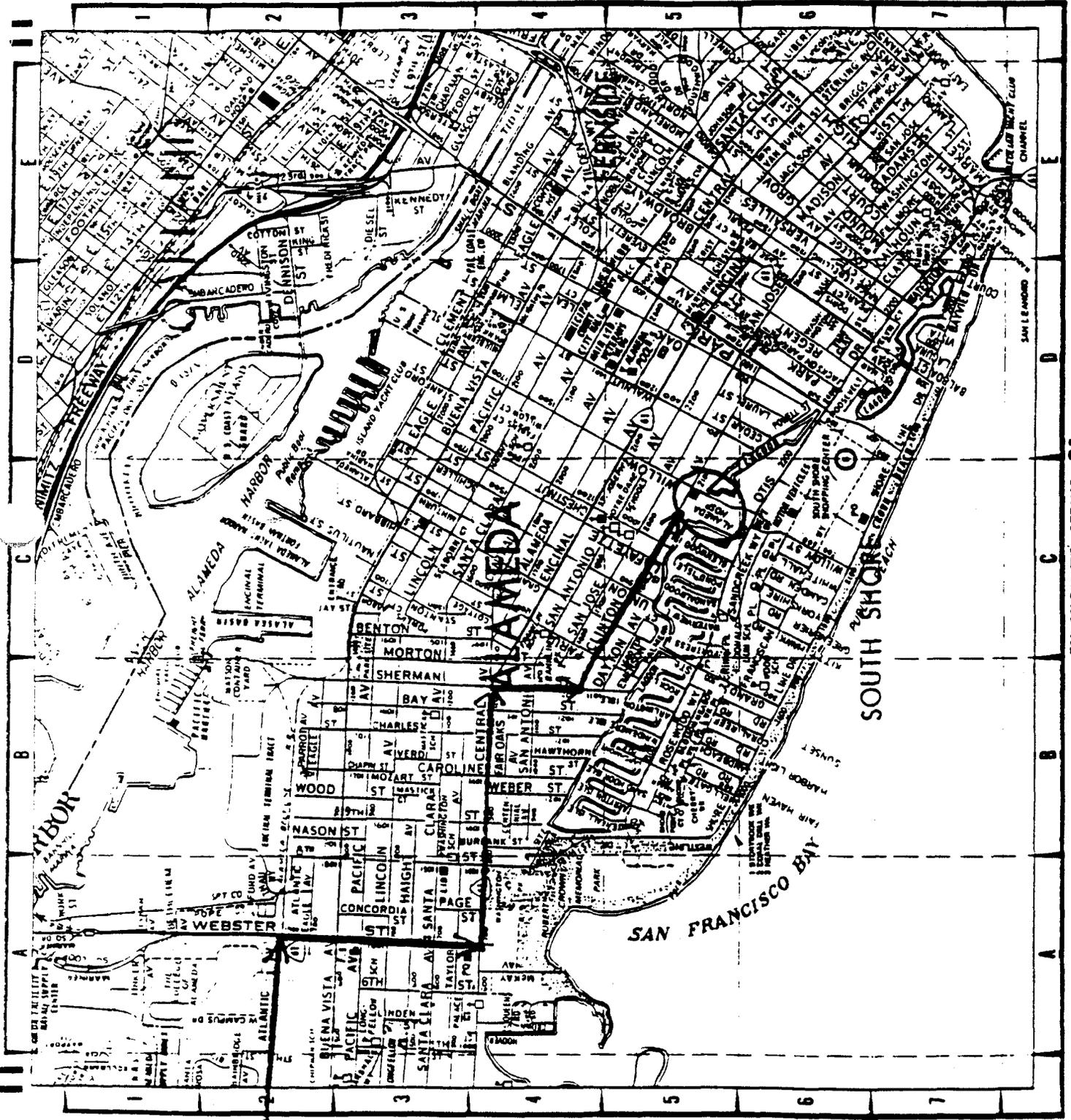
12.1 Summary

A brief summary of the major requirements of the project SHSP will be provided in the site-specific training.

12.2 Checklist

- Air horn
- First aid kits (one per vehicle and facility)
- Fire extinguishers (one per vehicle and facility)
- Safety glasses or goggles, ANSI approved
- Hard hats, ANSI approved
- Ear plugs
- Noise dosimeters/sound level meter with calibrator
- Combustible gas/oxygen indicator
- Impermeable gloves
- Work gloves
- Steel toed work boots, ANSI approved
- Tyvek suits coated (yellow)
- Photoionization detector and gas
- Duct tape
- Trash bags
- Eyewash
- Portable toilet
- Drinking water and disposable cups
- Air purifying respirators (full-face)
- Organic vapor/HEPA cartridges, NIOSH approved
- Traffic control signs and vests
- Thermometer
- Barricades with lights
- Traffic cones
- Barricade tape
- Towels
- Personal sampling pumps
- Pulse rate meter
- Airflow calibrator
- Charcoal tubes
- Filter cassettes
- SHSP

APPENDIX A
SITE AND HOSPITAL LOCATION MAPS



FOR CONTINUATION SEE MAP 12

FOR CONTINUATION SEE MAP 8

1.485 1.488 1.491 1.494 1.497 1.500

FOR CONTINUATION SEE MAP 21

APPENDIX B
MATERIAL SAFETY DATA SHEETS

ATIONAL HEALTH SERVICES, INC.
11 WEST 42ND STREET, 12TH FLOOR
NEW YORK, NEW YORK 10036
1-800-445-MSDS (1-800-445-6737) OR
1-212-789-3535

FOR EMERGENCY SOURCE INFORMATION
CONTACT: 1-615-366-2000

SUBSTANCE IDENTIFICATION

SUBSTANCE: BARIUM METAL
CAS NUMBER: 7440-39-3
RTECS NUMBER: CQ8370000

TRADE NAMES/SYNONYMS:
BARIUM; BARIUM, METALLIC; METALLIC BARIUM; BARIUM ELEMENT; UN 1400; BA;
OHS02270

CHEMICAL FAMILY:
METAL

MOLECULAR FORMULA: BA

MOLECULAR WEIGHT: 137.33

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=3 REACTIVITY=2 PERSISTENCE=3
NFPA RATINGS (SCALE 0-4): HEALTH=U FIRE=3 REACTIVITY=2

COMPONENTS AND CONTAMINANTS

COMPONENT: BARIUM METAL PERCENT: 100.0
CAS# 7440-39-3

OTHER CONTAMINANTS: NONE.

EXPOSURE LIMITS:

BARIUM, SOLUBLE COMPOUNDS (AS BA):

0.5 MG/M3 OSHA TWA
3/M3 ACGIH TWA
0.5 MG/M3 NIOSH RECOMMENDED TWA
0.5 MG/M3 DFG MAK TWA (TOTAL DUST);
1.0 MG/M3 DFG MAK 30 MINUTE PEAK, AVERAGE VALUE, 4 TIMES/SHIFT

MEASUREMENT METHOD: PARTICULATE FILTER; WATER; ATOMIC ABSORPTION
SPECTROMETRY; (NIOSH VOL. III # 7056).

SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING

PHYSICAL DATA

DESCRIPTION: SILVER-WHITE OR YELLOWISH-WHITE, LUSTROUS METAL.

BOILING POINT: 2984 F (1640 C) MELTING POINT: 1337 F (725 C)

SPECIFIC GRAVITY: 3.51 VAPOR PRESSURE: 10 MMHG @ 1049 C

SOLUBILITY IN WATER: REACTS

SOLUBILITY: SOLUBLE IN ALCOHOL; INSOLUBLE IN BENZENE.

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLECTIBLE FIRE HAZARD IN BULK FORM; HOWEVER, DUST, POWDER, OR FUMES ARE
FLAMMABLE OR EXPLOSIVE WHEN EXPOSED TO HEAT OR FLAMES.

FINELY DIVIDED MATERIAL MAY IGNITE ON EXPOSURE TO AIR.

FIREFIGHTING MEDIA:
DRY CHEMICAL, SODA ASH, LIME OR SAND
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FOR LARGER FIRES, WITHDRAW FROM AREA AND LET FIRE BURN
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FIREFIGHTING:
DO NOT USE WATER OR FOAM. MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT
WITHOUT RISK (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE PAGE 40).

EXTINGUISH USING AGENTS INDICATED. DO NOT GET WATER INSIDE CONTAINERS. AVOID
BREATHING VAPORS FROM BURNING MATERIAL.

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49-CFR 172.101:
FLAMMABLE SOLID

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49-CFR 172.101 AND
SUBPART E:
FLAMMABLE SOLID AND DANGEROUS WHEN WET

DEFINITION OF TRANSPORTATION PACKAGING REQUIREMENTS: 49-CFR 173.154
EXCLUSIONS: 49-CFR 173.153

FINAL RULE ON HAZARDOUS MATERIALS REGULATIONS (HMR, 49 CFR PARTS 171-180),
DOCKET NUMBERS HM-181, HM-181A, HM-181B, HM-181C, HM-181D AND HM-204.
EFFECTIVE DATE OCTOBER 1, 1991. HOWEVER, COMPLIANCE WITH THE REGULATIONS IS
AUTHORIZED ON AND AFTER JANUARY 1, 1991. (55 FR 52402, 12/21/90)

EXCEPT FOR EXPLOSIVES, INHALATION HAZARDS, AND INFECTIOUS SUBSTANCES, THE
EFFECTIVE DATE FOR HAZARD COMMUNICATION REQUIREMENTS IS EXTENDED TO
OCTOBER 1, 1993. (56 FR 47158, 09/18/91)

U.S. DEPARTMENT OF TRANSPORTATION SHIPPING NAME-ID NUMBER, 49 CFR 172.101:
BARIUM-UN 1400

U.S. DEPARTMENT OF TRANSPORTATION HAZARD CLASS OR DIVISION, 49 CFR 172.101:
2.3 - DANGEROUS WHEN WET MATERIAL

U.S. DEPARTMENT OF TRANSPORTATION PACKING GROUP, 49 CFR 172.101:

PAGE 11

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS, 49 CFR 172.101
SUBPART E:
DANGEROUS WHEN WET

J.S. DEPARTMENT OF TRANSPORTATION PACKAGING AUTHORIZATIONS:
EXCEPTIONS: NONE
NON-BULK PACKAGING: 49 CFR 173.212
BULK PACKAGING: 49 CFR 173.241

J.S. DEPARTMENT OF TRANSPORTATION QUANTITY LIMITATIONS 49 CFR 172.101:
PASSENGER AIRCRAFT OR RAILCAR: 15 KG
CARGO AIRCRAFT ONLY: 50 KG

TOXICITY

BARIUM METAL:
CARCINOGEN STATUS: NONE.
LOCAL EFFECTS: IRRITANT- INHALATION, SKIN, EYE.
ACUTE TOXICITY LEVEL: NO DATA AVAILABLE.
TARGET EFFECTS: POISONING MAY AFFECT THE HEART AND KIDNEYS.

HEALTH EFFECTS AND FIRST AID

INHALATION:
BARIUM:
IRRITANT. 250 MG/M3 IS IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.
ACUTE EXPOSURE- MAY CAUSE SORE THROAT, COUGHING, SHORTNESS OF BREATH,
VOMITING, DIARRHEA, TREMBLING, FAINTNESS, AND PARALYSIS OF THE ARMS AND
LEGS. BARIUM AND ITS SOLUBLE COMPOUNDS MAY ALSO CAUSE DYSPNEA, WEAKNESS,
ANXIETY, CARDIAC IRREGULARITY AND OTHER MUSCLE STIMULATION EFFECTS, AND
CONVULSIONS.
CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING
STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST.
TREAT ASYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:
BARIUM:
IRRITANT.
ACUTE EXPOSURE- MAY CAUSE IRRITATION.
CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT MAY CAUSE DERMATITIS.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED
AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO
EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL
ATTENTION IMMEDIATELY.

EYE CONTACT:
BARIUM:
IRRITANT.
ACUTE EXPOSURE- DIRECT CONTACT MAY CAUSE IRRITATION, REDNESS, AND PAIN.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

BARIUM:

ACUTE EXPOSURE- BARIUM AND SOLUBLE BARIUM COMPOUNDS MAY CAUSE SALIVATION, VOMITING, SEVERE DIARRHEA WITH WATERY AND BLOODY STOOLS, COLIC, GASTROENTERITIS, WEAKNESS, GIDDINESS, ANXIETY, TINNITIS, VERTIGO, CONFUSION, AND INCREASING SOMNOLENCE WITHOUT COMA, DYSPNEA, SLOW PULSE, HYPOKALEMIA, DELAYED KIDNEY DAMAGE, AND AT HIGH LEVELS, HEMOLYSIS AND HEMORRHAGES IN THE STOMACH, INTESTINES AND KIDNEYS MAY OCCUR. STIMULATION OF ALL MUSCLE TYPES MAY RESULT IN HYPERPERISTALSIS, BLADDER CONTRACTION, LUMBAR PAIN, MUSCLE TWITCHING PROGRESSING TO CONVULSIONS AND/OR PARALYSIS, VASOCONSTRICTION, AND IRREGULAR CONTRACTION OF THE HEART FOLLOWED BY ARREST IN SYSTOLE. DEATH MAY OCCUR FROM CARDIAC OR RESPIRATORY FAILURE. CHRONIC EXPOSURE- NO EFFECTS HAVE BEEN REPORTED IN HUMANS. ANIMAL STUDIES HAVE SHOWN EFFECTS ON THE HEMOPOIETIC AND CENTRAL NERVOUS SYSTEMS.

FIRST AID- INDUCE VOMITING IMMEDIATELY WHEN SOLUBLE BARIUM COMPOUNDS ARE INGESTED. TREAT SUPPORTIVELY AND SYMPTOMATICALLY (PARMEGGIANI, ENCYCLOPEDIA OF OCCUPATIONAL HEALTH AND SAFETY, 3RD EDITION). GET MEDICAL ATTENTION IMMEDIATELY.

ANTIDOTE:

THE FOLLOWING ANTIDOTE HAS BEEN RECOMMENDED. HOWEVER, THE DECISION AS TO WHETHER THE SEVERITY OF POISONING REQUIRES ADMINISTRATION OF ANY ANTIDOTE AND ACTUAL DOSE REQUIRED SHOULD BE MADE BY QUALIFIED MEDICAL PERSONNEL.

POISONING FROM BARIUM COMPOUNDS:

GIVE 30 GRAMS OF SODIUM SULFATE IN 250 ML OF WATER ORALLY AND REPEAT IN ONE HOUR. GIVE BY GASTRIC TUBE IF SYMPTOMS HAVE APPEARED. THE ADMINISTRATION OF SULFATE SALTS INTRAVENOUSLY IS HAZARDOUS, SINCE THEY INDUCE THE PRECIPITATION OF BARIUM SULFATE IN THE KIDNEY, WITH SUBSEQUENT RENAL FAILURE. ADMINISTRATION OF POTASSIUM IS CRITICAL. (DREISBACH, HANDBOOK OF POISONING, 12TH ED.). AN ANTIDOTE SHOULD BE ADMINISTERED BY QUALIFIED MEDICAL PERSONNEL.

REACTIVITY

REACTIVITY:

BARIUM METAL:

REACTS EXOTHERMICALLY ON CONTACT WITH WATER RELEASING FLAMMABLE HYDROGEN GAS WHICH MAY BE IGNITED BY THE HEAT OF THE REACTION.

INCOMPATIBILITIES:

BARIUM:

ACIDS: VIOLENT REACTION.

AMMONIA: INCOMPATIBLE.

BROMINE PENTAFLUORIDE: VIOLENT REACTION AND POSSIBLE IGNITION.

CARBON TETRACHLORIDE: VIOLENT REACTION OR POSSIBLE EXPLOSION.

FLUOROTRICHLOROMETHANE: FORMS AN EXPLOSIVE MIXTURE.

IODINE HEPTAFLUORIDE: EXOTHERMIC REACTION.

OXIDIZERS (STRONG): FIRE AND EXPLOSION HAZARD.

TETRACHLOROETHYLENE: FORMS AN EXPLOSIVE MIXTURE.

TRICHLOROETHYLENE: FORMS AN EXPLOSIVE MIXTURE.
TRICHLOROTRIFLUOROETHANE: FORMS AN EXPLOSIVE MIXTURE.

POSITION:
THERMAL DECOMPOSITION MAY RELEASE CORROSIVE FUMES OF OXIDES OF BARIUM.

POLYMERIZATION:
HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

****STORAGE****

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

****DISPOSAL****

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40 CFR 262. EPA HAZARDOUS WASTE NUMBERS, D001 AND D003. 100 POUND CERCLA SECTION 103 REPORTABLE QUANTITY.

BARIUM - REGULATORY LEVEL: 100.0 MG/L (TCLP-40 CFR 261 APPENDIX II)
MATERIALS WHICH CONTAIN THE ABOVE SUBSTANCE AT OR ABOVE THE TCLP REGULATORY LEVEL MEET THE EPA TOXICITY CHARACTERISTIC, AND MUST BE DISPOSED OF IN ACCORDANCE WITH 40 CFR PART 262. EPA HAZARDOUS WASTE NUMBER D005.

CONDITIONS TO AVOID

MAY IGNITE ITSELF IF EXPOSED TO AIR OR IN PRESENCE OF MOISTURE. MAY RE-IGNITE AFTER FIRE IS EXTINGUISHED. VIOLENT REACTION WITH WATER PRODUCES FLAMMABLE GAS. LEAK OFF TO SEWER MAY CREATE FIRE OR EXPLOSION HAZARD.

SPILL AND LEAK PROCEDURES

OCCUPATIONAL SPILL:
SHUT OFF IGNITION SOURCES. DO NOT TOUCH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. DO NOT GET WATER ON SPILLED MATERIAL OR INSIDE THE CONTAINER. FOR SMALL DRY SPILLS, WITH CLEAN SHOVEL PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; MOVE CONTAINERS FROM SPILL AREA. FOR SMALL LIQUID SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR LARGER SPILLS, DIKE SPILL FOR LATER DISPOSAL. COVER POWDER SPILLS WITH PLASTIC SHEET OR TARP TO MINIMIZE SPREADING. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY.

PROTECTIVE EQUIPMENT

VENTILATION:

PROVIDE LOCAL EXHAUST VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS.
 VENTILATION EQUIPMENT MUST BE EXPLOSION-PROOF.

RESPIRATOR:

THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS; NIOSH CRITERIA DOCUMENTS OR BY THE U.S. DEPARTMENT OF LABOR, 29 CFR 1910 SUBPART Z.

THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

BARIIUM, SOLUBLE COMPOUNDS (AS BA):

5 MG/M3- ANY DUST AND MIST RESPIRATOR EXCEPT SINGLE-USE AND QUARTER-MASK RESPIRATORS.
 ANY SUPPLIED AIR RESPIRATOR.
 ANY SELF-CONTAINED BREATHING APPARATUS.

12.5 MG/M3- ANY POWERED AIR-PURIFYING RESPIRATOR WITH A DUST AND MIST FILTER.
 ANY SUPPLIED-AIR RESPIRATOR OPERATED IN A CONTINUOUS FLOW MODE.

25 MG/M3- ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.
 ANY POWERED AIR-PURIFYING RESPIRATOR WITH A TIGHT-FITTING FACEPIECE AND A HIGH EFFICIENCY PARTICULATE FILTER.
 ANY SUPPLIED-AIR RESPIRATOR WITH A TIGHT-FITTING FACEPIECE OPERATED IN A CONTINUOUS FLOW MODE.
 ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.
 ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE.

250 MG/M3- ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE AND OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

ESCAPE- ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.
 ANY APPROPRIATE ESCAPE-TYPE SELF-CONTAINED BREATHING APPARATUS.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

RESPIRATORY PROTECTION:

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE.

EMERGENCY EYE WASH: WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

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Section 1. Material Identification

Chromium Metal/Powder Description: Obtained from chrome ore, chromite ($FeCr_2O_4$), by electrolysis of chromium solutions, by direct reduction (ferrochrome), and by reducing the oxide with finely divided carbon or aluminum. Used for chromeplating other metals; for greatly increasing metal resistance and durability; in manufacturing chrome-steel or chrome-nickel-steel alloys (stainless steel); as a constituent of inorganic pigments; as protective coating for automotive and equipment accessories; and in nuclear and high-temperature research.

Other Designations: Chrome; Cr; CAS No. 7440-47-3.

Manufacturer: Contact your supplier or distributor. Consult the latest *Chemicalweek Buyers' Guide* (Genium ref. 73) for a suppliers list.

R 1
I 4
S 1
K 1

Genium



HMS
H 2
F 1
R 1
PPG*
* Sec. 8

Section 2. Ingredients and Occupational Exposure Limits

Chromium metal/powder, ca 100%

OSHA PEL

8-hr TWA: 1 mg/m³

ACGIH TLV, 1988-89*

TLV-TWA: 0.5 mg/m³

NIOSH REL, 1987†

8-hr TWA (for chromium metal and insoluble salts): 1 mg Cr/m³

Toxicity Data‡

Rat. implant. TD₀₁: 1200 µg/kg body weight administered intermittently over six weeks

* This TLV is applicable to Cr²⁺ and Cr³⁺ compounds. For water soluble and water-insoluble Cr⁶⁺, the 8-hr TWA is 0.05 mg Cr⁶⁺/m³. Certain water-insoluble Cr⁶⁺ compounds (zinc chromate, calcium chromate, lead chromate, barium chromate, strontium chromate, and sintered chromium trioxide) are designated as A1a (human carcinogen).

† The NIOSH REL (10-hr TWA) for carcinogenic Cr⁶⁺ compounds is 1 µg/m³; for noncarcinogenic Cr⁶⁺ compounds (including chromic acid), the RELs (10-hr TWAs) are 25 µg/m³ and 50 µg/m³ (15-min ceiling). The noncarcinogenic compounds include mono- and dichromates of hydrogen, cesium, sodium, lithium, potassium, rubidium, ammonia, and Cr³⁺ (chromic acid anhydride). Any and all Cr⁶⁺ materials excluded from the noncarcinogenic group above are carcinogenic Cr⁶⁺ compounds.

‡ See NIOSH, RTECS (DB4200000), for additional data with references to tumorigenic effects.

Section 3. Physical Data

Boiling Point: 4788 °F (2642 °C)

Melting Point: 3452 °F (1900 °C)

Vapor Pressure: 1 mm Hg at 2941 °F (1616 °C)

Vapor Density (Air = 1): 1.79

Atomic Weight: 51.996 g/mol

Specific Gravity (H₂O = 1 at 39 °F (4 °C)): 7.2 at 68 °F (20 °C)

Water Solubility: Insoluble

Appearance and Odor: Steel-gray, lustrous metal; no odor.

Section 4. Fire and Explosion Data

Flash Point: None reported

Autoignition Temperature: Cloud, 1076 °F (580 °C); dust layer, 752 °F (400 °C)

LEL: Dust cloud explosion, 0.230 oz/ft³

UEL: None reported

Extinguishing Media: Use dry chemical or sand.

Unusual Fire or Explosion Hazards: Particle size and dispersion in air determine reactivity. Chromium powder explodes spontaneously in air, while chromium dust suspended in CO₂ is ignitable and explosive when heated.

Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode.

*One hundred percent of dust goes through a 74-µm sieve. A 140-ml spark can ignites a dust cloud.

Section 5. Reactivity Data

Stability/Polymerization: Chromium is stable when properly handled and stored. Hazardous polymerization cannot occur.

Chemical Incompatibilities: Chromium reacts readily with dilute, not nitric, acids to form chromous salts. It is soluble in acids (not nitric) and strong alkalis. Its powder is incompatible with strong oxidizing agents, including high O₂ concentration. Evaporation of mercury (Hg) from Cr amalgam leaves pyrophoric chromium. Finely divided Cr attains incandescence with nitrogen oxide, potassium chlorate, and sulfur dioxide.

Molten lithium at 18 °C severely attacks Cr. Fused ammonium nitrate below 200 °C reacts explosively and may ignite or react violently with bromine pentafluoride.

Hazardous Products of Decomposition: Thermal oxidative decomposition of Cr can produce toxic chromium oxide fumes.

Section 6. Health Hazard Data

Carcinogenicity: The NTP and OSHA list chromium as a human carcinogen.

Summary of Risks: When ingested chromium is a human poison, with gastrointestinal (GI) effects. Chromium 3 (Cr³) compounds show little or no toxicity. Less soluble chromium 6 (Cr⁶) compounds are suspected carcinogens and severe irritants of the larynx, nasopharynx, lungs, and skin (Sec. 2). Chromic acid or chromate salts cause irritation of the skin and respiratory passage. Ingestion leads to severe irritation of the gastrointestinal tract, renal damage, and circulatory shock. Chromium metal (when heated to high temperatures) and insoluble salts are said to be involved in pathological fibrosis of the lungs, which may progress to clinically evident pneumoconiosis. Exposure to chromate dust and powder can cause skin (dermatitis) and eye irritation (conjunctivitis).

Medical Conditions Aggravated by Long-Term Exposure: An increased incidence of bronchogenic carcinoma occurs in workers exposed to chromate dust.

Target Organs: Respiratory system.

Primary Entry: Inhalation, percutaneous absorption, and ingestion.

Acute Effects: Acute exposures to dust may cause headache, coughing, shortness of breath, pneumoconiosis, fever, weight loss, nasal irritation, inflammation of the conjunctiva, and dermatitis.

Chronic Effects: Asthmatic bronchitis.

FIRST AID

Eyes: Flush immediately, including under the eyelids, gently but thoroughly with flooding amounts of running water for at least 15 min.

Skin: Brush off chromium dust. After rinsing affected area with flooding amounts of water, wash it with soap and water.

Inhalation: Remove exposed person to fresh air and support breathing as needed.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. If ingested, have that conscious person slowly drink 1 to 2 glasses of water to dilute. Do not induce vomiting. A physician should evaluate all ingestion cases.

After first aid, get appropriate in-plant, paramedic, or community medical attention and support.

Physician's Note: Acute toxicity causes a two-phase insult: 1) multisystem shock due to gastrointestinal corrosivity and 2) hepatic, renal, hemopoietic insult. Treatment should use ascorbic acid as a neutralizer with gastric lavage. If the ingestion is substantial, exchange transfusions and/or consider hemodialysis. Treat allergic dermatitis with local cortisone or 10% ascorbic acid to reduce Cr⁶ to Cr³. Ten percent EDTA in a lanolin base applied every 24 hr helps heal skin ulcers.

Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Notify safety personnel of large spills. Cleanup personnel should wear protective clothing and approved respirators. Remove heat and ignition sources. Provide adequate ventilation. Keep airborne dust at a minimum. Remove spills quickly and place in appropriate containers for disposal or reuse.

Disposal: Reclaim salvageable metal. Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

C Designations

Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1)

EPA Designations

RCRA Hazardous Waste (40 CFR 261.33): Not listed

Listed as a CERCLA Hazardous Substance* (40 CFR 302.4), Reportable Quantity (RQ): 1 lb (0.454 kg) [* per Clean Water Act, Sec. 307(a)]

SARA Extremely Hazardous Substance (40 CFR 355): Not listed

Listed as a SARA Toxic Chemical (40 CFR 372.65)

Section 8. Special Protection Data

Goggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133).

Respirator: Wear a NIOSH-approved respirator if necessary. Wear an SCBA with a full facepiece when the particle concentration's upper limit is 50 mg/m³.

Warning: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Other: Wear impervious rubber gloves, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact.

Ventilation: Provide general and local explosion-proof ventilation systems to maintain airborne concentrations below the OSHA standard (Sec. 2). Local exhaust ventilation is preferred since it prevents contaminant dispersion into the work area by eliminating it at its source (Genium ref. 103).

Safety Stations: Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities.

Contaminated Equipment: Never wear contact lenses in the work area: soft lenses may absorb, and all lenses concentrate, irritants. Launder contaminated clothing before wearing. Remove this material from your shoes and equipment.

Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9. Special Precautions and Comments

Storage Requirements: Store material in cool, dry, well-ventilated area separate from acids and oxidizing agents. Seal and protect containers from physical damage. Keep away from heat or ignition sources.

Engineering Controls: Avoid dust inhalation. Practice good housekeeping (vacuuming and wet sweeping) to minimize airborne particulates and to prevent dust accumulation. Use nonsparking tools and ground electrical equipment and machinery.

Regulation Data (49 CFR 172.101, .102): Not listed

MSDS Collection References: 1, 2, 26, 38, 80, 87, 88, 89, 100, 109, 124, 126

Prepared by: MJ Allison, BS; **Industrial Hygiene Review:** DJ Wilson, CIH; **Medical Review:** MJ Hardies, MD



Section 1: Material Identification

Copper (Cu) Description: Widely distributed in nature in elemental state, oxides, sulfides, chlorides, and carbonates. Prepared by crushing, grinding, and concentrating copper ores by flotation and leaching or by smelting copper ore concentrates to yield a blister (96 to 98%) copper which is electrolytically refined to yield 99.99% copper. Copper is the most widely used structural metal, next to iron and aluminum. Used in electric wiring; switches; heating, plumbing, roofing, and building construction; alloys (brass, bronze, Monel metal, beryllium-copper); other chemical and pharmaceutical machinery; electroplated protective coatings and undercoats for nickel, chromium, zinc, etc.; coating vessels; insecticides; antifouling paints; and as a catalyst. Copper whiskers are used in thermal and electrical composites. Copper flakes are used as insulation for liquid fuels.

Other Designations: CAS No. 7440-50-8, bronze powder, copper slag-carbonate, copper slag-milled.

Manufacturer: Contact your supplier or distributor. Consult the latest *Chemical and Safety Guide* for a suppliers list.

Caution: Copper may be toxic through contact, inhalation, and ingestion. It may cause skin and eye irritation and metal fume fever. Copper is not considered a fire hazard, but fine particles may burn in air.

R	0
I	4
S	1
X	0

Genchem

HMS
H 2
F 0
R C
PPG
Sec. 8

Section 2: Ingredients and Occupational Exposure Limits

Copper, ca 100%			
1989 OSHA PELs 8-hr TWA: 1 mg/m ³ 8-hr TWA: 0.1 mg/m ³	1985-90 ACGIH TLVs TLV-TWA: 1 mg/m ³ TLV-TWA: 0.2 mg/m ³	1988 NIOSH REL None established	1985-86 Toxicity Data Human, oral TD ₀₁ : 120 µg/kg affects the gastrointestinal tract (nausea or vomiting) Rat, oral TD ₀₁ : 1310 µg/kg (35 weeks prior to mating) affects fertility (pre- and post-implantation mortality)

* Copper dusts and mists, as Cu.
† Copper fumes.
‡ See NIOSH, ATZCS (OHS-32000), for additional reproductive, carcinogenic, and toxicity data.

Section 3: Physical Data

Boiling Point: 4703 °F (2595 °C) **Molecular Weight:** 63.546
Melting Point: 1981 °F (1083 °C) **Density/Specific Gravity:** 8.94
Vapor Pressure: 1 mm Hg at 2962 °F (1628 °C) **Water Solubility:** Insoluble

Appearance and Odor: Solid, various shapes, odorless, red/brown-colored metal or powder. Copper is ductile, tough, and easily worked. It is very resistant to corrosion, but readily attacked by alkalis.

Section 4: Flammability and Explosion Data

Flash Point: None reported **Autoignition Temperature:** None reported **LEL:** None reported **UEL:** None reported

Extinguishing Media: Use extinguishing media appropriate to the surrounding fire since copper does not burn. Finely divided copper burns in air, and in extreme cases ignites spontaneously.

Usual Fire or Explosion Hazard: Liquid copper explodes on contact with water. High concentrations of fine copper particles in the air may present an explosion hazard.

Special Fire-fighting Procedures: Since Cu may produce toxic fumes, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode and a fully encapsulating suit.

Section 5: Reactivity Data

Stability/Polymerization: Copper is stable at room temperature in closed containers under normal storage and handling conditions. However, on long standing, a white, highly explosive peroxide deposit may form. Copper's vapors are uninhibited and may form polymers in vents and flame arresters.

Chemical Incompatibilities: Copper reacts violently with ammonium nitrate, bromates, iodates, chlorates, ethylene oxide, hydrazoic acid, potassium oxide, dimethyl sulfide, trichloroacetic acid, hydrogen peroxide, sodium peroxide, sodium azide, sulfuric acid, hydrogen sulfide, air, and lead azide. A potentially explosive reaction occurs with acetylene compounds. Copper ignites on contact with chlorine, fluorine (above 250 °F (121 °C)), chlorine trifluoride, and hydrazinium nitrate (above 138 °F (70 °C)). It is also incompatible with 1-bromo-2-propyne; an unimolecular reaction occurs with potassium dioxide.

Conditions to Avoid: Avoid prolonged exposure to air and moisture. On exposure to moist air, copper slowly converts to the carbonate.

Hazardous Products of Decomposition: Thermal oxidative decomposition of copper can produce metallic oxides (copper fumes).

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Section 6: Health Hazard Data

Carcinogenicity: The NTP, IARC, and OSHA do not list copper as a carcinogen. Experimental studies show tumorigenic and teratogenic effects in laboratory animals.

Summary of Risks: Copper is a necessary human nutrient, excessive intake levels of which the kidneys normally eliminate. In individuals with kidney disease or, rarely, Wilson's disease (abnormal retention and storage of copper in the body that damages the liver, kidneys, brain, blood, bones, and endocrine glands), copper levels may accumulate. Significant industrial exposure to copper occurs mainly through inhalation of fumes during welding, smelting, or refining operations; or through exposure to copper dusts and mists during mining, extracting, refining, or manufacturing processes. Copper particles may irritate, discolor, and damage eyes. Exposure to copper salts in many applications is potentially toxic. Copper dusts, fumes, and salts may irritate the upper respiratory tract. Long-term exposure may irritate the skin and discolor the skin or hair.

Medical Conditions Aggravated by Long-Term Exposure: Individuals with impaired pulmonary or renal function should avoid exposure.

Target Organs: Respiratory system, skin, eyes, liver, kidneys.

Primary Entry Routes: Inhalation, ingestion.

Acute Effects: Inhalation of copper fumes may give rise to metal fume fever (after an incubation period of about 5 hr), an allergic reaction with flu-like symptoms—high temperature, metallic taste, nausea, coughing, general weakness, muscle aches, and exhaustion. These symptoms usually disappear within 24 hr. Direct contact with copper causes skin and (less often) eye irritation, and itching of the linings of the nose, mouth, and respiratory tract. Exposure to copper dust may cause a greenish-black skin discoloration. Copper ingestion causes nausea, vomiting, abdominal pain, and diarrhea. Ingestion of large doses may cause stomach and intestine ulceration, jaundice, and kidney and liver damage.

Chronic Effects: Continued exposure to copper may cause mild dermatitis and degeneration of the mucous membranes. Repeated or prolonged exposure to copper dusts and mists can discolor skin and hair and irritate the skin. Repeated inhalation can cause chronic respiratory disease. Individuals with Wilson's disease (1 in 200,000 individuals) are more susceptible to chronic copper poisoning. If undetected and untreated, this progressive condition is eventually fatal.

FIRST AID

Eyes: Gently lift the eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Consult a physician immediately.

Skin: Quickly remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. For reddened or blistered skin, consult a physician. Wash affected area with soap and water.

Inhalation: Remove exposed person to fresh air and support breathing with artificial respiration.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. If ingested, have that conscious person drink 1 to 2 glasses of water, then induce vomiting.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Physician's Note: A blood count shows leukocytosis if an individual has metal fume fever. Consider chelation with penicillamine or BAL (British Anti-Lewisite or dimercaprol) for chronic intoxication.

Section 7: Spill/Leak and Disposal Procedures

Spill/Leak: Notify safety personnel, remove all heat and ignition sources, and provide adequate ventilation. Avoid creating dusty conditions. Cleanup personnel should protect against vapor inhalation and skin and eye contact. Cleanup methods such as vacuuming (with the appropriate filter) or wet mopping minimize dust dispersion. Absorb liquid containing copper with vermiculite, dry sand, or other inert materials. Place in appropriate containers for disposal. Follow applicable OSHA regulations (29 CFR 1910.120).

Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

EPA Designations

RCRA Hazardous Waste (40 CFR 261.33): Not listed

Listed as a CERCLA Hazardous Substance* (40 CFR 302.4), Reportable Quantity (RQ): 5000 lb (2270 kg) (* per Clean Water Act, 307(a))

SARA Extremely Hazardous Substance (40 CFR 355): Not listed

Listed as a SARA Toxic Chemical (40 CFR 372.63)

OSHA Designations

Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1-A)

Section 8: Special Precaution Data

Goggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133).

Respirator: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a NIOSH-approved respirator. Some recommendations follow. For copper dust and mists greater than 50 mg/m³, wear a high-efficiency particulate respirator, a supplied-air respirator, or an SCBA, all with a full facepiece. For copper dust and mists greater than 2000 mg/m³, wear a supplied-air respirator equipped either with a full facepiece operated in pressure-demand or positive-pressure mode or with a hood in continuous-flow mode. For copper fumes over 100 mg/m³, wear either a powered air-purifying respirator with a high-efficiency filter, or a supplied-air respirator equipped either with a full facepiece operated in pressure-demand or positive-pressure mode or with a hood in continuous-flow mode.

Warning: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Other: Wear impervious gloves, boots, aprons, and gaiters to prevent prolonged or repeated skin contact. Eye and face protection is required when grinding, welding, cutting, or remelting. Protect skin from molten metal and radiant heat when melting scrap. Machine turnings may also present a laceration hazard. When handling oil-contaminated copper, wear rubber gloves to prevent skin contact.

Ventilation: Provide general and local explosion-proof ventilation systems to maintain airborne concentrations below OSHA PELs and ACGIH TLVs (Sec. 2). Local exhaust ventilation is preferred since it prevents contaminants dispersion into the work area by controlling it at its source.⁽¹⁾⁽²⁾

Safety Stations: Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities.

Contaminated Equipment: Never wear contact lenses in the work area; soft lenses may absorb, and all lenses concentrate, irritants. Remove this material from your shoes and equipment. Launder contaminated clothing before wearing.

Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9: Special Precautionary Statements

Storage Requirements: Store copper in tightly closed containers in a cool, dry, well-ventilated area. Avoid exposure to air and moisture.

Engineering Controls: Avoid dust and fume inhalation and direct contact with skin and eyes. Use only with adequate ventilation and appropriate personal protective gear. Institute a respiratory protection program that includes regular washing, maintenance, inspection, and evaluation. Practice good personal hygiene and housekeeping procedures. Maintain exposure below the PEL/TLV. Monitor copper dust and mist levels in the air.

Other Precautions: Provide placement and periodic examinations that emphasize the skin, eyes, and respiratory system. Prevent exposing individuals with chronic respiratory disease or Wilson's disease.

Transportation Data (49 CFR 172.101, 102): Not listed

MSDS Code/Ref: 25, 31, 73, 84, 88, 89, 100, 101, 102, 109, 134, 126, 127, 131, 133, 134, 136, 138, 139, 143, 144

Prepared by: MJ Allison, BS; Insecticide Hygiene Review: DJ Wilson, CH; Medical Review: W Edverman, MD; Edited by: JR Stuart, MS

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Schenectady, NY 12303-1836 USA
(518) 377-8854

Sheet No. 470
Diesel Fuel Oil No. 2-D

Issued: 10/81

Revision: A, 11/90

Section 1. Material Identification

33

Diesel Fuel Oil No. 2-D Description: Diesel fuel is obtained from the middle distillate in petroleum separation; a distillate oil of low sulfur content. It is composed chiefly of unbranched paraffin. Diesel fuel is available in various grades, one of which is synonymous with fuel oil No. 2-D. This diesel fuel oil requires a minimum Cetane No. (efficiency rating for diesel fuel) comparable to cetane number ratings for gasoline) of 40 (ASTM D613). Used as a fuel for trucks, ships, and other automobile engines; as mosquito control (coating on breeding waters); and for drilling muds.

Other Designations: CAS No. 68334-30-5, diesel fuel.

Manufacturer: Contact your supplier or distributor. Consult the latest *Chemicalweek Buyers' Guide*™ for a suppliers list.

R 1
I 2
S 2
K 2



HMIS
H 0
F 2
R 0
PPG
* See 6

Cautions: Diesel fuel oil No. 2-D is a skin irritant and central nervous depressant with high mist concentrations. It is an environmental hazard and moderate fire risk.

Section 2. Ingredients and Occupational Exposure Limits

Diesel fuel oil No. 2 D*

1989 USHA PFL	1990-91 ACGIH TLV	1988 NIOSH REL	1985-86 Toxicity Data†
None established	Mineral Oil Mist TWA: 5 mg/m³† STEL: 10 mg/m³	None established	Ret. oral, LD ₅₀ : 9 g/kg produces gastrointestinal (hypermotility, diarrhea) effects

* Diesel fuel No. 2-D tends to be low in aromatics and high in paraffins. This fuel oil is complex mixture of: 1) 95% paraffinic, olefinic, naphthenic, and aromatic hydrocarbons, 2) sulfur (<0.5%), and 3) benzene (<10 ppm). [A low benzene level reduces carcinogenic risk. Fuel nite can be exempted under the benzene standard (29 CFR 1910.1028)]. Although low in the fuel itself, benzene concentrations are likely to be much higher in processing areas.

† As sampled by evaporator-collecting method.
‡ Manual NIOSH, RTECS (H71800000), for future toxicity data.

Section 3. Physical Data

Boiling Point Range: 340 to 675 °F (171 to 358 °C)
Viscosity: 1.9 to 4.1 centistokes at 104 °F (40 °C)
Appearance and Odor: Brown, slightly viscous liquid.

Specific Gravity: <0.86
Water Solubility: Insoluble

Section 4. Fire and Explosion Data

Flash Point: 125 °F (52 °C) min. | **Autoignition Temperature:** >500 °F (260 °C) | **LEL:** 0.6% v/v | **UEL:** 7.5% v/v

Extinguishing Media: Use dry chemical, carbon dioxide, or foam to fight fire. Use a water spray to cool fire exposed containers. Do not use a forced water spray directly on burning oil since this will scatter the fire. Use a smothering technique for extinguishing fire.

Unusual Fire or Explosion Hazards: Diesel fuel oil No. 2-D is a OSHA Class II combustible liquid. Its volatility is similar to that of gas oil. Vapors may travel to a source of ignition and flash back.

Special Fire-fighting Procedures: Isolate hazard area and deny entry. Since fire may produce toxic fumes, wear a self contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode and full protective clothing. If feasible, remove containers from fire. Be aware of runoff from fire control methods. Do not release to sewers or waterways due to pollution and fire or explosion hazard.

Section 5. Reactivity Data

Stability/Polymerization: Diesel fuel oil No. 2-D is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur.

Chemical Incompatibilities: It is incompatible with strong oxidizing agents; heating greatly increases the fire hazard.

Conditions to Avoid: Avoid heat and ignition sources.

Hazardous Products of Decomposition: Thermal oxidative decomposition of diesel fuel oil No. 2-D can produce various hydrocarbons and hydrocarbon derivatives, and other partial oxidation products such as carbon dioxide, carbon monoxide, and sulfur dioxide.

Section 6. Health Hazard Data

Carcinogenicity: Although the IARC has not assigned an overall evaluation to diesel fuels as a group, it has evaluated occupational exposures in petroleum refining as an IARC probable human carcinogen (Group 2A). It has evaluated distillate (light) diesel oils as not classifiable as human carcinogens (Group 3).

Summary of Risks: Although diesel fuel's toxicologic effects should resemble kerosene's, they are somewhat more pronounced due to additives such as sulfurized esters. Excessive inhalation of aerosol or mist can cause respiratory tract irritation, headache, dizziness, nausea, vomiting, and loss of coordination, depending on concentration and exposure time. When removed from exposure area, affected persons usually recover completely. If vomiting occurs after ingestion and if oil is aspirated into the lungs, hemorrhaging and pulmonary edema, progressing to renal involvement and chemical pneumonitis, may result. A comparative ratio of oral to aspirated lethal doses may be 1 pt vs. 3 ml. Aspiration may also result in transient CNS depression or excitement. Secondary effects may include hypoxia (insufficient oxygen in body cells), infection, pneumococcal pneumonia, and chronic lung dysfunction. Inhalation may result in euphoria, caustic dysrhythmias, respiratory arrest, and CNS toxicity. Prolonged or repeated skin contact may irritate hair follicles and block sebaceous glands, producing a rash of acne pimples and spots, usually on arms and legs.

Medical Conditions Aggravated by Long-Term Exposure: None reported.

Target Organs: Central nervous system, skin, and mucous membranes.

Primary Entry Routes: Inhalation, ingestion.

Acute Effects: Systemic effects from ingestion include gastrointestinal irritation, vomiting, diarrhea, and in severe cases central nervous system depression, progressing to coma or death. Inhalation of aerosols or mists may result in increased rate of respiration, tachycardia (excessively rapid heart beat), and cyanosis (dark purplish discoloration of the skin and mucous membranes caused by deficient blood oxygenation).

Chronic Effects: Repeated contact with the skin causes dermatitis.

FIRST AID

Eyes: Gently lift the eyelids and flush immediately and continuously with flowing amounts of water until transported to an emergency medical facility. Consult a physician immediately.

Skin: Quickly remove contaminated clothing. Rinse with flowing amounts of water for at least 15 min. If large areas of the body have been exposed or if irritation persists, get medical help immediately. Wash affected area with soap and water.

Inhalation: Remove exposed person to fresh air and support breathing as needed.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. If ingested, do not induce vomiting due to aspiration hazard.

Consult a physician immediately. Position to avoid aspiration.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: Gastric lavage is contraindicated due to aspiration hazard. Preferred antidotes are charcoal and milk. In cases of severe aspiration pneumonitis, consider monitoring arterial blood gases to ensure adequate ventilation. Observe the patient for 6 hr. If vital signs become abnormal or symptoms develop, obtain a chest x-ray.

Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Notify safety personnel, evacuate area (or large spills, remove all heat and ignition sources, and provide maximum explosion-proof ventilation. Cleanup personnel should protect against vapor inhalation and liquid contact. Clean up spills promptly to reduce fire or vapor hazards. Use a noncombustible absorbent material to pick up small spills or residues. For large spills, dig far ahead to contain. Pick up liquid for recclamation or disposal. Do not release to sewers or waterways due to health and fire and/or explosive hazard. Follow applicable OSHA regulations (29 CFR 1910.120). Diesel fuel oil No. 2-D spills may be environmental hazards. Report large spills.

Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

EPA Designations

RCRA Hazardous Waste (40 CFR 261.21): Ignitable waste

CERCLA Hazardous Substance (40 CFR 302.4): Not listed

SARA Extremely Hazardous Substance (40 CFR 355): Not listed

SARA Toxic Chemical (40 CFR 372.65): Not listed

OSHA Designations

Air Contaminant (29 CFR 1910.1000, Subpart Z): Not listed

Section 8. Special Protection Data

Goggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133).

Respirator: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, use a NIOSH-approved respirator with a mist filter and organic vapor cartridge. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.*

Other: Wear impervious gloves, boots, aprons, and gaiters to prevent skin contact.

Ventilation: Provide general and local explosion-proof ventilation systems to maintain airborne concentrations that promote worker safety and productivity. Local exhaust ventilation is preferred since it prevents contaminant dispersion into the work area by capturing it at its source.⁽¹⁰⁾

Safety Stations: Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities.

Contaminated Equipment: Never wear contact lenses in the work area: soft lenses may absorb, and all lenses concentrate, irritants. Remove this material from your shoes and equipment. Launder contaminated clothing before wearing.

Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9. Special Precautions and Comments

Storage Requirements: Use and storage conditions should be suitable for a OSHA Class II combustible liquid. Store in closed containers in a well-ventilated area away from heat and ignition sources and strong oxidizing agents. Protect containers from physical damage. To prevent static sparks, electrically ground and bond all containers and equipment used in shipping, receiving, or transferring operations. Use nonsparking tools and explosion-proof electrical equipment. No smoking in storage or use areas.

Engineering Controls: Avoid vapor or mist inhalation and prolonged skin contact. Wear protective rubber gloves and chemical safety glasses where contact with liquid or high mist concentration may occur. Additional suitable protective clothing may be required depending on working conditions. Institute a respiratory protection program that includes regular training, maintenance, inspection, and evaluation. Practice good personal hygiene and housekeeping procedures. Do not wear oil contaminated clothing. At least weekly laundering of work clothes is recommended. Do not put oily rags in pockets. When working with this material, wear gloves or use barrier cream.

Transportation Data (49 CFR 172.101)

DOT Shipping Name: Fuel oil

DOT Hazard Class: Combustible liquid

ID No.: NA1993

DOT Label: None

DOT Packaging Exceptions: 173.118a

DOT Packaging Requirements: None

MSDS Collection References: 1, 6, 7, 12, 75, 84, 101, 103, 126, 137, 132, 133, 134, 143, 146

Prepared by: NU Alliance, MS; Industrial Hygiene Review: DJ Wilson, CH; Medical Review: AC Fortington, MD; Edited by: JK Smart, MS

SECTION 1 CHEMICAL PRODUCTS & COMPANY IDENTIFICATION

INFORMATION SYSTEMS, INC.
#600 CATALINA STREET
SAN LEANDRO, CA 94577
1-800-635-0064 OR
1-510-895-1313

FOR EMERGENCY SOURCE INFORMATION
CONTACT: 1-615-366-2000 USA

CAS NUMBER: 8006-61-9
RTECS NUMBER: LX3373000

SUBSTANCE: GASOLINE, AUTOMOTIVE, UNLEADED

TRADE NAMES/SYNONYMS:

UNLEADED GASOLINE; PREMIUM UNLEADED GASOLINE; PETROL; MOTOR SPIRITS; BENZIN;
GASOLINE; "A" GRADE GASOLINE (NCRA); "N" GRADE GASOLINE (NCRA); 420003415;
600000024; UN 1203; STCC 4908178; OHS10340

CHEMICAL FAMILY:

Petroleum hydrocarbon

CREATION DATE: 04/23/85

REVISION DATE: 09/12/94

SECTION 2 COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENT : GASOLINE, AUTOMOTIVE, UNLEADED

NUMBER: 8006-61-9

PERCENTAGE: 100.0

MAY CONTAIN:

BENZENE >0.1%

CAS NUMBER: 71-43-2

OTHER CONTAMINANTS: NONE

SECTION 3 HAZARDS IDENTIFICATION

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=3 REACTIVITY=0 PERSISTENCE=1

NFPA RATINGS (SCALE 0-4): HEALTH=1 FIRE=3 REACTIVITY=0

EMERGENCY OVERVIEW:

Clear colorless to amber, aromatic, volatile liquid

Cancer hazard (contains material which can cause cancer in humans). Risk of cancer depends on duration and level of exposure. Causes respiratory tract, skin and eye irritation. May cause blood disorders. May affect the central nervous system.

Flammable liquid and vapor. May cause flash fire.

Do not breathe vapor or mist. Do not get in eyes, on skin, or on clothing.

Keep away from all ignition sources. Keep container tightly closed. Wash thoroughly after handling. Use only with adequate ventilation. Handle with caution.

POTENTIAL HEALTH EFFECTS:

INHALATION:

SHORT TERM EFFECTS: May cause irritation. Additional effects may include paleness, flushing, ringing in the ears, lack of appetite, nausea, vomiting,

difficulty speaking, difficulty swallowing, chest pain, difficulty breathing, irregular heartbeat, headache, weakness, drowsiness, drunkenness, feeling of well-being, confusion, disorientation, nervousness, restlessness, sleeplessness, numbness, twitching, visual disturbances, suffocation, lung damage, blood disorders, nerve effects, paralysis, convulsions, shock, unconsciousness and coma.

LONG TERM EFFECTS: In addition to effects from short term exposure, weight loss, low blood pressure, loss of memory, hearing loss, bruising, kidney damage, nerve damage and brain damage may occur. May also cause reproductive effects and cancer.

SKIN CONTACT:

SHORT TERM EFFECTS: May cause irritation. Additional effects may include blisters, blood in the urine, low blood pressure, lung damage and kidney damage.

LONG TERM EFFECTS: In addition to effects from short term exposure, burns, tingling sensation and nerve effects may occur.

EYE CONTACT:

SHORT TERM EFFECTS: May cause irritation. Additional effects may include spastic winking.

LONG TERM EFFECTS: In addition to effects from short term exposure, cataracts may occur.

INGESTION:

SHORT TERM EFFECTS: May cause gastrointestinal irritation. Additional effects may include coughing, paleness, flushing, fever, nausea, vomiting, diarrhea, chest pain, difficulty breathing, irregular heartbeat, headache, weakness, drunkenness, feeling of well-being, confusion, disorientation, nervousness, restlessness, excitation or drowsiness, twitching, visual disturbances, bluish skin color, suffocation, lung damage, liver damage, paralysis, convulsions, unconsciousness, coma and heart failure.

LONG TERM EFFECTS: In addition to effects from short term exposure, anemia and impotence may occur. May also cause reproductive effects and cancer.

CARCINOGEN STATUS:

OSHA: Y

NTP: Y

IARC: Y

SECTION 4

FIRST AID MEASURES

INHALATION:

FIRST AID- Remove from exposure area to fresh air immediately. Perform artificial respiration if necessary. Maintain airway, blood pressure and respiration. Keep warm and at rest. Treat symptomatically and supportively. Get medical attention immediately. Qualified medical personnel should consider administering oxygen.

SKIN CONTACT:

FIRST AID- Remove contaminated clothing and shoes immediately. Wash with soap or mild detergent and large amounts of water until no evidence of chemical remains (at least 15-20 minutes). Get medical attention immediately.

EYE CONTACT:

FIRST AID- Wash eyes immediately with large amounts of water or normal saline, occasionally lifting upper and lower lids, until no evidence of chemical remains (at least 15-20 minutes). Get medical attention immediately.

INGESTION:

FIRST AID- Only hydrocarbons that are solvents for a toxic agent or are themselves toxic need to be evacuated. Extreme care must be used to prevent aspiration. Gastric lavage with a cuffed endotracheal tube in place to prevent further aspiration should be done within 15 minutes. In the absence of depression or convulsions or impaired gag reflex, emesis can also be induced using syrup of ipecac without increasing the hazard of aspiration (Dreisbach, Handbook of Poisoning, 12th Ed.). Treat symptomatically and supportively. Gastric lavage should be performed by qualified medical personnel. Get medical attention immediately.

NOTE TO PHYSICIAN**ANTIDOTE:**

No specific antidote. Treat symptomatically and supportively.

| SECTION 5FIRE FIGHTING MEASURES |
-----**FIRE AND EXPLOSION HAZARD:**

Dangerous fire hazard when exposed to heat or flame.

Vapors are heavier than air and may travel a considerable distance to a source of ignition and flash back.

Vapor-air mixtures are explosive.

EXTINGUISHING MEDIA:

Water, chemical, carbon dioxide, water spray or regular foam (1993 Emergency Response Guidebook, RSPA P 5800.6).

For larger fires, use water spray, fog or regular foam (1993 Emergency Response Guidebook, RSPA P 5800.6).

FIREFIGHTING:

Move container from fire area if you can do it without risk. Apply cooling water to sides of containers that are exposed to flames until well after fire is out. Stay away from ends of tanks. For massive fire in cargo area, use unmanned hose holder or monitor nozzles; if this is impossible, withdraw from area and let fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire. Isolate for 1/2 mile in all directions if tank, rail car or tank truck is involved in fire (1993 Emergency Response Guidebook, RSPA P 5800.6, Guide Page 27).

Extinguish only if flow can be stopped; use water in flooding amounts as fog, solid streams may spread fire. Cool containers with flooding amounts of water, apply from as far a distance as possible. Avoid breathing vapors, keep upwind. Evacuate to a radius of 1500 feet for uncontrollable fires. Consider evacuation of downwind area if material is leaking.

Water may be ineffective (NFPA 325M, Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids, 1991)

FLASH POINT: -45 F (-43 C) (CC)

LOWER FLAMMABLE LIMIT: 1.2%

UPPER FLAMMABLE LIMIT: 7.6%

AUTOIGNITION: 536-853 F (280-456 C)
FLAMMABILITY CLASS (OSHA): IB

HAZARDOUS COMBUSTION PRODUCTS:

Thermal decomposition products may include toxic oxides of carbon.

SECTION 6

ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL SPILL:

Shut off ignition sources. Stop leak if you can do it without risk. Use water spray to reduce vapors. For small spills, take up with sand or other absorbent material and place into containers for later disposal. For larger spills, dike far ahead of spill for later disposal. No smoking, flames or flares in hazard area. Keep unnecessary people away; isolate hazard area and restrict entry.

Reportable Quantity (RQ):

The Superfund Amendments and Reauthorization Act (SARA) Section 304 requires that a release equal to or greater than the reportable quantity established for that substance be immediately reported to the local emergency planning committee and the state emergency response commission (40 CFR 355.40). If the release of this substance is reportable under CERCLA Section 103, the National Response Center must be notified immediately at (800) 424-8802 or (202) 426-2675 in the metropolitan Washington, D.C. area (40 CFR 302.6).

WATER SPILL:

The California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) prohibits contaminating any known source of drinking water with substances known to cause cancer and/or reproductive toxicity.

SECTION 7

HANDLING AND STORAGE

Observe all federal, state and local regulations when storing this substance.

Store in accordance with 29 CFR 1910.106.

Store away from incompatible substances.

SECTION 8

EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMITS:

GASOLINE (BULK HANDLING):

300 ppm (900 mg/m³) OSHA TWA; 500 ppm (1,500 mg/m³) OSHA STEL
300 ppm (900 mg/m³) ACGIH TWA; 500 ppm (1,500 mg/m³) ACGIH STEL

BENZENE:

1 ppm OSHA TWA; 5 ppm OSHA 15 minute STEL; 0.5 ppm OSHA action level
10 ppm (30 mg/m³) ACGIH TWA;
ACGIH A2-Suspected Human Carcinogen
(Notice of Intended Changes 1990-91)
0.1 ppm (0.32 mg/m³) NIOSH recommended 8 hour TWA;
1 ppm (3.2 mg/m³) NIOSH recommended 15 minute ceiling

Measurement method: Charcoal tube; carbon disulfide; gas chromatography with flame ionization detection; (NIOSH Vol. III # 1500, Hydrocarbons).

10 pounds CERCLA Section 103 Reportable Quantity
Subject to SARA Section 313 Annual Toxic Chemical Release Reporting
Subject to California Proposition 65 cancer and/or reproductive toxicity
warning and release requirements- (February 27, 1987)

**OSHA revoked the final rule limits of January 19, 1989 in response to the
11th Circuit Court of Appeals decision (AFL-CIO v. OSHA) effective
June 30, 1993. See 29 CFR 1910.1000 (58 FR 35338)**

VENTILATION:

Provide local exhaust or general dilution ventilation to meet published
exposure limits. Ventilation equipment should be explosion-proof if explosive
concentrations of dust, vapor or fume are present.

EYE PROTECTION:

Employee must wear splash-proof or dust-resistant safety goggles to prevent
eye contact with this substance.

Emergency eye wash: Where there is any possibility that an employee's eyes may
be exposed to this substance, the employer should provide an eye wash
fountain within the immediate work area for emergency use.

CLOTHING:

Employee must wear appropriate protective (impervious) clothing and equipment
to prevent repeated or prolonged skin contact with this substance.

Any clothing wet with a flammable liquid should be immediately removed at
the location where it is wetted to prevent burns from possible ignition.

GLOVES:

Employee must wear appropriate protective gloves to prevent contact with this
substance.

RESPIRATOR:

The following respirators are recommended based on information found in the
physical data, toxicity and health effects sections. They are ranked in
order from minimum to maximum respiratory protection.

The specific respirator selected must be based on contamination levels found
in the work place, must be based on the specific operation, must not exceed
the working limits of the respirator and must be jointly approved by the
National Institute for Occupational Safety and Health and the Mine Safety
and Health Administration (NIOSH-MSHA).

Any chemical cartridge respirator with organic vapor cartridge(s) and a
full facepiece.

Any gas mask with organic vapor canister (chin-style or front- or
back-mounted canister), with a full facepiece.

Any type 'C' supplied-air respirator with a full facepiece operated in
pressure-demand or other positive pressure mode or with a full facepiece,
helmet or hood operated in a continuous-flow mode.

Any self-contained breathing apparatus with a full facepiece operated in
pressure-demand or other positive pressure mode.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

CARCINOGEN STATUS: Human Inadequate Evidence, Animal Limited Evidence (IARC Group-2B). In studies with mice and rats by inhalation, an increased incidence of hepatocellular adenomas and carcinomas was produced in female but not male mice; an increased incidence of adenomas and carcinomas of the kidney was produced in male but not female rats.

LOCAL EFFECTS: Irritant- inhalation, skin, eye.

ACUTE TOXICITY LEVEL: Relatively non-toxic by inhalation and ingestion.

TARGET EFFECTS: Central nervous system depressant; simple asphyxiant.

ADDITIONAL DATA: The use of alcoholic beverages enhances the toxic effects. Stimulants such as epinephrine may induce ventricular fibrillation.

BENZENE:

IRRITATION DATA: 20 mg/24 hours skin-rabbit moderate; 15 mg/24 hours open skin-rabbit mild; 88 mg eye-rabbit moderate; 2 mg/24 hours eye-rabbit severe.

TOXICITY DATA: 2000 ppm/5 minutes inhalation-human LCLo; 2 pph/5 minutes inhalation-human LCLo; 65 mg/m³/5 years inhalation-human LCLo; 100 ppm inhalation-human TCLo; 150 ppm/1 year intermittent inhalation-man TCLo; 10000 ppm/7 hours inhalation-rat LC50; 300 ppm/6 hours/13 weeks intermittent inhalation-rat TCLo; 300 ppm/6 hours/99 weeks intermittent inhalation-rat TCLo; 9980 ppm inhalation-mouse LC50; 103 ppm/6 hours/5 days intermittent inhalation-mouse TCLo; 221 ppm/6 hours/7 days intermittent inhalation-mouse TCLo; 48 ppm/6 hours/14 days intermittent inhalation-mouse TCLo; 10 ppm/6 hours/10 weeks intermittent inhalation-mouse TCLo; 300 ppm/6 hours/13 weeks intermittent inhalation-mouse TCLo; 300 ppm/6 hours/16 weeks intermittent inhalation-mouse TCLo; 302 ppm/6 hours/26 weeks intermittent inhalation-mouse TCLo; 100 ppm/6 hours/72 weeks intermittent inhalation-mouse TCLo; 146000 mg/m³ inhalation-dog LCLo; 170000 mg/m³ inhalation-cat LCLo; 45000 ppm/30 minutes inhalation-rabbit LCLo; 20000 ppm/5 minutes inhalation-mammal LCLo; >9400 mg/kg skin-rabbit LD50; >9400 mg/kg skin-guinea pig LD50; 50 mg/kg oral-man LDLo; 930 mg/kg oral-rat LD50; 6600 mg/kg/27 weeks intermittent oral-rat TDLo; 4700 mg/kg oral-mouse LD50; 2 gm/kg oral-dog LDLo; 88 mg/kg intravenous-rabbit LDLo; 1400 mg/kg subcutaneous-frog LDLo; 2890 ug/kg intraperitoneal-rat LD50; 340 mg/kg intraperitoneal-mouse LD50; 527 mg/kg intraperitoneal-guinea pig LDLo; 1500 mg/kg intraperitoneal-mammal LDLo; 194 mg/kg unreported-man LDLo; mutagenic data (RTECS); reproductive effects data (RTECS); tumorigenic data (RTECS).

CARCINOGEN STATUS: OSHA Carcinogen; Known Human Carcinogen (NTP); Human Sufficient Evidence, Animal Sufficient Evidence (IARC Group-1). Numerous case reports and series have suggested a relationship between exposure to benzene and the occurrence of various types of leukemia. Several case-control studies have also shown increased odds ratios for exposure to benzene, but mixed exposure patterns and poorly defined exposures render their interpretation difficult. Three independent cohort studies have demonstrated an increased incidence of acute nonlymphocytic leukemia in workers exposed to benzene.

LOCAL EFFECTS: Irritant- inhalation, skin, eye.

ACUTE TOXICITY LEVEL: Moderately toxic by inhalation and ingestion; slightly toxic by dermal absorption.

TARGET EFFECTS: Central nervous system depressant; bone marrow depressant. Poisoning may also affect the immune system and the heart.

AT INCREASED RISK FROM EXPOSURE: Persons with certain immunological tendencies, poor nutrition, anemia and drug or chemically induced granulocytopenia.

ADDITIONAL DATA: Use of alcoholic beverages may enhance the toxic effects. Use of stimulants such as epinephrine may cause cardiac arrhythmias. May cross the placenta. Interactions with medications have been reported.

HEALTH EFFECTS

INHALATION:

GASOLINE, AUTOMOTIVE, UNLEADED:

IRRITANT/NARCOTIC/ASPHYXIANT/CARCINOGEN.

ACUTE EXPOSURE- At 160-270 ppm throat irritation may occur within several hours. At 2000 ppm mild anesthesia may occur within 30 minutes. Other symptoms of central nervous system depression may include headache, nausea, vomiting, dizziness, drowsiness, facial flushing, blurred vision, slurred speech, difficulty swallowing, staggering, confusion and euphoria. At higher levels dyspnea, pulmonary edema and bronchopneumonia may develop. Further depression may occur with weak respiration and pulse, nervousness, twitching, irritability, and ataxia. Severe intoxication may result in delirium, unconsciousness, coma, and convulsions with epileptiform seizures. The pupils may be constricted or, in comatose states, fixed and dilated or unequal; nystagmus may also occur. May also affect the liver, kidneys, spleen, brain, myocardium and pancreas. Death may be due to respiratory or circulatory failure or ventricular fibrillation. Extremely high concentration may cause asphyxiation.

CHRONIC EXPOSURE- With few exceptions, most of the reported effects of repeated inhalation are from intentional "sniffing" of gasoline rather than workplace exposure. Reported symptoms include headache, nausea, fatigue, anorexia and weight loss, pallor, dizziness, insomnia, memory loss, nervousness, confusion, muscular weakness and cramps, peripheral neuropathy, polyneuritis, and neurasthenia. It is unclear whether some of these symptoms may have been due to gasoline containing lead. Liver and kidney damage are also possible. In a 90 day study, male but not female rats exhibited a severe, dose-related renal toxicity. In another study, an increase in renal adenomas and carcinomas in male rats and an increase in hepatocellular adenomas and carcinomas in female mice were reported.

BENZENE:

IRRITANT/NARCOTIC/BONE MARROW DEPRESSANT/CARCINOGEN.

ACUTE EXPOSURE- Concentrations of 3000 ppm may cause respiratory tract irritation; more severe exposures may result in pulmonary edema. Systemic effects are mainly on the central nervous system and depend on exposure time and concentration. No effects were noted at 25 ppm for 8 hours; signs of intoxication began at 50-150 ppm within 5 hours; at 500-1500 ppm, within 1 hour; were severe at 7500 ppm, within 30-60 minutes; and 20,000 ppm was fatal within 5-10 minutes. Effects may include nausea, vomiting, headache, dizziness, drowsiness, weakness, sometimes preceded by a brief period of exhilaration or euphoria, irritability, malaise, confusion, ataxia, staggering, weak, rapid pulse, chest pain and tightness with breathlessness, pallor, cyanosis of the lips and fingertips, and tinnitus. In severe exposures there may be blurred vision, shallow, rapid breathing, delirium, cardiac arrhythmias, unconsciousness, deep anesthesia, paralysis, and coma characterized by motor restlessness, tremors and hyperreflexia, sometimes preceded by convulsions. Recovery depends on the severity of exposure.

Polyneuritis may occur and there may be persistent nausea, anorexia, muscular weakness, headache, drowsiness, insomnia, and agitation. Nervous irritability, breathlessness, and unsteady gait may persist for 2-3 weeks; a peculiar skin color and cardiac distress may persist for 4 weeks. Liver and kidney effects may occur, but are usually mild, temporary impairments. Chromosomal damage has been found after exposure to toxic levels. Although generally hematotoxicity is not a significant concern in acute exposure, delayed hematological effects, including anemia and thrombocytopenia, have been reported, as have petechial hemorrhages, spontaneous internal

bleeding and secondary infections. In fatal exposures, death may be due to asphyxia, central nervous system depression, cardiac or respiratory failure and circulatory collapse, or occasionally, sudden ventricular fibrillation. It may occur within a few minutes to several hours, or cardiac arrhythmia may occur at anytime within 24 hours. Also, death from central nervous system, respiratory or hemorrhagic complications may occur up to 5 days after exposure. Pathologic findings have included respiratory inflammation with edema and hemorrhage of the lungs, renal congestion, cerebral edema, and extensive petechial hemorrhages in the brain, pleurae, pericardium, urinary tract, mucous membranes, and skin.

CHRONIC EXPOSURE- Longterm exposure may cause symptoms referable to the central nervous, hematopoietic and immune systems. Early effects are vague and varied and may include headache, light-headedness, dizziness, nausea, anorexia, abdominal discomfort, and fatigue. Sore, dry throat, weakness, lethargy, malaise, drowsiness, nervousness, and irritability have also been reported. Later there may be dyspnea, pallor, slightly increased temperature, decreased blood pressure, rapid pulse, palpitations, and visual disturbances. Dizziness when cold water is placed in the ear and hearing impairment have been reported, as have diffuse cerebral atrophy associated with ataxia, tremors and emotional lability. Workers exposed to benzene in combination with other solvents have exhibited polyneuritis. Several case reports, one of them an acute exposure, suggest the possibility that systemic exposure may be associated with retrobulbar or optic neuritis. Occasionally hemorrhages in retina and conjunctiva occur and rarely neuroretinal edema and papilledema have accompanied the retinal hemorrhages. Hematological effects vary widely and may appear after a few weeks or many years of exposure or even many years after exposure has ceased. The degree of exposure below which no blood effects will occur cannot be established with certainty. In the early stages, there may be blood clotting defects due to morphological, functional and quantitative platelet alteration with resultant bleeding from the nose and gums, easy bruising and petechiae; leukopenia with predominant lymphocytopenia or neutropenia; and anemia which may be normochromic or macrocytic and hypochromic. Extramedullary hematopoiesis, splenomegaly, circulating immature marrow cells, and an initial increase in leukocytes, erythrocytes and platelets have also been reported. The bone marrow may be hyper-, hypo- or normoplastic and does not always correlate with the peripheral blood picture. Also, the symptoms do not always parallel the laboratory findings. If treated at this stage, the effects appear reversible, although recovery may be protracted and there may be relapses. Decreased erythrocyte survival, hemolysis, capillary fragility, internal hemorrhages, iron metabolism disturbances, and hyperbilirubinemia have also been reported. Exposure to high levels for longer periods may result in aplasia and fatty degeneration of the bone marrow with pancytopenia. The most serious cases of aplastic anemia may be fatal due to hemorrhage and infection; death may occur within 3 months of diagnosis. Enormous variability in individual response, including non-dose dependent aplasia, and the finding of eosinophilia suggests that, in some cases, the blood dyscrasia may partially be an allergic reaction. Numerous case reports and series have suggested a relationship between exposure to benzene and the occurrence of various types of leukemia. Several case-control studies have also shown increased odds ratios for exposure to benzene, but mixed exposure patterns and poorly defined exposures render their interpretation difficult. Three independent cohort studies have demonstrated an increased incidence of acute nonlymphocytic leukemia in workers exposed to benzene. Several studies have also suggested a link between occupational exposure and multiple myeloma and lymphoma, both Hodgkin's and nonhodgkin's.

Although aplastic anemia is probably the more likely consequence of longterm exposure, it is not uncommon for an individual surviving this, to go through a preleukemic phase into frank leukemia. Conversely, leukemia without precedent aplastic anemia can occur. In one study the range of time from the start of the exposure to the diagnosis of leukemia was 3-24 years. It has been suggested that the chromosomal aberrations which can arise in peripheral blood and bone marrow cells and persist for a long time after exposure ceases, may be associated with the increased incidence of leukemia. The immunosuppressive effect has also been suggested as being associated with the leukemogenesis. Adverse effects on the immunological system have been shown to make rabbits more susceptible to tuberculosis and pneumonia and may explain why the terminal event in some cases of benzene intoxication may be overwhelming infection. Exposed mice exhibited a tendency toward induction of lymphoid neoplasms. Rats exhibited an increased incidence of neoplasms, mainly carcinomas, at various sites. Menstrual disturbances have been reported more frequently in exposed women. Testicular damage has been reported in rats, rabbits and guinea pigs. Some animal studies have demonstrated embryo/fetotoxicity, sometimes at levels as low as 10 ppm and the potential for teratogenic effects such as decreased body weight and skeletal variants, have also been shown. Other studies have not produced any abnormalities or embryoletality.

SKIN CONTACT:

**GASOLINE, AUTOMOTIVE, UNLEADED:
IRRITANT.**

ACUTE EXPOSURE- Liquid may cause irritation with erythema and pain.

Prolonged or extensive contact may cause blistering and, in extreme cases epidermal necrolysis. A 12 year old boy partially immersed in a pool of gasoline for 1 hour experienced hypotension, abdominal tenderness, disseminated intravascular coagulation, transient hematuria, nonoliguric renal failure and an elevated serum amylase. Autopsy revealed cerebral edema, diffuse bilateral pneumonia, biventricular cardiac enlargement, toxic nephrosis, fatty infiltration of liver and peripancreatic fat necrosis.

CHRONIC EXPOSURE- Repeated or prolonged contact with the liquid may cause irritation, dermatitis and defatting of the skin with drying and cracking or burns and blistering. Some individuals may develop hypersensitivity, probably due to additives.

BENZENE:

IRRITANT.

ACUTE EXPOSURE- Direct contact may cause irritation. Effects may include erythema, a burning sensation, and with prolonged contact, blistering and edema. Under normal conditions, significant signs of systemic toxicity are unlikely from skin contact alone due to the slow rate of absorption; it may however, contribute to the toxicity from inhalation. Application to guinea pigs resulted in increased dermal permeability.

CHRONIC EXPOSURE- Repeated or prolonged contact defats the skin and may result in dermatitis with erythema, scaling, dryness, vesiculation, and fissuring, possibly accompanied by paresthesias of the fingers which may persist several weeks after the dermatitis subsides. Peripheral neuritis has also been reported. Secondary infections may occur. Tests on guinea pigs indicate sensitization is possible. Although animal studies have failed to establish a relationship between skin contact and a carcinogenic effect, most of the studies were inadequate; some papillomas and hematopoietic effects have been reported.

EYE CONTACT:

GASOLINE, AUTOMOTIVE, UNLEADED:

IRRITANT.

ACUTE EXPOSURE- Concentrations between 270 and 900 ppm may cause a sensation of irritation often before signs such as conjunctival hyperemia are visible. Liquid splashed in the eyes may cause pain, smarting and slight, transient corneal epithelial disturbance. Blepharospasm and conjunctival hyperemia and edema may occur.

CHRONIC EXPOSURE- Repeated or prolonged exposure may cause conjunctivitis and possible gradual, irreversible loss of corneal and conjunctival sensitivity.

BENZENE:

IRRITANT.

ACUTE EXPOSURE- May cause irritation. Vapor concentrations of 3000 ppm are very irritating, even on brief exposure. Droplets cause a moderate burning sensation, but only a slight, transient corneal epithelial injury with rapid recovery.

CHRONIC EXPOSURE- Repeated or prolonged exposure may cause conjunctivitis. 50% of rats exposed to 50 ppm for more than 600 hours developed cataracts.

INGESTION:

GASOLINE, AUTOMOTIVE, UNLEADED:

NARCOTIC.

ACUTE EXPOSURE- May cause irritation and burning of the gastrointestinal tract with nausea, vomiting and diarrhea. Absorption may cause initial central nervous stimulation followed by depression. Symptoms may include a mild excitation, restlessness, nervousness, irritability, twitching, weakness, blurred vision, headache, dizziness, drowsiness, incoordination, confusion, delirium, unconsciousness, convulsions and coma. Cardiac arrhythmias may occur. Transient liver damage is possible. Direct or indirect aspiration may cause chemical pneumonitis with pulmonary edema and hemorrhage, possibly complicated by bacterial pneumonia, and less frequently, by emphysema and pneumothorax. Signs of pulmonary involvement may include coughing, dyspnea, substernal pain, sudden development of rapid breathing, cyanosis, tachycardia and fever. Even small amounts may be fatal with death caused by cardiac arrest, asphyxia or respiratory paralysis. Depending on amount aspirated, death may occur rapidly or within 24 hours.

CHRONIC EXPOSURE- No data available.

BENZENE:

NARCOTIC/CARCINOGEN.

ACUTE EXPOSURE- May cause local irritation and burning sensation in the mouth, throat and stomach, and hemorrhagic inflammatory lesions of the mucous membranes in contact with the liquid. Signs and symptoms of systemic intoxication may include nausea, vomiting, headache, dizziness, weakness, staggering, chest pain and tightness, shallow, rapid pulse and respiration; breathlessness, pallor followed by flushing, and a fear of impending death. There may be visual disturbances, tremors, convulsions, ventricular irregularities, and paralysis. Excitement, euphoria or delirium may precede weariness, fatigue, sleepiness and followed by stupor and unconsciousness, coma and death from respiratory failure. Those who survive the central nervous system effects may develop bronchitis, pneumonia, pulmonary edema, and intrapulmonary hemorrhage. Aspiration may cause immediate pulmonary edema and hemorrhage. The usual lethal dose in humans is 10-15 milliliters, but smaller amounts have been reported to cause death. A single exposure may produce longterm

effects with pancytopenia persisting up to a year.

CHRONIC EXPOSURE- Daily administration to humans of 2-5 grams in olive oil caused headache, vertigo, bladder irritability, impotence, gastric disturbances, and evidence of renal congestion. In female rats treated with 132 single daily doses over 187 days, no effects were observed at 1 mg/kg; slight leukopenia at 10 mg/kg; and both leukopenia and anemia at 50 and 100 mg/kg. Oral administration to rats and mice at various dose levels induced neoplasms at multiple sites in males and females. In a one year gavage study, rats given 50 or 250 mg/kg, 4-5 days/week for 52 weeks did not exhibit acute or subacute toxic effects, but a dose correlated increase of leukemias and mammary carcinomas was observed; some other tumor types were also reported. Reproductive effects have been reported in animals.

| SECTION 12

ECOLOGICAL INFORMATION |

ENVIRONMENTAL IMPACT RATING (0-4): no data available

ACUTE AQUATIC TOXICITY: no data available

DEGRADABILITY: no data available

LOG BIOCONCENTRATION FACTOR (BCF): no data available

LOG OCTANOL/WATER PARTITION COEFFICIENT: no data available

| SECTION 13

DISPOSAL INFORMATION |

Observe all federal, state and local regulations when disposing of this substance.

Disposal must be in accordance with standards applicable to generators of hazardous waste, 40 CFR 262. EPA Hazardous Waste Number D001.

100 pound CERCLA Section 103 Reportable Quantity.

Benzene - Regulatory level: 0.5 mg/l (TCLP-40 CFR 261 Appendix II) materials which contain the above substance at or above the TCLP regulatory level meet the EPA toxicity characteristic, and must be disposed of in accordance with 40 CFR part 262. EPA Hazardous Waste Number D018.

| SECTION 14

TRANSPORTATION INFORMATION |

U.S. DEPARTMENT OF TRANSPORTATION SHIPPING NAME-ID NUMBER, 49 CFR 172.101:
Gasoline-UN 1203

U.S. DEPARTMENT OF TRANSPORTATION HAZARD CLASS OR DIVISION, 49 CFR 172.101:
3 - Flammable liquid

U.S. DEPARTMENT OF TRANSPORTATION PACKING GROUP, 49 CFR 172.101:
PG II

U.S. DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS, 49 CFR 172.101
AND SUBPART E:
Flammable liquid

U.S. DEPARTMENT OF TRANSPORTATION PACKAGING AUTHORIZATIONS:

EXCEPTIONS: 49 CFR 173.150

NON-BULK PACKAGING: 49 CFR 173.202

K PACKAGING: 49 CFR 173.242

U.S. DEPARTMENT OF TRANSPORTATION QUANTITY LIMITATIONS 49 CFR 172.101:

PASSENGER AIRCRAFT OR RAILCAR: 5 L

CARGO AIRCRAFT ONLY: 60 L

SECTION 15 REGULATORY INFORMATION

TSCA STATUS: Y

CERCLA SECTION 103 (40CFR302.4):	Y	10 pounds RQ
SARA SECTION 302 (40CFR355.30):	N	
SARA SECTION 304 (40CFR355.40):	N	
SARA SECTION 313 (40CFR372.65):	Y	
OSHA PROCESS SAFETY (29CFR1910.119):	N	
CALIFORNIA PROPOSITION 65:	Y	

SARA HAZARD CATEGORIES, SARA SECTIONS 311/312 (40 CFR 370.21)

ACUTE HAZARD:	Y
CHRONIC HAZARD:	Y
FIRE HAZARD:	Y
REACTIVITY HAZARD:	N
SUDDEN RELEASE HAZARD:	N

SECTION 16 OTHER

ADDITIONAL HEALTH DATA

See Page 3

SPECIAL PROTECTIVE INFORMATION

Eye Protection: Avoid contact with eyes. Eye contact can be avoided by wearing chemical safety goggles.

Skin Protection: Avoid prolonged or frequently repeated skin contact with this material. Skin contact can be minimized by wearing impervious protective clothing including rubber gloves.

Respiratory Protection: Wear approved respiratory protection such as an organic vapor cartridge or an air-supplying respirator unless ventilation equipment is adequate to keep airborne concentrations below the exposure standard.

Ventilation: Use adequate ventilation to keep airborne concentrations of this material below the exposure standard.

FIRE PROTECTION

Liquid evaporates and forms vapors (fumes) which can catch fire and burn with explosive violence. Invisible vapor spreads easily and can be set on fire by many sources such as pilot lights, welding equipment, and electrical motors and switches. Fire hazard is greater as liquid temperature rises above 85°F.

Flash Point: (TCC) 52°C (125°F) Min.

Autoignition Temp.: 260°C (500°F)

Flammability Limits: 0.9 - 6.0%

Extinguishing Media: CO₂, Dry Chemical, Foam, Water Spray

Special Fire Fighting Procedures: For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment. This may include self-contained breathing apparatus to protect against the hazardous effects of normal products of combustion or oxygen deficiency. Read the entire bulletin.

SPECIAL PRECAUTIONS

See Page 3

ENVIRONMENTAL PROTECTION

Environmental Impact: This material is not expected to present any environmental problems other than those associated with oil spills.

Precautions if Material is Released or Spilled: Eliminate all open flames in vicinity of spill or released vapor. Clean up spills as soon as possible, observing precautions in Special Protective Information and on product label. Absorb large spills with absorbent clay, diatomaceous earth or other suitable material. A fire or vapor hazard may exist since these cleanup materials will only absorb liquid; they will not absorb vapor.

Waste Disposal Methods: Place contaminated materials in disposable containers and bury in an approved dumping area.

REACTIVITY DATA

Stability (Thermal, Light, etc.): Stable

Incompatibility (Materials to Avoid): May react with strong oxidizing materials.

Hazardous Decomposition Products: Normal combustion forms carbon dioxide and water vapor; incomplete combustion can produce carbon monoxide.

Hazardous Polymerization: Will not occur.

PHYSICAL PROPERTIES

Solubility: Miscible with hydrocarbon solvents; insoluble in water.

Appearance (Color, odor, etc.): Colorless liquid.

Boiling Range: 350-510°F

Melting Point: n/a

Specific Gravity: 0.81 @ 60/60°F

Vapor Pressure: 1 mm Hg @ 77°F

Vapor Density (Air = 1): 5.7

Percent Volatile (Volume %): 99+%

Evaporation (Bu Ac = 1): 0.03

Molecular Weight: 166 (Avg.)

Viscosity: 1.50 cSt @ 100°F

n/a = Not Applicable

Material Information Bulletin

CHEVRON Pearl Kerosene

CMS 217105

ADDITIONAL HEALTH DATA

Signs and symptoms of central nervous system depression may include one or more of the following: headache, dizziness, loss of appetite, weakness and loss of coordination. Affected persons usually experience complete recovery when removed from the exposure area.

Not expected to produce systemic toxicity by skin contact; the acute dermal LD₅₀ for rabbits was 19.6 g/kg.

Note to Physician: Ingestion of this product or subsequent vomiting can result in aspiration of light hydrocarbon liquid which can cause pneumonitis.

SPECIAL PRECAUTIONS

READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL

Contains Petroleum Distillate

DO NOT USE OR STORE near flame, sparks, or hot surfaces. USE ONLY IN WELL VENTILATED AREA.

DO NOT weld, heat or drill container.

Replace cap or bung. Emptied container still contains hazardous or explosive vapor or liquid.

CAUTION! Do not use pressure to empty drum or explosion may result.

NATIONAL HEALTH SERVICES, INC.
11 WEST 42ND STREET, 12TH FLOOR
NEW YORK, NEW YORK 10036
1-800-445-MSDS (1-800-445-6737) OR
1-212-789-3535

FOR EMERGENCY SOURCE INFORMATION
CONTACT: 1-615-366-2000

SUBSTANCE IDENTIFICATION

CAS NUMBER: 7439-92-1
RTECS NUMBER: OF7525000

SUBSTANCE: LEAD

TRADE NAMES/SYNONYMS:

C.I. PIGMENT METAL 4; C.I. 77575; LEAD FLAKE; KS-4; LEAD S 2; S1; SO;
PLUMBUM; SO; PB-S 100; LEAD ELEMENT; L-18; L-24; L-29; L-27; T-134;
40BP, 80BP, 100BP, 200BP, FP, SFP (SCM METAL PRODUCTS INC); LEAD GRANULES;
PB; OHS12510

CHEMICAL FAMILY:
METAL

MOLECULAR FORMULA: PB

MOLECULAR WEIGHT: 207.19

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=0 PERSISTENCE=3
NFPA RATINGS (SCALE 0-4): HEALTH=U FIRE=0 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: LEAD PERCENT: 99.8
CAS# 7439-92-1

OTHER CONTAMINANTS: BISMUTH, COPPER, ARSENIC, ANTIMONY, TIN, IRON,
SILVER, ZINC

EXPOSURE LIMITS:

LEAD (INORGANIC FUMES AND DUST (AS PB)):

50 UG/M3 OSHA 8 HOUR TWA

30 UG/M3 OSHA 8 HOUR TWA ACTION LEVEL

IF AN EMPLOYEE IS EXPOSED TO LEAD FOR MORE THAN 8 HOURS PER DAY THE

FOLLOWING FORMULA IS USED:

MAXIMUM PERMISSIBLE LIMIT (IN UG/M3)= 400 DIVIDED BY HOURS WORKED IN THE DAY

0.15 MG/M3 ACGIH TWA

<0.10 MG/M3 NIOSH RECOMMENDED 10 HOUR TWA

0.1 MG/M3 DFG MAK TWA;

1.0 MG/M3 DFG MAK 30 MINUTE PEAK, AVERAGE VALUE, 1 TIME/SHIFT

MEASUREMENT METHOD: PARTICULATE FILTER; NITRIC ACID/HYDROGEN PEROXIDE;
ATOMIC ABSORPTION SPECTROMETRY; (NIOSH VOL. III # 7082).

1 POUND CERCLA SECTION 103 REPORTABLE QUANTITY

SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING

SUBJECT TO CALIFORNIA PROPOSITION 65 CANCER AND/OR REPRODUCTIVE TOXICITY

WARNING AND RELEASE REQUIREMENTS- (FEBRUARY 27, 1987)

PHYSICAL DATA

DESCRIPTION: BLUISH-WHITE, SILVERY GRAY, HEAVY, MALLEABLE METAL
BOILING POINT: 3164 F (1740 C) MELTING POINT: 622 F (328 C)
SPECIFIC GRAVITY: 11.3 VAPOR PRESSURE: 1.3 MMHG @ 970 C
SOLUBILITY IN WATER: INSOLUBLE
SOLVENT SOLUBILITY: SOLUBLE IN NITRIC ACID, HOT CONCENTRATED SULFURIC ACID
HARDNESS: 1.5 MOHS

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLECTIBLE FIRE HAZARD IN BULK FORM; HOWEVER, DUST, POWDER, OR FUMES ARE
FLAMMABLE OR EXPLOSIVE WHEN EXPOSED TO HEAT OR FLAMES.

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FIREFIGHTING:
MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK (1990 EMERGENCY
RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE PAGE 53).

EXTINGUISH USING AGENT SUITABLE FOR TYPE OF SURROUNDING FIRE. AVOID BREATHING
VAPORS AND DUSTS. KEEP UPWIND.

TOXICITY

LEAD:
TOXICITY DATA: 10 UG/M3 INHALATION-HUMAN TCLO; 450 MG/KG/6 YEARS
ORAL-WOMAN TDLO; 1000 MG/KG INTRAPERITONEAL-RAT LDLO; MUTAGENIC DATA
(RTECS); REPRODUCTIVE EFFECTS DATA (RTECS).
CARCINOGEN STATUS: HUMAN INADEQUATE EVIDENCE, ANIMAL SUFFICIENT EVIDENCE
(IARC GROUP-2B FOR INORGANIC LEAD COMPOUNDS). RENAL TUMORS WERE PRODUCED IN
ANIMALS BY LEAD ACETATE, SUBACETATE AND PHOSPHATE GIVEN ORALLY,
SUBCUTANEOUSLY OR INTRAPERITONEALLY. NO EVALUATION COULD BE MADE OF THE
CARCINOGENICITY OF POWDERED LEAD.
ACUTE TOXICITY LEVEL: INSUFFICIENT DATA.
TARGET EFFECTS: NEUROTOXIN; NEPHROTOXIN; TERATOGEN. POISONING MAY ALSO AFFECT
THE BLOOD, HEART, AND THE ENDOCRINE AND IMMUNE SYSTEMS.
AT INCREASED RISK FROM EXPOSURE: PERSONS WITH NERVOUS SYSTEM OR
GASTROINTESTINAL DISORDERS, ANEMIA, OR CHRONIC BRONCHITIS.
ADDITIONAL DATA: MAY CROSS THE PLACENTA. SMOKING MAY RESULT IN HIGH BLOOD LEAD
LEVELS.

 HEALTH EFFECTS AND FIRST AID

INHALATION:

LEAD:

SEE INFORMATION ON LEAD COMPOUNDS AND METAL FUME FEVER.

LEAD COMPOUNDS:

NEUROTOXIN/NEPHROTOXIN/TERATOGEN.

ACUTE EXPOSURE- ABSORPTION OF LARGE AMOUNTS OF LEAD MAY CAUSE A METALLIC TASTE, THIRST, A BURNING SENSATION IN THE MOUTH AND THROAT, SALIVATION, ABDOMINAL PAIN WITH SEVERE COLIC, VOMITING, DIARRHEA OF BLACK OR BLOODY STOOLS, CONSTIPATION, FATIGUE, SLEEP DISTURBANCES, DULLNESS, RESTLESSNESS, IRRITABILITY, MEMORY LOSS, LOSS OF CONCENTRATION, DELIRIUM, OLIGURIA OFTEN WITH HEMATURIA AND ALBUMINURIA, ENCEPHALOPATHY WITH VISUAL FAILURE, PARESTHESIAS, MUSCLE PAIN AND WEAKNESS, CONVULSIONS, AND PARALYSIS. DEATH MAY RESULT FROM CARDIORESPIRATORY ARREST OR SHOCK. SURVIVORS OF ACUTE EXPOSURE MAY EXPERIENCE THE ONSET OF CHRONIC INTOXICATION. LIVER EFFECTS MAY INCLUDE ENLARGEMENT AND TENDERNESS, AND JAUNDICE. THE FATAL DOSE OF ABSORBED LEAD IS APPROXIMATELY 0.5 GRAMS. PATHOLOGICAL FINDINGS INCLUDE GASTROINTESTINAL INFLAMMATION AND RENAL TUBULAR DEGENERATION.

CHRONIC EXPOSURE- PROLONGED OR REPEATED EXPOSURE TO LOW LEVELS OF LEAD MAY RESULT IN AN ACCUMULATION IN BODY TISSUES AND EXERT ADVERSE EFFECTS ON THE BLOOD, NERVOUS SYSTEMS, HEART, ENDOCRINE AND IMMUNE SYSTEMS, KIDNEYS, AND REPRODUCTION. EARLY STAGES OF LEAD POISONING, "PLUMBISM", MAY BE EVIDENCED BY ANOREXIA, WEIGHT LOSS, CONSTIPATION, APATHY OR IRRITABILITY, OCCASIONAL VOMITING, FATIGUE, HEADACHE, WEAKNESS, METALLIC TASTE IN THE MOUTH, GINGIVAL LEAD LINE IN PERSONS WITH POOR DENTAL HYGIENE, AND ANEMIA. LOSS OF RECENTLY DEVELOPED MOTOR SKILLS IS GENERALLY OBSERVED ONLY IN CHILDREN. MORE ADVANCED STAGES OF POISONING MAY BE CHARACTERIZED BY INTERMITTENT VOMITING, IRRITABILITY AND NERVOUSNESS, MYALGIA OF THE ARMS, LEGS, JOINTS AND ABDOMEN, PARALYSIS OF THE EXTENSOR MUSCLES OF THE ARMS AND LEGS WITH WRIST AND/OR FOOT DROP. SEVERE "PLUMBISM" MAY RESULT IN PERSISTENT VOMITING, ATAXIA, PERIODS OF STUPOR OR LETHARGY, ENCEPHALOPATHY WITH VISUAL DISTURBANCES WHICH MAY PROGRESS TO OPTIC NEURITIS AND ATROPHY, HYPERTENSION, PAPPILLEDEMA, CRANIAL NERVE PARALYSIS, DELIRIUM, CONVULSIONS, AND COMA. NEUROLOGIC SEQUELAE MAY INCLUDE MENTAL RETARDATION, SEIZURES, CEREBRAL PALSY, AND DYSTONIA MUSCULORUM DEFORMANS. IRREVERSIBLE KIDNEY DAMAGE HAS BEEN ASSOCIATED WITH INDUSTRIAL EXPOSURE. REPRODUCTIVE EFFECTS HAVE BEEN EXHIBITED IN BOTH MALES AND FEMALES. PATERNAL EFFECTS MAY INCLUDE DECREASED SEX DRIVE, IMPOTENCE, STERILITY AND ADVERSE EFFECTS ON THE SPERM WHICH MAY INCREASE THE RISK OF BIRTH DEFECTS. MATERNAL EFFECTS MAY INCLUDE MISCARRIAGE AND STILLBIRTHS IN EXPOSED WOMEN OR WOMEN WHOSE HUSBANDS WERE EXPOSED, ABORTION, STERILITY OR DECREASED FERTILITY, AND ABNORMAL MENSTRUAL CYCLES. LEAD CROSSES THE PLACENTA AND MAY AFFECT THE FETUS CAUSING BIRTH DEFECTS, MENTAL RETARDATION, BEHAVIORAL DISORDERS, AND DEATH DURING THE FIRST YEAR OF CHILDHOOD. ANIMAL STUDIES INDICATE THAT REPRODUCTIVE EFFECTS MAY BE ADDITIVE IF BOTH PARENTS ARE EXPOSED TO LEAD.

METAL FUME FEVER:

ACUTE EXPOSURE- METAL FUME FEVER, AN INFLUENZA-LIKE ILLNESS, MAY OCCUR DUE TO THE INHALATION OF FRESHLY FORMED METAL OXIDE PARTICLES SIZED BELOW 1.5 MICRONS AND USUALLY BETWEEN 0.02-0.05 MICRONS. SYMPTOMS MAY BE DELAYED 4-12 HOURS AND BEGIN WITH A SUDDEN ONSET OF THIRST, AND A SWEET, METALLIC OR FOUL TASTE IN THE MOUTH. OTHER SYMPTOMS MAY INCLUDE UPPER RESPIRATORY TRACT IRRITATION ACCOMPANIED BY COUGHING AND A DRYNESS OF THE MUCOUS MEMBRANES, LASSITUDE AND A GENERALIZED FEELING OF MALAISE. FEVER,

CHILLS, MUSCULAR PAIN, MILD TO SEVERE HEADACHE, NAUSEA, OCCASIONAL VOMITING, EXAGGERATED MENTAL ACTIVITY, PROFUSE SWEATING, EXCESSIVE INACTION, DIARRHEA AND PROSTRATION MAY ALSO OCCUR. TOLERANCE TO FUMES DEVELOPS RAPIDLY, BUT IS QUICKLY LOST. ALL SYMPTOMS USUALLY SUBSIDE WITHIN 24-36 HOURS.

CHRONIC EXPOSURE- THERE IS NO FORM OF CHRONIC METAL FUME FEVER, HOWEVER, REPEATED BOUTS WITH SYMPTOMS AS DESCRIBED ABOVE ARE QUITE COMMON. RESISTANCE TO THE CONDITION DEVELOPS AFTER A FEW DAYS OF EXPOSURE, BUT IS QUICKLY LOST IN 1 OR 2 DAYS.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:

LEAD:
SEE INFORMATION ON LEAD COMPOUNDS.

LEAD COMPOUNDS:

ACUTE EXPOSURE- CONTACT WITH LEAD POWDERS OR DUST MAY BE IRRITATING. LEAD IS NOT ABSORBED THROUGH THE SKIN, BUT MAY BE TRANSFERRED TO THE MOUTH INADVERTENTLY BY CIGARETTES, CHEWING TOBACCO, FOOD, OR MAKE-UP.
CHRONIC EXPOSURE- PROLONGED OR REPEATED EXPOSURE TO THE POWDER OR DUST MAY RESULT IN DERMATITIS. SYSTEMIC TOXICITY MAY DEVELOP IF LEAD IS TRANSFERRED TO THE MOUTH BY CIGARETTES, CHEWING TOBACCO, FOOD, OR MAKE-UP.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:

LEAD:
SEE INFORMATION ON LEAD COMPOUNDS.

LEAD COMPOUNDS:

ACUTE EXPOSURE- LEAD DUST OR POWDERS MAY BE IRRITATING. METALLIC LEAD PARTICLES MAY CAUSE AN INFLAMMATORY FOREIGN BODY REACTION AND INJURY IS GENERALLY THOUGHT TO BE MECHANICAL AND NOT TOXIC.
CHRONIC EXPOSURE- PROLONGED EXPOSURE MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

LEAD:
SEE INFORMATION ON LEAD COMPOUNDS.

LEAD COMPOUNDS:

NEUROTOXIN/NEPHROTOXIN/TERATOGEN.

ACUTE EXPOSURE- ABSORPTION OF LARGE AMOUNTS OF LEAD FROM THE INTESTINAL TRACT MAY CAUSE ALL THE SAME EFFECTS AS DETAILED IN ACUTE INHALATION. THE FATAL DOSE OF ABSORBED LEAD IS APPROXIMATELY 0.5 GRAMS.
CHRONIC EXPOSURE- PROLONGED OR REPEATED EXPOSURE TO LOW LEVELS OF LEAD MAY RESULT IN AN ACCUMULATION IN BODY TISSUES AND ADVERSE EFFECTS ON THE KIDNEYS, HEART AND BLOOD AND ON THE NERVOUS, REPRODUCTIVE, ENDOCRINE AND IMMUNE SYSTEMS AS DETAILED IN CHRONIC INHALATION.

FIRST AID- DO NOT INDUCE VOMITING. QUALIFIED MEDICAL PERSONNEL SHOULD REMOVE
MICAL BY GASTRIC LAVAGE OR CATHARSIS. ACTIVATED CHARCOAL IS USEFUL. GET
ICAL ATTENTION IMMEDIATELY.

ANTIDOTE:
THE FOLLOWING ANTIDOTE HAS BEEN RECOMMENDED. HOWEVER, THE DECISION AS TO
WHETHER THE SEVERITY OF POISONING REQUIRES ADMINISTRATION OF ANY ANTIDOTE AND
ACTUAL DOSE REQUIRED SHOULD BE MADE BY QUALIFIED MEDICAL PERSONNEL.

FOR LEAD POISONING:
INITIATE URINE FLOW FIRST. GIVE 10% DEXTROSE IN WATER INTRAVENOUSLY, 10-20
ML/KG BODY WEIGHT, OVER A PERIOD OF 1-2 HOURS. IF URINE FLOW DOES NOT START,
GIVE MANNITOL, 20% SOLUTION, 5-10 ML/KG BODY WEIGHT INTRAVENOUSLY OVER
20 MINUTES. FLUID MUST BE LIMITED TO REQUIREMENTS AND CATHERTIZATION MAY BE
NECESSARY IN COMA. DAILY URINE OUTPUT SHOULD BE 350-500 ML/M2/24 HOURS.

EXCESSIVE FLUIDS FURTHER INCREASE CEREBRAL EDEMA.
FOR ADULTS WITH ACUTE ENCEPHALOPATHY, GIVE DIMERCAPROL, 4 MG/KG,
INTRAMUSCULARLY EVERY 4 HOURS FOR 30 DOSES. BEGINNING 4 HOURS LATER, GIVE
CALCIUM DISODIUM EDETATE AT A SEPERATE INJECTION SITE, 12.5 MG/KG
INTRAMUSCULARLY EVERY 4 HOURS AS A 20% SOLUTION, WITH 0.5% PROCAINE ADDED,
FOR A TOTAL OF 30 DOSES. IF SIGNIFICANT IMPROVEMENT HAS NOT OCCURRED BY THE
FOURTH DAY, INCREASE THE NUMBER OF INJECTIONS BY 10 FOR EACH DRUG.
FOR SYMPTOMATIC ADULTS, THE COURSE OF DIMERCAPROL AND CALCIUM DISODIUM
EDETATE CAN BE SHORTENED OR CALCIUM DISODIUM EDETATE ONLY CAN BE GIVEN IN
A DOSAGE OF 50 MG/KG INTRAVENOUSLY AS 0.5% SOLUTION IN 5% DEXTROSE IN WATER
OR NORMAL SALINE BY INFUSION OVER NOT LESS THAN 8 HOURS FOR NOT MORE THAN
5 DAYS. FOLLOW WITH PENICILLAMINE, 500-750 MG/DAY, ORALLY FOR 1-2 MONTHS OR
UNTIL URINE LEAD LEVELS DROPS BELOW 0.3 MG/24 HOURS (DREISBACH, HANDBOOK OF
POISONING, 12TH ED.). ANTIDOTE SHOULD BE ADMINISTERED BY QUALIFIED MEDICAL
PERSONNEL.

REACTIVITY

REACTIVITY:
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:

LEAD NITRIUM NITRATE: VIOLENT OR EXPLOSIVE REACTION.
CHLORINE TRIFLUORIDE: VIOLENT REACTION.
DISODIUM ACETYLIDE: TRITURATION IN MORTAR MAY BE VIOLENT AND LIBERATE
CARBON.
HYDROGEN PEROXIDE (52% OR GREATER): VIOLENT DECOMPOSITION.
HYDROGEN PEROXIDE (60% SOLUTION) AND TRIOXANE: SPONTANEOUSLY DETONABLE.
METALS (ACTIVE): INCOMPATIBLE.
NITRIC ACID: LEAD-CONTAINING RUBBER MAY IGNITE.
OXIDIZERS (STRONG): INCOMPATIBLE.
SODIUM AZIDE: FORMS LEAD AZIDE AND COPPER AZIDE IN COPPER PIPE.
SODIUM CARBIDE: VIGOROUS REACTION.
SULFURIC ACID (HOT): REACTS.
ZIRCONIUM-LEAD ALLOYS: IGNITION ON IMPACT.

DECOMPOSITION:
THERMAL DECOMPOSITION PRODUCTS ARE TOXIC OXIDES OF LEAD.

POLYMERIZATION:
HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL
TEMPERATURES AND PRESSURES.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING
OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE
ENVIRONMENTAL PROTECTION AGENCY.

****STORAGE****

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

****DISPOSAL****

LEAD - REGULATORY LEVEL: 5.0 MG/L (TCLP-40 CFR 261 APPENDIX II)
MATERIALS WHICH CONTAIN THE ABOVE SUBSTANCE AT OR ABOVE THE TCLP REGULATORY
LEVEL MEET THE EPA TOXICITY CHARACTERISTIC, AND MUST BE DISPOSED OF IN
ACCORDANCE WITH 40 CFR PART 262. EPA HAZARDOUS WASTE NUMBER D008.

CONDITIONS TO AVOID

MAY BURN BUT DOES NOT IGNITE READILY. PREVENT DISPERSION OF DUST IN AIR. DO
NOT ALLOW SPILLED MATERIAL TO CONTAMINATE WATER SOURCES.

SPILL AND LEAK PROCEDURES

WATER SPILL:
THE CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986
(PROPOSITION 65) PROHIBITS CONTAMINATING ANY KNOWN SOURCE OF DRINKING WATER
WITH SUBSTANCES KNOWN TO CAUSE CANCER AND/OR REPRODUCTIVE TOXICITY.

OCCUPATIONAL SPILL:
DO NOT TOUCH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. FOR
SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO
CONTAINERS FOR LATER DISPOSAL. FOR SMALL DRY SPILLS, WITH A CLEAN SHOVEL
PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER. MOVE CONTAINERS FROM
SPILL AREA. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL.
KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY.

RESIDUE SHOULD BE CLEANED UP USING A HIGH-EFFICIENCY PARTICULATE FILTER
VACUUM.

REPORTABLE QUANTITY (RQ): 1 POUND
THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES
THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS
SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE
AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF
THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE
CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE
METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

 PROTECTIVE EQUIPMENT

ATION:

USE LOCAL EXHAUST VENTILATION SYSTEM TO MEET PUBLISHED EXPOSURE LIMITS.

LEAD (ELEMENTAL, INORGANIC, AND SOAPS):
 VENTILATION SHOULD MEET THE REQUIREMENTS IN 29 CFR 1910.1025(E).

RESPIRATOR:
 THE FOLLOWING RESPIRATORS ARE THE MINIMUM LEGAL REQUIREMENTS AS SET FORTH
 BY THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION FOUND IN 29 CFR 1910,
 SUBPART Z.

RESPIRATORY PROTECTION FOR LEAD AEROSOLS

AIRBORNE CONCENTRATION OF LEAD OR CONDITION OF USE	REQUIRED RESPIRATOR
NOT IN EXCESS OF 0.5 MG/M3 (10X PEL)	HALF-MASK, AIR PURIFYING RESPIRATOR EQUIPPED WITH HIGH-EFFICIENCY FILTERS.
NOT IN EXCESS OF 2.5 MG/M3 (50X PEL)	FULL FACEPIECE, AIR-PURIFYING RESPIRATOR WITH HIGH EFFICIENCY FILTERS.
NOT IN EXCESS OF 50 MG/M3 (1000X PEL)	ANY POWERED AIR-PURIFYING RESPIRATOR WITH HIGH EFFICIENCY FILTERS; OR HALF-MASK SUPPLIED-AIR RESPIRATOR OPERATED IN POSITIVE-PRESSURE MODE.
NOT IN EXCESS OF 100 MG/M3	SUPPLIED-AIR RESPIRATORS WITH FULL FACEPIECE, HOOD OR HELMET OR SUIT, OPERATED IN POSITIVE PRESSURE MODE.
G. THAN 100 MG/M3, UNKNOWN CONCENTRATIONS OR FIREFIGHTING	FULL FACEPIECE, SELF-CONTAINED BREATHING APPARATUS OPERATED IN POSITIVE-PRESSURE MODE.

(RESPIRATORS SPECIFIED FOR HIGHER CONCENTRATIONS CAN BE USED AT LOWER
 CONCENTRATIONS OF LEAD).
 (FULL FACEPIECE IS REQUIRED IF THE LEAD AEROSOLS CAUSE EYE OR SKIN IRRITATION
 AT THE USE CONCENTRATIONS.)
 (A HIGH EFFICIENCY PARTICULATE FILTER MEANS 99.97% EFFICIENT AGAINST 0.3
 MICRON PARTICLES.)

THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS
 BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO
 CHEMICAL HAZARDS OR NIOSH CRITERIA DOCUMENTS.
 THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND
 IN THE WORK PLACE AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE OF
 OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION.

LEAD, INORGANIC FUMES AND DUSTS (AS PB):

- 0.50 MG(PB)/M3-** ANY SUPPLIED-AIR RESPIRATOR.
ANY AIR-PURIFYING RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.
ANY SELF-CONTAINED BREATHING APPARATUS.
- 1.25 MG(PB)/M3-** ANY POWERED AIR-PURIFYING RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.
ANY SUPPLIED-AIR RESPIRATOR OPERATED IN A CONTINUOUS FLOW MODE.
- 2.50 MG(PB)/M3-** ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.
ANY POWERED AIR-PURIFYING RESPIRATOR WITH A TIGHT-FITTING FACEPIECE AND A HIGH-EFFICIENCY PARTICULATE FILTER.
ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.
ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE.
ANY SUPPLIED-AIR RESPIRATOR WITH A TIGHT-FITTING FACEPIECE OPERATED IN A CONTINUOUS FLOW MODE.
- 50.0 MG(PB)/M3-** ANY SUPPLIED-AIR RESPIRATOR OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.
- 100.0 MG(PB)/M3-** ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE AND OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.
- ESCAPE-** ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.
ANY APPROPRIATE ESCAPE-TYPE SELF-CONTAINED BREATHING APPARATUS.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

- ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.
- ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

LEAD (ELEMENTAL, INORGANIC, AND SOAPS):

PROTECTIVE CLOTHING SHOULD MEET THE REQUIREMENTS FOR PROTECTIVE WORK CLOTHING AND EQUIPMENT IN 29 CFR 1910.1025(G).

GLOVES:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

LEAD (ELEMENTAL, INORGANIC & SOAPS):

PROTECTIVE GLOVES SHOULD MEET THE REQUIREMENTS FOR PROTECTIVE WORK CLOTHING AND EQUIPMENT IN 29 CFR 1910.1025(G).

EYE PROTECTION:

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EMERGENCY EYE WASH: WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

LEAD (ELEMENTAL, INORGANIC, AND SOAPS):

PROTECTIVE EYE EQUIPMENT SHOULD MEET THE REQUIREMENTS FOR PROTECTIVE WORK CLOTHING AND EQUIPMENT IN 29 CFR 1910.1025(G).

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Occupational Health Guideline for Magnesium Oxide Fume

INTRODUCTION

This guideline is intended as a source of information for employees, employers, physicians, industrial hygienists, and other occupational health professionals who may have a need for such information. It does not attempt to present all data; rather, it presents pertinent information and data in summary form.

SUBSTANCE IDENTIFICATION

- Formula: MgO
- Synonyms: Magnesia fume
- Appearance: White fume.

PERMISSIBLE EXPOSURE LIMIT (PEL)

The current OSHA standard for magnesium oxide fume is 15 milligrams of magnesium oxide fume per cubic meter of air (mg/m^3) averaged over an eight-hour work shift. The American Conference of Governmental Industrial Hygienists has recommended for magnesium oxide fume a Threshold Limit Value of $10 \text{ mg}/\text{m}^3$.

HEALTH HAZARD INFORMATION

• Routes of exposure

Magnesium oxide fume can affect the body if it is inhaled or if it comes in contact with the eyes.

• Effects of overexposure

1. *Short-term Exposure:* Magnesium oxide fume may cause irritation of the eyes and nose. It may also cause a metal fume fever. Symptoms of metal fume fever include chills, fever, headache, tightness of chest, cough, weakness, tiredness, dryness of the nose and mouth, muscular pain, nausea, and vomiting.

2. *Long-term Exposure:* None known.

3. *Reporting Signs and Symptoms:* A physician should be contacted if anyone develops any signs or symptoms and suspects that they are caused by exposure to magnesium oxide fume.

• Recommended medical surveillance

The following medical procedures should be made available to each employee who is exposed to magnesium oxide fume at potentially hazardous levels:

1. *Initial Medical Screening:* Employees should be screened for history of certain medical conditions (listed below) which might place the employee at increased risk from magnesium oxide fume exposure.

—Chronic respiratory disease: In persons with impaired pulmonary function, especially those with obstructive airway diseases, the breathing of magnesium oxide fume might cause exacerbation of symptoms due to its irritant properties.

2. *Periodic Medical Examination:* Any employee developing the above-listed conditions should be referred for further medical examination.

• Summary of toxicology

Magnesium oxide fume mildly irritates the eyes and nose. Examination of 95 workers exposed to an unspecified concentration of magnesium oxide dust revealed slight irritation of the eyes and nose; the magnesium level in the serum of 60% of those examined was above the normal upper limit of 3.5 mg%. Experimental subjects exposed to fresh magnesium oxide fume developed metal fume fever, an illness similar to influenza; their symptoms included fever, cough, oppression in the chest, and a leukocytosis. There are no reports of metal fume fever resulting from industrial exposure. Metal magnesium slivers produce a gaseous reaction and cause a slow-healing burn with ulceration, but this has not been reported for magnesium oxide.

CHEMICAL AND PHYSICAL PROPERTIES

• Physical data

1. Molecular weight: 40.3
2. Boiling point (760 mm Hg): 3582 C (6480 F) (solid)
3. Specific gravity (water = 1): Solid = 3.58
4. Vapor density (air = 1 at boiling point of magnesium oxide fume): Not applicable
5. Melting point: 2800 C (5072 F) (solid)

These recommendations reflect good industrial hygiene and medical surveillance practices and their implementation will assist in achieving an effective occupational health program. However, they may not be sufficient to achieve compliance with all requirements of OSHA regulations.

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- 6. Vapor pressure at 20 C (68 F): Essentially zero
- 7. Solubility in water, g/100 g water at 20 C (68 F):

Insoluble

- 8. Evaporation rate (butyl acetate = 1): Not applicable

- **Reactivity**

1. Conditions contributing to instability: None
2. Incompatibilities: Magnesium oxide fume reacts violently with chlorine trifluoride.
3. Hazardous decomposition products: None
4. Special precautions: None

- **Flammability**

1. Not combustible

- **Warning properties**

Magnesium oxide fume may cause mild eye irritation.

MONITORING AND MEASUREMENT PROCEDURES

- **General**

Measurements to determine employee exposure are best taken so that the average eight-hour exposure is based on a single eight-hour sample or on two four-hour samples. Several short-time interval samples (up to 30 minutes) may also be used to determine the average exposure level. Air samples should be taken in the employee's breathing zone (air that would most nearly represent that inhaled by the employee).

- **Method**

Sampling and analyses may be performed by collection of magnesium oxide fume on a cellulose membrane filter, followed by treatment with nitric acid, and atomic absorption spectrophotometric analysis. An analytical method for magnesium oxide fume is in the *NIOSH Manual of Analytical Methods*, 2nd Ed., Vol. 3, 1977, available from the Government Printing Office, Washington, D.C. 20402 (GPO No. 017-033-00261-4).

RESPIRATORS

- Good industrial hygiene practices recommend that engineering controls be used to reduce environmental concentrations to the permissible exposure level. However, there are some exceptions where respirators may be used to control exposure. Respirators may be used when engineering and work practice controls are not technically feasible, when such controls are in the process of being installed, or when they fail and need to be supplemented. Respirators may also be used for operations which require entry into tanks or closed vessels, and in emergency situations. If the use of respirators is necessary, the only respirators permitted are those that have been approved by the Mine Safety and Health Administration (formerly Mining Enforcement and Safety Administration) or by the National Institute for Occupational Safety and Health.

- In addition to respirator selection, a complete respiratory protection program should be instituted which includes regular training, maintenance, inspection, cleaning, and evaluation.

COMMON OPERATIONS AND CONTROLS

The following list includes some common operations in which exposure to magnesium oxide fume may occur and control methods which may be effective in each case:

Operation	Controls
Liberation from fabrication of alloys for aircraft, ships, automobiles, boats, tools, machinery, and military equipment	Local exhaust ventilation; general dilution ventilation; personal protective equipment
Liberation from casting of metal and alloys	Local exhaust ventilation; general dilution ventilation
Liberation from fabrication of metal	Local exhaust ventilation; general dilution ventilation; personal protective equipment

EMERGENCY FIRST AID PROCEDURES

In the event of an emergency, institute first aid procedures and send for first aid or medical assistance.

- **Breathing**

If a person breathes in large amounts of magnesium oxide fume, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible.

- **Rescue**

Move the affected person from the hazardous exposure. If the exposed person has been overcome, notify someone else and put into effect the established emergency rescue procedures. Do not become a casualty. Understand the facility's emergency rescue procedures and know the locations of rescue equipment before the need arises.

SPILL PROCEDURES

- Persons not wearing protective equipment and clothing should be restricted from areas of releases until cleanup has been completed.
- If potentially hazardous amounts of magnesium oxide fume are inadvertently released, ventilate the area of release to disperse the fume.

REFERENCES

• American Conference of Governmental Industrial Hygienists: "Magnesium Oxide Fume," *Documentation of the Threshold Limit Values for Substances in Workroom Air* (3rd ed., 2nd printing), Cincinnati, 1974.

- American Industrial Hygiene Association: "Magnesium," *Hygienic Guide Series*, Detroit, Michigan, 1960.
- Browning, E.: *Toxicity of Industrial Metals* (2nd ed.), Butterworths, London, 1969.
- Patty, F. A. (ed.): *Toxicology*, Vol. II of *Industrial Hygiene and Toxicology* (2nd ed. rev.), Interscience, New York, 1963.

RESPIRATORY PROTECTION FOR MAGNESIUM OXIDE FUME

Condition	Minimum Respiratory Protection* Required Above 15 mg/m ³
Particulate Concentration	
150 mg/m ³ or less	Any fume respirator or high efficiency particulate filter respirator. Any supplied-air respirator. Any self-contained breathing apparatus.
750 mg/m ³ or less	A high efficiency particulate filter respirator with a full facepiece. Any supplied-air respirator with a full facepiece, helmet, or hood. Any self-contained breathing apparatus with a full facepiece.
7,500 mg/m ³ or less	A powered air-purifying respirator with a high efficiency particulate filter. A Type C supplied-air respirator operated in pressure-demand or other positive pressure or continuous-flow mode.
Greater than 7,500 mg/m ³ or entry and escape from unknown concentrations	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode. A combination respirator which includes a Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure or continuous-flow mode and an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.
Fire Fighting	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.

*Only NIOSH-approved or MSHA-approved equipment should be used.

Occupational Health Guideline for Manganese

INTRODUCTION

This guideline is intended as a source of information for employees, employers, physicians, industrial hygienists, and other occupational health professionals who may have a need for such information. It does not attempt to present all data; rather, it presents pertinent information and data in summary form.

SUBSTANCE IDENTIFICATION

- Formula: Mn
- Synonyms: None
- Appearance: Gray solid.

PERMISSIBLE EXPOSURE LIMIT (PEL)

The current OSHA standard for manganese is a ceiling level of 5 milligrams of manganese per cubic meter of air (mg/m^3).

HEALTH HAZARD INFORMATION

• Routes of exposure

Manganese can affect the body if it is inhaled. Manganese can also affect the body if it is swallowed.

• Effects of overexposure

1. Short-term Exposure: Inhalation of fumes with high concentrations of manganese and its oxides may bring about "metal fume fever." Symptoms of metal fume fever are chills and fever, upset stomach, vomiting, dryness of the throat, cough, weakness, and aching of the head and body. Symptoms often occur several hours after exposure to fumes and usually last for only a day.

2. Long-term Exposure: Prolonged or repeated exposure to manganese may affect the nervous system with difficulty in walking and balancing, weakness or cramps in the legs, hoarseness of the voice, trouble with memory and judgment, unstable emotions or unusual irritability. If high exposure continues, a person may have poor coordination, difficulty in speaking clearly, or shaking or tremor of the arms or legs. A person may

also have hallucinations or uncontrollable laughter or crying. The respiratory system may be affected by a condition known as "manganese pneumonia," which may result in symptoms and signs of coughing, fever, chills, general aching of the body, chest pain, and other common signs of pneumonia.

3. Reporting Signs and Symptoms: A physician should be contacted if anyone develops any signs or symptoms and suspects that they are caused by exposure to manganese.

• Recommended medical surveillance

The following medical procedures should be made available to each employee who is exposed to manganese at potentially hazardous levels:

1. Initial Medical Examination:

—A complete history and physical examination: The purpose is to detect pre-existing conditions that might place the exposed employee at increased risk, and to establish a baseline for future health monitoring. Persons with a history of alcoholism, psychiatric, neurologic, or pulmonary diseases or liver dysfunction would be expected to be at increased risk from exposure. Examination of the respiratory tract, hemopoietic system, and kidneys should be stressed.

—14" x 17" chest roentgenogram: Manganese causes pneumonitis or metal fume fever. Surveillance of the lungs is indicated.

—FVC and FEV (1 sec): Manganese is reported to cause decreased pulmonary function. Periodic surveillance is indicated.

—A complete blood count: Manganese has been reported to cause blood changes. A complete blood count should be performed including a red cell count, a white cell count, a differential count of a stained smear, as well as hemoglobin and hematocrit.

—Urinalysis: Since kidney damage has been observed in humans exposed to manganese, a urinalysis should be performed, including at a minimum specific gravity, albumin, glucose, and a microscopic on centrifuged

These recommendations reflect good industrial hygiene and medical surveillance practices and their implementation will assist in achieving an effective occupational health program. However, they may not be sufficient to achieve compliance with all requirements of OSHA regulations.

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sediment. Determination of manganese level in urine may be helpful in assessing exposure.

2. **Periodic Medical Examination:** The aforementioned medical examinations should be repeated on an annual basis, except that an x-ray is considered necessary only when indicated by the results of pulmonary function testing, or by signs and symptoms of respiratory disease.

• **Summary of toxicology**

Inhalation of manganese dust or fume primarily affects the central nervous system; high concentrations cause the influenza-like illness termed manganese pneumonitis. Manganese acts either as a direct neurotoxin, or it adversely affects certain neuroenzymes. Manganese fume causes a disease quite similar to Parkinsonism after 6 months to 2 years of exposure. Initially there is headache; asthenia; restless sleep or somnolence; change in personality with psychomotor instability associated with restlessness, irritability, and a tendency to either cry or laugh inappropriately. This is followed by an intermediate phase with visual hallucinations, double vision; impaired hearing; uncontrollable impulses; mental confusion; euphoria; and normal reaction to painful stimuli. In the advanced phase, the subject exhibits possible anemia; excessive salivation; disorders of the basal ganglia of Parkinsonian type, such as mask-like facies, muscle weakness, muscle rigidity, tremor of the upper extremities and head, and impaired gait. High concentrations of manganese dust produce fever and chills similar to mental fume fever. During human exposure to manganese fume there is dryness and irritation of the throat, a sweet or metallic taste followed by substernal tightness, constriction in the chest, and a dry cough. Several hours following exposure the subject develops chills, lassitude, malaise, fatigue, frontal headache, low back pain, muscle cramps, and occasionally blurred vision, nausea, and vomiting. Physical examination reveals fever, perspiration, dyspnea, rales throughout the chest, and tachycardia; in some instances there has been a reversible reduction in pulmonary vital capacity. Leukopenia has been reported in 4 out of 16 cases of manganese poisoning, although there is no convincing evidence that any changes in the blood should be regarded as specific or diagnostic of manganese poisoning.

CHEMICAL AND PHYSICAL PROPERTIES

• **Physical data**

1. Molecular weight: 54.94
2. Boiling point (760 mm Hg): 2097 C (3806 F)
3. Specific gravity (water = 1): 7.2
4. Vapor density (air = 1 at boiling point of manganese): Data not available
5. Melting point: 1245 C (2273 F)
6. Vapor pressure at 1227 C (2240 F): 1 mm Hg
7. Solubility in water, g/100 g water at 20 C (68 F): not pertinent
8. Evaporation rate (butyl acetate = 1): Not pertinent

2. Autoignition temperature: Data not available
3. Flammable limits in air, % by volume: Data not available
4. Extinguishant: Data not available

• **Warning properties**

Grant states that "local contact of manganese with the cornea does not appear to be a problem industrially."

MONITORING AND MEASUREMENT PROCEDURES

• **Ceiling Evaluation**

Measurements to determine employee ceiling exposure are best taken during periods of maximum expected airborne concentrations of manganese. Each measurement should consist of a fifteen (15) minute sample or series of consecutive samples totalling fifteen (15) minutes in the employee's breathing zone (air that would most nearly represent that inhaled by the employee). A minimum of three (3) measurements should be taken on one work shift and the highest of all measurements taken is an estimate of the employee's exposure.

• **Method**

Sampling and analyses may be performed by collection of manganese in a filter, followed by atomic absorption spectrophotometric analysis. An analytical method for manganese is in the *NIOSH Manual of Analytical Methods*, 2nd Ed., Vol. 5, 1979, available from the Government Printing Office, Washington, D.C. 20402 (GPO No. 017-033-00349-1).

RESPIRATORS

- Good industrial hygiene practices recommend that engineering controls be used to reduce environmental concentrations to the permissible exposure level. However, there are some exceptions where respirators may be used to control exposure. Respirators may be used when engineering and work practice controls are not technically feasible, when such controls are in the process of being installed, or when they fail and need to be supplemented. Respirators may also be used for operations which require entry into tanks or closed vessels, and in emergency situations. If the use of respirators is necessary, the only respirators permitted are those that have been approved by the Mine Safety and Health Administration (formerly Mining Enforcement and Safety Administration) or by the National Institute for Occupational Safety and Health.
- In addition to respirator selection, a complete respiratory protection program should be instituted which includes regular training, maintenance, inspection, cleaning, and evaluation.

COMMON OPERATIONS AND CONTROLS

The following list includes some common operations in which exposure to manganese may occur and control methods which may be effective in each case:

Operation	Controls	Operation	Controls
Liberation during welding operations	Local exhaust ventilation; respiratory protective devices; dilution ventilation	Liberation of dioxide and sulfate during manufacture and application of fertilizers	Local exhaust ventilation
Liberation during casting of molten ferromanganese	Local exhaust ventilation	Liberation of dust during manufacture of manganese soap and wood preservatives;	Local exhaust ventilation
Liberating during bagging of manganese ore	Local exhaust ventilation; respiratory protective devices and dust suppression with water	manufacture of safety matches, signal flares, fire-works, and strikers; during mixing and kiln operations of brick manufacture	
Liberation during mixing and pressing of dry battery depolarization	Local exhaust ventilation	Liberation of dusts during manufacture and utilization of oxidation catalysts, such as hopcalite, manganese acetate, and naphthenate	Local exhaust ventilation
Liberation during grinding of ore containing manganese	Local exhaust ventilation; respiratory protective devices and dust suppression with water		
Liberation during arc burning of manganese-hardened steel in repair and manufacture programs	Local exhaust ventilation; respiratory protective devices; dilution ventilation		
Liberation from top of submerged arc electric furnace	General dilution ventilation and process enclosure, if possible		
Liberation of dust during ore extraction	General dilution ventilation; respiratory protective devices		
Liberation during metal finishing operations of high manganese steel	Local exhaust ventilation; respiratory protective equipment		
Liberation of dust during crushing of ferromanganese metal prior to shipment; during dumping, weighing, and mixing operations in ceramics and glass manufacture for pigmentation and coloration purposes	Local exhaust ventilation; respiratory protective equipment		
Liberation from formulation of proprietary mixtures for paint and varnish manufacture	Local exhaust ventilation; respiratory protective equipment		

EMERGENCY FIRST AID PROCEDURES

In the event of an emergency, institute first aid procedures and send for first aid or medical assistance.

• Breathing

If a person breathes in large amounts of manganese, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible.

• Swallowing

When manganese has been swallowed and the person is conscious, give the person large quantities of water immediately. After the water has been swallowed, try to get the person to vomit by having him touch the back of his throat with his finger. Do not make an unconscious person vomit. Get medical attention immediately.

• Rescue

Move the affected person from the hazardous exposure. If the exposed person has been overcome, notify someone else and put into effect the established emergency rescue procedures. Do not become a casualty. Understand the facility's emergency rescue procedures and know the locations of rescue equipment before the need arises.

SPILL AND DISPOSAL PROCEDURES

• Persons not wearing protective equipment and clothing should be restricted from areas of spills until cleanup has been completed.

• If manganese is spilled, the following steps should be taken:

1. Remove all ignition sources.

2. Ventilate area of spill.

2. For small quantities, sweep onto paper or other suitable material, place in an appropriate container and burn in a safe place (such as a fume hood). Large quantities may be reclaimed; however, if this is not practical, dissolve in a flammable solvent (such as alcohol) and atomize in a suitable combustion chamber equipped with an appropriate effluent gas cleaning device.

• Waste disposal methods:

Manganese may be disposed of:

1. By making packages of manganese in paper or other flammable material and burning in a suitable combustion chamber equipped with an appropriate effluent gas cleaning device.

2. By dissolving manganese in a flammable solvent (such as alcohol) and atomizing in a suitable combustion chamber equipped with an appropriate effluent gas cleaning device.

ADDITIONAL INFORMATION

To find additional information on manganese, look up manganese in the following documents:

- Medical Surveillance for Chemical Hazards
- Respiratory Protection for Chemical Hazards
- Personal Protection and Sanitation for Chemical Hazards

These documents are available through the NIOSH Division of Technical Services, 4676 Columbia Parkway, Cincinnati, Ohio 45226.

REFERENCES

- American Conference of Governmental Industrial Hygienists: "Manganese," *Documentation of the Threshold Limit Values for Substances in Workroom Air* (3rd ed., 2nd printing), Cincinnati, 1974.
- American Industrial Hygiene Association: "Manganese," *Hygienic Guide Series*, Detroit, Michigan, 1962.

• *American National Standard Acceptable Concentrations - Manganese*: ANSI-Z37.6-1948, American National Standards Institute, Inc., New York, 1948.

• Browning, E.: *Toxicity of Industrial Metals* (2nd ed.), Butterworths, London, 1969.

• Dow Chemical Company: *Material Safety Data Sheet - Manganese*, Midland, Michigan, 1975.

• Gleason, M. N., Gosselin, R. E., Hodge, H. C., and Smith, R. P.: *Clinical Toxicology of Commercial Products* (3rd ed.), Williams and Wilkins, Baltimore, 1969.

• Grant, W. M.: *Toxicology of the Eye* (2nd ed.), C. C. Thomas, Springfield, Illinois, 1974.

• *Hygienic Information Guide No. 29 - Manganese*, Commonwealth of Pennsylvania, Department of Environmental Resources, Bureau of Occupational Health, 1973.

• International Labour Office: *Encyclopedia of Occupational Health and Safety*, McGraw-Hill, New York, 1971.

• Patty, F. A. (ed.): *Toxicology*, Vol. II of *Industrial Hygiene and Toxicology* (2nd ed. rev.), Interscience, New York, 1963.

• Penalver, R.: "Manganese Poisoning," *Industrial Medicine and Surgery*, 24:1-7, 1955.

• Sax, N. I.: *Dangerous Properties of Industrial Materials* (3rd ed.), Van Nostrand Reinhold, New York, 1968.

• Smyth, L. T., et al.: "Clinical Manganism and Exposure to Manganese in the Production and Processing of Ferromanganese Alloy," *Journal of Occupational Medicine*, 15:101-109, 1973.

RESPIRATORY PROTECTION FOR MANGANESE

Condition	Minimum Respiratory Protection* Required Above 5 mg/m ³
Dust or Mist Concentration	
25 mg/m ³ or less	Any dust and mist respirator, except single-use respirators.
50 mg/m ³ or less	Any dust and mist respirator, except single-use or quarter-mask respirator.
Dust, Mist, or Fume Concentration	
50 mg/m ³ or less	Any fume respirator or high efficiency particulate filter respirator. Any supplied-air respirator. Any self-contained breathing apparatus.
250 mg/m ³ or less	A high efficiency particulate filter respirator with a full facepiece. Any supplied-air respirator with a full facepiece, helmet, or hood. Any self-contained breathing apparatus with a full facepiece.
5000 mg/m ³ or less	A powered air-purifying respirator with a high efficiency particulate filter. A Type C supplied-air respirator operated in pressure-demand or other positive pressure or continuous-flow mode.
10,000 mg/m ³ or less	A Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure mode or with a full facepiece, helmet, or hood operated in continuous-flow mode.
Greater than 10,000 mg/m ³ or entry and escape from unknown concentrations	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode. A combination respirator which includes a Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure or continuous-flow mode and an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.
Fire Fighting	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.

*Only NIOSH-approved or MSHA-approved equipment should be used.

Occupational Health Guideline for Methyl Chloroform

INTRODUCTION

This guideline is intended as a source of information for employees, employers, physicians, industrial hygienists, and other occupational health professionals who may have a need for such information. It does not attempt to present all data; rather, it presents pertinent information and data in summary form.

SUBSTANCE IDENTIFICATION

- Formula: CH_2CCl_3
- Synonyms: 1,1,1-trichloroethane; 1,1,1-trichloroethane, stabilized
- Appearance and odor: Colorless liquid with a mild odor, like chloroform.

PERMISSIBLE EXPOSURE LIMIT (PEL)

The current OSHA standard for methyl chloroform is 350 parts of methyl chloroform per million parts of air (ppm) averaged over an eight-hour work shift. This may also be expressed as 1910 milligrams of methyl chloroform per cubic meter of air (mg/m^3). NIOSH has recommended that the permissible exposure limit be changed to a ceiling of 350 ppm ($1910 \text{ mg}/\text{m}^3$) averaged over a 15-minute period. The NIOSH Criteria Document for 1,1,1-Trichloroethane should be consulted for more detailed information.

HEALTH HAZARD INFORMATION

• Routes of exposure

Methyl chloroform can affect the body if it is inhaled or if it comes in contact with the eyes or skin. It can also affect the body if it is swallowed.

• Effects of overexposure

1. *Short-term Exposure:* Exposure to methyl chloroform vapor may cause headache, dizziness, drowsiness, unconsciousness, irregular heart beat, and death. Methyl chloroform liquid splashed in the eyes may cause irritation.

2. *Long-term Exposure:* Prolonged or repeated skin contact with liquid methyl chloroform may cause irritation of the skin. Reproductive abnormalities have been noted in studies of animals exposed to high concentrations of methyl chloroform.

3. *Reporting Signs and Symptoms:* A physician should be contacted if anyone develops any signs or symptoms and suspects that they are caused by exposure to methyl chloroform.

• Recommended medical surveillance

The following medical procedures should be made available to each employee who is exposed to methyl chloroform at potentially hazardous levels:

1. *Initial Medical Examination:*

—A complete history and physical examination: The purpose is to detect pre-existing conditions that might place the employee at increased risk, and to establish a baseline for future health monitoring. Examination of the skin, liver, and cardiovascular system should be stressed. The physician should be made aware of any adverse reproductive effects in workers exposed to methyl chloroform.

—Skin disease: Methyl chloroform can cause dermatitis on prolonged exposure. Persons with pre-existing skin disorders may be more susceptible to the effects of this agent.

—Liver disease: At high concentrations, methyl chloroform causes liver changes in animals, which justifies consideration of the possible consequences before exposing persons with impaired liver function.

—Cardiovascular disease: In persons with impaired cardiovascular function, especially those with a history of cardiac arrhythmias, the inhalation of methyl chloroform might cause exacerbation of disorders of the conduction mechanism due to its sensitizing effects on the myocardium.

—Medical warning: Workers should be provided with information advising them of studies in which congenital abnormalities were found following exposure of animals to high concentrations of methyl chloroform.

These recommendations reflect good industrial hygiene and medical surveillance practices and their implementation will assist in achieving an effective occupational health program. However, they may not be sufficient to achieve compliance with all requirements of OSHA regulations.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service Centers for Disease Control
National Institute for Occupational Safety and Health

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

form. The physician should be made aware of any reproductive abnormalities in workers.

2. Periodic Medical Examination: The aforementioned medical examinations should be repeated on an annual basis.

• **Summary of toxicology**

Methyl chloroform vapor is a narcotic. Repeated exposure of animals to concentrations of 1000 to 10,000 ppm caused liver and lung changes in some species. In dogs, cardiac sensitization to epinephrine occurred at concentrations of 5000 to 10,000 ppm. A number of human fatalities related to industrial exposure in closed spaces have been reported. A 5-minute exposure to 5000 ppm can be expected to produce marked incoordination and anesthesia. Prolonged exposure at this concentration may cause coma and death. Exposure to concentrations in excess of 1000 ppm for 15 minutes, or 2000 ppm for 5 minutes, can be expected to produce a disturbance of equilibrium in the majority of adults. Above 1700 ppm, minor disturbances of equilibrium have been observed, with complaints of headache and lassitude. In controlled human exposures to 500 ppm no effects other than slight, transient eye irritation were noted; at 1000 ppm and above, mild eye irritation was experienced by all subjects, and some became dizzy. Following exposure, most of the compound is eliminated unchanged via the lungs within 48 hours. When placed into the rabbit eye, the liquid caused conjunctival irritation but no corneal damage. Dermatitis may result from repeated skin contact with the liquid.

CHEMICAL AND PHYSICAL PROPERTIES

• **Physical data**

1. Molecular weight: 133.4
2. Boiling point (760 mm Hg): 74 C (165 F)
3. Specific gravity (water = 1): 1.33
4. Vapor density (air = 1 at boiling point of methyl chloroform): 4.55
5. Melting point: -38 C (-36 F)
6. Vapor pressure at 20 C (68 F): 100 mm Hg
7. Solubility in water, g/100 g water at 20 C (68 F): 0.07
8. Evaporation rate (butyl acetate = 1): 12.8

• **Reactivity**

1. Conditions contributing to instability: Heat.
2. Incompatibilities: Contact with strong caustics, strong oxidizers, and chemically active metals such as aluminum and magnesium powders, or sodium and potassium may cause fires and explosions.
3. Hazardous decomposition products: Toxic gases and vapors (such as hydrogen chloride, phosgene, and carbon monoxide) may be released in a fire involving methyl chloroform.
4. Special precautions: Liquid methyl chloroform will attack some forms of plastics, rubber, and coatings.

Flammability

1. Flash point: None in normal test method.
2. Autoignition temperature: 500 C (932 F)

3. Flammable limits in air, % by volume: (At elevated temperature and pressure) Lower: 7; Upper: 16

4. Extinguishant: Foam, dry chemical, carbon dioxide

• **Warning properties**

1. Odor Threshold: The AIHA *Hygienic Guide* states that the odor threshold of methyl chloroform may range from 20 to 100 ppm. Both May and Summer give 400 ppm as the odor threshold, however.

2. Eye Irritation Level: The *Hygienic Guide* states that "in controlled human exposures to 500 ppm no effects other than slight, transient eye irritation were noted, but at 1000 ppm and above, mild eye irritation was experienced by all subjects."

3. Evaluation of Warning Properties: Since the odor threshold of methyl chloroform is near or below the permissible exposure limit, and since eye irritation occurs at a concentration only twice the permissible exposure limit, methyl chloroform is treated as a material with adequate warning properties.

MONITORING AND MEASUREMENT PROCEDURES

• **Eight-Hour Exposure Evaluation**

Measurements to determine employee exposure are best taken so that the average eight-hour exposure is based on a single eight-hour sample or on two four-hour samples. Several short-time interval samples (up to 30 minutes) may also be used to determine the average exposure level. Air samples should be taken in the employee's breathing zone (air that would most nearly represent that inhaled by the employee).

• **Ceiling Evaluation**

Measurements to determine employee ceiling exposure are best taken during periods of maximum expected airborne concentrations of methyl chloroform. Each measurement should consist of a fifteen (15) minute sample or series of consecutive samples totalling fifteen (15) minutes in the employee's breathing zone (air that would most nearly represent that inhaled by the employee). A minimum of three (3) measurements should be taken on one work shift and the highest of all measurements taken is an estimate of the employee's exposure.

• **Method**

Sampling and analyses may be performed by collection of vapors using an adsorption tube with subsequent desorption with carbon disulfide and gas chromatographic analysis. Also, detector tubes certified by NIOSH under 42 CFR Part 84 or other direct-reading devices calibrated to measure methyl chloroform may be used. An analytical method for methyl chloroform is in the *NIOSH Manual of Analytical Methods*, 2nd Ed., Vol. 3, 1977, available from the Government Printing Office, Washington, D.C. 20402 (GPO No. 017-033-00261-4).

RESPIRATORS

- Good industrial hygiene practices recommend that engineering controls be used to reduce environmental concentrations to the permissible exposure level. However, there are some exceptions where respirators may be used to control exposure. Respirators may be used when engineering and work practice controls are not technically feasible, when such controls are in the process of being installed, or when they fail and need to be supplemented. Respirators may also be used for operations which require entry into tanks or closed vessels, and in emergency situations. If the use of respirators is necessary, the only respirators permitted are those that have been approved by the Mine Safety and Health Administration (formerly Mining Enforcement and Safety Administration) or by the National Institute for Occupational Safety and Health.
- In addition to respirator selection, a complete respiratory protection program should be instituted which includes regular training, maintenance, inspection, cleaning, and evaluation.

PERSONAL PROTECTIVE EQUIPMENT

- Employees should be provided with and required to use impervious clothing, gloves, face shields (eight-inch minimum), and other appropriate protective clothing necessary to prevent repeated or prolonged skin contact with liquid methyl chloroform.
- Non-impervious clothing which becomes wet with liquid methyl chloroform should be removed promptly and not reworn until the methyl chloroform is removed from the clothing.
- Employees should be provided with and required to use splash-proof safety goggles where liquid methyl chloroform may contact the eyes.

SANITATION

- Skin that becomes wet with liquid methyl chloroform should be promptly washed or showered to remove any methyl chloroform.

COMMON OPERATIONS AND CONTROLS

The following list includes some common operations in which exposure to methyl chloroform may occur and control methods which may be effective in each case:

Operation

Use as solvent in cold cleaning of metals, and plastics; in vapor degreasing; in ultrasonic cleaning; in dyeing and cleaning of fabrics and yarns

Use in organic synthesis in polymer manufacture; as primary and carrier solvent in spot cleaners, adhesives, shoe polishes, stain repellants, hair sprays, Mace, insecticides, resins, inks, lubricants, protective coatings, asphalt extraction, and waste water treatment; use in aerosol manufacture as pressure depressant

Use as coolant and lubricant in cutting oils on metals; use during printed circuit boards production; liquid Drano production and photographic film processing

Controls

General dilution ventilation; local exhaust ventilation; personal protective equipment

Process enclosure; local exhaust ventilation

General dilution ventilation; local exhaust ventilation; personal protective equipment

EMERGENCY FIRST AID PROCEDURES

In the event of an emergency, institute first aid procedures and send for first aid or medical assistance.

• Eye Exposure

If methyl chloroform gets into the eyes, wash eyes immediately with large amounts of water, lifting the lower and upper lids occasionally. If irritation is present after washing, get medical attention. Contact lenses should not be worn when working with this chemical.

• Skin Exposure

If methyl chloroform gets on the skin, promptly wash the contaminated skin using soap or mild detergent and water. If methyl chloroform soaks through the clothing, remove the clothing promptly and wash the skin using soap or mild detergent and water. If irritation persists after washing, get medical attention.

• Breathing

If a person breathes in large amounts of methyl chloroform, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible.

- **Swallowing**

When methyl chloroform has been swallowed, get medical attention immediately. If medical attention is not immediately available, get the afflicted person to vomit by having him touch the back of his throat with his finger or by giving him syrup of ipecac as directed on the package. This non-prescription drug is available at most drug stores and drug counters and should be kept with emergency medical supplies in the workplace. Do not make an unconscious person vomit.

- **Rescue**

Move the affected person from the hazardous exposure. If the exposed person has been overcome, notify someone else and put into effect the established emergency rescue procedures. Do not become a casualty. Understand the facility's emergency rescue procedures and know the locations of rescue equipment before the need arises.

SPILL, LEAK, AND DISPOSAL PROCEDURES

- Persons not wearing protective equipment and clothing should be restricted from areas of spills or leaks until cleanup has been completed.

- If methyl chloroform is spilled or leaked, the following steps should be taken:

1. Ventilate area of spill or leak.

2. Collect for reclamation or absorb in vermiculite, dry sand, earth, or a similar material.

- Waste disposal method:

Methyl chloroform may be disposed of by absorbing it in vermiculite, dry sand, earth or a similar material and disposing in a secured sanitary landfill.

REFERENCES

- American Conference of Governmental Industrial Hygienists: "Methyl Chloroform," *Documentation of the Threshold Limit Values for Substances in Workroom Air* (3rd ed., 2nd printing), Cincinnati, 1974.

- American Industrial Hygiene Association: "1,1,1-Trichloroethane (Methyl Chloroform)," *Hygienic Guide Series*, Detroit, Michigan, 1961.

- Browning, E.: *Toxicity and Metabolism of Industrial Solvents*, Elsevier, New York, 1965.

- Deichmann, W. B., and Gerarde, H. W.: *Toxicology of Drugs and Chemicals*, Academic Press, New York, 1969.

- Ethyl Corporation: *Material Safety Data Sheet - Methyl Chloroform*, Baton Rouge, Louisiana.

- Grant, W. M.: *Toxicology of the Eye* (2nd ed.), C. C. Thomas, Springfield, Illinois, 1974.

- Manufacturing Chemists Association, Inc.: *Chemical Safety Data Sheet SD-90, Methyl Chloroform*, Washington D.C., 1974.

- May, J.: "Solvent Odor Thresholds for the Evaluation of Solvent Odors in the Atmosphere," *Staub-Reinhalt*, 26:9, 385-389, 1966.

- National Institute for Occupational Safety and Health, U.S. Department of Health, Education, and Welfare: *Criteria for a Recommended Standard Occupational Exposure to 1,1,1-Trichloroethane*, HEW Publication No. (NIOSH) 76-184, U.S. Government Printing Office, Washington, D.C., 1976.

- Patty, F. A. (ed.): *Toxicology*, Vol. II of *Industrial Hygiene and Toxicology* (2nd ed. rev.), Interscience, New York, 1963.

- Reinhardt, C. F., et al.: "Epinephrine-Induced Cardiac Arrhythmia Potential of Some Common Industrial Solvents," *Journal of Occupational Medicine*, 15:953-955, 1973.

- Sax, N. I.: *Dangerous Properties of Industrial Materials* (3rd ed.), Van Nostrand Reinhold, New York, 1968.

- Stewart, R. D.: "Methyl Chloroform Intoxication," *Journal of the American Medical Association*, 215:1789-1792, March 15, 1971.

- Summer, W.: *Odor Pollution of Air: Causes and Control*, L. Hill, London, 1975.

- "1,1,1-Trichloroethane: Emergency Exposure Limits," *American Industrial Hygiene Association Journal*, 25:585-586, 1964.

RESPIRATORY PROTECTION FOR METHYL CHLOROFORM

Condition	Minimum Respiratory Protection* Required Above 350 ppm
Vapor Concentration	
500 ppm or less	Any chemical cartridge respirator with an organic vapor cartridge(s). Any supplied-air respirator. Any self-contained breathing apparatus.
1000 ppm or less	A chemical cartridge respirator with a full facepiece and an organic vapor cartridge(s). A gas mask with a chin-style or a front- or back-mounted organic vapor canister. Any supplied-air respirator with a full facepiece, helmet, or hood. Any self-contained breathing apparatus with a full facepiece.
Greater than 1000 ppm or entry and escape from unknown concentrations	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode. A combination respirator which includes a Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure or continuous-flow mode and an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.
Fire Fighting	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.
Escape	Any gas mask providing protection against organic vapors. Any escape self-contained breathing apparatus.

*Only NIOSH-approved or MSHA-approved equipment should be used.



MATERIAL SAFETY DATA SHEET

MSDS NUMBER

52,500-3

PAGE

97367 (4-85)

24 HOUR EMERGENCY ASSISTANCE			GENERAL MSDS ASSISTANCE		
SHELL: 713-473-9461 CHEMTREC: 800-424-9300			SHELL: 713-241-4819		
ACUTE HEALTH +	FIRE 1	REACTIVITY 0	HAZARD RATING		
1	1	0	LEAST - 0 SLIGHT - 1 MODERATE - 2 HIGH - 3 EXTREME - 4		
*For acute and chronic health effects refer to the discussion in Section III					



SECTION II

PRODUCT ▶ HEAVY DUTY MOTOR OIL II 15W40

CHEMICAL NAME ▶ MIXTURE (SEE SECTION II-A)

CHEMICAL FAMILY ▶ PETROLEUM HYDROCARBON: MOTOR OIL

SHELL CODE ▶ 50019

Post-It™ brand fax transmittal memo 7671 # of pages ▶ 20

To DO	From Carol
Co.	Co. Ramos Oil
Dept.	Phone #
Fax # 510-458-0912	Fax #

SECTION II-A PRODUCT/INGREDIENT

NO.	COMPOSITION	CAS NUMBER	PERCENT
P	HEAVY DUTY MOTOR OIL II 15W40	MIXTURE	100
1	SOLVENT REFINED, HYDROTREATED HEAVY PARAFFINIC DISTILLATE	64742-54-7	10-65
2	SOLVENT REFINED, CATALYTIC DEWAXED HEAVY PARAFFINIC DISTILLATE	64742-70-7	0-75
3	SOLVENT REFINED, HYDROTREATED RESIDUAL OIL	64742-57-0	0-10
4	POLYMERIC ADDITIVE IN OIL	MIXTURE	10-15
5	ADDITIVE CONTAINING ZINC DIALKYL DITHIOPHOSPHATE	MIXTURE	10-15

SECTION II-B ACUTE TOXICITY DATA

NO.	ACUTE ORAL LD50	ACUTE DERMAL LD50	ACUTE INHALATION LC50
P	NOT AVAILABLE		

SECTION III HEALTH INFORMATION

THE HEALTH EFFECTS NOTED BELOW ARE CONSISTENT WITH REQUIREMENTS UNDER THE OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200).

EYE CONTACT
LUBRICATING BASE OILS ARE GENERALLY CONSIDERED NO MORE THAN MINIMALLY IRRITATING TO THE EYES.

SKIN CONTACT
LUBRICATING BASE OILS ARE GENERALLY CONSIDERED NO MORE THAN MILDLY IRRITATING TO THE SKIN. PROLONGED OR REPEATED CONTACT MAY CAUSE VARIOUS SKIN DISORDERS SUCH AS DERMATITIS, FOLLICULITIS OR OIL ACNE.

INHALATION
INHALATION OF VAPORS (GENERATED AT HIGH TEMPERATURES ONLY) OR OIL MIST OF THIS PRODUCT MAY RESULT IN MILD IRRITATION TO THE NOSE, THROAT AND RESPIRATORY TRACT.

INGESTION
LUBRICATING BASE OILS ARE GENERALLY CONSIDERED NO MORE THAN SLIGHTLY TOXIC IF SWALLOWED.

PRODUCT NAME: HEAVY DUTY MOTOR OIL II 15W40

MSDS 52,500-3
PAGE 2

SIGNS AND SYMPTOMS
IRRITATION AS NOTED ABOVE.

AGGRAVATED MEDICAL CONDITIONS
PREEXISTING SKIN AND RESPIRATORY DISORDERS MAY BE AGGRAVATED BY EXPOSURE TO THIS PRODUCT.

SECTION IV OCCUPATIONAL EXPOSURE LIMITS

NO.	OSHA PEL/TWA	OSHA PEL/CEILING	ACGIH TLV/TWA	ACGIH TLV/STEL	OTHER
P	5 MG/M3*		5 MG/M3*	10 MG/M3*	

*OIL MIST, MINERAL

SECTION V EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT
FLUSH EYES WITH PLENTY OF WATER FOR 15 MINUTES WHILE HOLDING EYELIDS OPEN. GET MEDICAL ATTENTION.

SKIN CONTACT
REMOVE CONTAMINATED CLOTHING/SHOES AND WIPE EXCESS FROM SKIN. FLUSH SKIN WITH WATER. FOLLOW BY WASHING WITH SOAP AND WATER. IF IRRITATION OCCURS, GET MEDICAL ATTENTION. DO NOT REUSE CLOTHING UNTIL CLEANED.

INHALATION
REMOVE VICTIM TO FRESH AIR AND PROVIDE OXYGEN IF BREATHING IS DIFFICULT. GET MEDICAL ATTENTION.

INGESTION
DO NOT INDUCE VOMITING. IN GENERAL, NO TREATMENT IS NECESSARY UNLESS LARGE QUANTITIES OF PRODUCT ARE INGESTED. HOWEVER, GET MEDICAL ADVICE.*

NOTE TO PHYSICIAN
-IN GENERAL, EMESIS INDUCTION IS UNNECESSARY IN HIGH VISCOSITY, LOW VOLATILITY PRODUCTS, I.E., MOST OILS AND GREASES.

SECTION VI SUPPLEMENTAL HEALTH INFORMATION

NONE IDENTIFIED

SECTION VII PHYSICAL DATA

BOILING POINT: N/AV (DEG F)	SPECIFIC GRAVITY: 0.8789 (H2O=1)	VAPOR PRESSURE: N/AV (MM HG)
MELTING POINT: -20 (DEG F) (POUR POINT)	SOLUBILITY: NEGLIGIBLE (IN WATER)	VAPOR DENSITY: N/AV (AIR=1)
EVAPORATION RATE (N-BUTYL ACETATE = 1): N/AV		VISCOSITY: 97 (CS @ 104 DEG F)

PRODUCT NAME: HEAVY DUTY MOTOR OIL II 15W40

MSDS 52,500-3
PAGE 3APPEARANCE AND ODOR:
DARK RED LIQUID; STRONG HYDROCARBON ODOR-----
SECTION VIIIFIRE AND EXPLOSION HAZARDS
-----FLASH POINT AND METHOD:
370 DEG F (PMCC)FLAMMABLE LIMITS /% VOLUME IN AIR
LOWER: N/AV UPPER: N/AV

EXTINGUISHING MEDIA

USE WATER FOG, FOAM, DRY CHEMICAL OR CO2. DO NOT USE A DIRECT STREAM OF WATER. PRODUCT WILL FLOAT AND CAN BE REIGNITED ON SURFACE OF WATER.

SPECIAL FIRE FIGHTING PROCEDURES AND PRECAUTIONS

MATERIAL WILL NOT BURN UNLESS PREHEATED. DO NOT ENTER CONFINED FIRE SPACE WITHOUT FULL BUNKER GEAR (HELMET WITH FACE SHIELD, BUNKER COATS, GLOVES AND RUBBER BOOTS), INCLUDING A POSITIVE PRESSURE NIOSH APPROVED SELF-CONTAINED BREATHING APPARATUS. COOL FIRE EXPOSED CONTAINERS WITH WATER.

SECTION IXREACTIVITY

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS AND MATERIALS TO AVOID:

AVOID HEAT, FLAME AND CONTACT WITH STRONG OXIDIZING AGENTS.

HAZARDOUS DECOMPOSITION PRODUCTS

THERMAL DECOMPOSITION PRODUCTS ARE HIGHLY DEPENDENT ON THE COMBUSTION CONDITIONS. A COMPLEX MIXTURE OF AIRBORNE SOLID, LIQUID, PARTICULATES AND GASES WILL EVOLVE WHEN THIS MATERIAL UNDERGOES PYROLYSIS OR COMBUSTION. CARBON MONOXIDE AND OTHER UNIDENTIFIED ORGANIC COMPOUNDS MAY BE FORMED UPON COMBUSTION.

SECTION XEMPLOYEE PROTECTION

RESPIRATORY PROTECTION

IF EXPOSURE MAY OR DOES EXCEED OCCUPATIONAL EXPOSURE LIMITS (SEC. IV) USE A NIOSH-APPROVED RESPIRATOR TO PREVENT OVEREXPOSURE. IN ACCORD WITH 29 CFR 1910.134 USE EITHER AN ATMOSPHERE-SUPPLYING RESPIRATOR OR AN AIR-PURIFYING RESPIRATOR FOR ORGANIC VAPORS AND PARTICULATES.

PROTECTIVE CLOTHING

AVOID PROLONGED OR REPEATED CONTACT WITH SKIN. WEAR GLOVES AND OTHER CLOTHING AS REQUIRED TO MINIMIZE CONTACT. AVOID CONTACT WITH EYES. WEAR SAFETY GLASSES OR GOGGLES AS APPROPRIATE. TEST DATA FROM PUBLISHED LITERATURE AND/OR GLOVE AND CLOTHING MANUFACTURERS INDICATE THE BEST PROTECTION IS PROVIDED BY NITRILE GLOVES.

SECTION XIENVIRONMENTAL PROTECTION

SPILL OR LEAK PROCEDURES

MAY BURN ALTHOUGH NOT READILY IGNITABLE. USE CAUTIOUS JUDGMENT WHEN CLEANING UP LARGE SPILLS. *** LARGE SPILLS *** WEAR RESPIRATOR AND PROTECTIVE CLOTHING AS APPROPRIATE. SHUT OFF SOURCE OF LEAK IF SAFE TO DO SO. DIKE AND CONTAIN. REMOVE WITH VACUUM TRUCKS OR PUMP TO STORAGE/SALVAGE VESSELS. SOAK UP RESIDUE WITH AN ABSORBENT SUCH AS CLAY, SAND OR OTHER SUITABLE MATERIAL; DISPOSE OF PROPERLY. FLUSH AREA WITH WATER TO REMOVE TRACE RESIDUE. *** SMALL SPILLS *** TAKE UP WITH AN ABSORBENT MATERIAL AND DISPOSE OF PROPERLY.

PRODUCT NAME: HEAVY DUTY MOTOR OIL II 15W40

MSDS 52,500-3
PAGE 4

SECTION XII SPECIAL PRECAUTIONS

STORE IN A COOL, DRY PLACE WITH ADEQUATE VENTILATION. KEEP AWAY FROM OPEN FLAMES AND HIGH TEMPERATURES. WASH WITH SOAP AND WATER BEFORE EATING, DRINKING, SMOKING, APPLYING COSMETICS, OR USING TOILET FACILITIES. LAUNDRY CONTAMINATED CLOTHING BEFORE REUSE. CONTAMINATED LEATHER ARTICLES INCLUDING SHOES CANNOT BE DECONTAMINATED AND SHOULD BE DESTROYED TO PREVENT REUSE.

SECTION XIII TRANSPORTATION REQUIREMENTS

DEPARTMENT OF TRANSPORTATION CLASSIFICATION:
NOT HAZARDOUS BY D.O.T. REGULATIONS.

SECTION XIV OTHER REGULATORY CONTROLS

THIS PRODUCT IS LISTED ON THE EPA/TSCA INVENTORY OF CHEMICAL SUBSTANCES.
IN ACCORDANCE WITH SARA TITLE III, SECTION 313, THE ATTACHED ENVIRONMENTAL DATA SHEET (EDS) SHOULD ALWAYS BE COPIED AND SENT WITH THE MSDS.

SECTION XV STATE REGULATORY INFORMATION

THE FOLLOWING CHEMICALS ARE SPECIFICALLY LISTED BY INDIVIDUAL STATES; OTHER PRODUCT SPECIFIC HEALTH AND SAFETY DATA IN OTHER SECTIONS OF THE MSDS MAY ALSO BE APPLICABLE FOR STATE REQUIREMENTS. FOR DETAILS ON YOUR REGULATORY REQUIREMENTS YOU SHOULD CONTACT THE APPROPRIATE AGENCY IN YOUR STATE.

STATE LISTED COMPONENT	PERCENT	STATE CODE
SOLVENT REFINED, CATALYTIC DEWAXED HEAVY PARAFFINIC DISTILLATE (CAS NO: 64742-70-7)	0-75	MA

CA = CALIFORNIA HAZ. SUBST. LIST; CA65 = CALIFORNIA SAFE DRINKING WATER AND TOXICS ENFORCEMENT ACT LIST; FL = FLORIDA SUBST. LIST; IL = ILLINOIS TOX. SUBST. LIST; MA = MASSACHUSETTS SUBST. LIST; ME = MAINE HAZ SUBST. LIST; MN = MINNESOTA HAZ. SUBST. LIST; NJ = NEW JERSEY HAZ. SUBST. LIST; PA = PENNSYLVANIA HAZ. SUBST. LIST; RI = RHODE ISLAND HAZ. SUBST. LIST.

SECTION XVI SPECIAL NOTES

PRODUCT NAME CHANGE (FORMERLY SG/CF4 HEAVY DUTY MOTOR OIL 15W/40).

PRODUCT NAME: HEAVY DUTY MOTOR OIL II 15W40

MSDS 52,500-3
PAGE 5

THE INFORMATION CONTAINED HEREIN IS BASED ON THE DATA AVAILABLE TO US AND IS BELIEVED TO BE CORRECT
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RESULTS TO BE OBTAINED FROM THE USE THEREOF. SHELL ASSUMES NO RESPONSIBILITY FOR INJURY FROM THE
USE OF THE PRODUCT DESCRIBED HEREIN

DATE PREPARED: AUGUST 05, 1993

J. C. WILLETT

BE SAFE
READ OUR PRODUCT
SAFETY INFORMATION ... AND PASS IT ON
(PRODUCT LIABILITY LAW
REQUIRES IT)

SHELL OIL COMPANY
PRODUCT SAFETY AND COMPLIANCE
P. O. BOX 4320
HOUSTON, TX 77210



ENVIRONMENTAL DATA SHEET

EDS NUMBER, ▶ 52,500-2

PAGE

97449 (9-87)

PRODUCT ▶ HEAVY DUTY MOTOR OIL II 15W40

PRODUCT CODE ▶ 50019

SECTION I

PRODUCT/COMPOSITION

NO.	COMPONENT	CAS NUMBER	PERCENT
P	HEAVY DUTY MOTOR OIL II 15W40	MIXTURE	100
1	SOLVENT REFINED, HYDROTREATED HEAVY PARAFFINIC DISTILLATE	64742-54-7	10-65
2	SOLVENT REFINED, CATALYTIC DEWAXED HEAVY PARAFFINIC DISTILLATE	64742-70-7	0-75
3	SOLVENT REFINED, HYDROTREATED RESIDUAL OIL	64742-57-0	0-10
4	POLYMERIC ADDITIVE IN OIL	MIXTURE	10-15
5	ADDITIVE CONTAINING ZINC DIALKYL DITHIOPHOSPHATE	MIXTURE	10-15
5A	ZINC FROM INGREDIENT 5		0.18

SECTION II

SARA TITLE III INFORMATION

NO.	EHS RQ (LBS) (*1)	EHS TPQ (LBS) (*2)	SEC 313 (*3)	313 CATEGORY (*4)	311/312 CATEGORIES (*5)
5A			YES	ZINC COMPOUND	

FOOTNOTES

- *1 = REPORTABLE QUANTITY OF EXTREMELY HAZARDOUS SUBSTANCE, SEC.302
- *2 = THRESHOLD PLANNING QUANTITY, EXTREMELY HAZARDOUS SUBSTANCE, SEC 302
- *3 = TOXIC CHEMICAL, SEC 313
- *4 = CATEGORY AS REQUIRED BY SEC 313 (40 CFR 372.65 C), MUST BE USED ON TOXIC RELEASE INVENTORY FORM
- *5 = HAZARD CATEGORY FOR SARA SEC. 311/312 REPORTING
 - HEALTH H-1 = IMMEDIATE (ACUTE) HEALTH HAZARD H-2 = DELAYED (CHRONIC) HEALTH HAZARD
 - PHYSICAL P-3 = FIRE HAZARD P-4 = SUDDEN RELEASE OF PRESSURE HAZARD
 - P-5 = REACTIVE HAZARD

SECTION III

ENVIRONMENTAL RELEASE INFORMATION

UNDER EPA-CWA, THIS PRODUCT IS CONSIDERED AN OIL UNDER SECTION 311. SPILLS INTO OR LEADING TO SURFACE WATERS THAT CAUSE A SHEEN MUST BE REPORTED TO THE NATIONAL RESPONSE CENTER, 800-424-8802.

SECTION IV

RCRA INFORMATION

IF THIS PRODUCT BECOMES A WASTE, IT WOULD NOT BE A HAZARDOUS WASTE BY RCRA CRITERIA (40 CFR 261). PLACE IN AN APPROPRIATE DISPOSAL FACILITY IN COMPLIANCE WITH LOCAL REGULATIONS.

PRODUCT NAME: HEAVY DUTY MOTOR OIL II 15W40

EDS 52,500-2
PAGE 2

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DATE PREPARED: AUGUST 05, 1993

SHELL OIL COMPANY
CORPORATE ENVIRONMENTAL AFFAIRS
P. O. BOX 4320
HOUSTON, TX 77210

FOR ADDITIONAL INFORMATION ON THIS ENVIRONMENTAL DATA PLEASE CALL
(713) 241-2252

FOR EMERGENCY ASSISTANCE PLEASE CALL
SHELL: (713) 473-9481
CHEMTREC: (800) 424-9300

Occupational Health Guideline for Nickel Metal and Soluble Nickel Compounds

INTRODUCTION

This guideline is intended as a source of information for employees, employers, physicians, industrial hygienists, and other occupational health professionals who may have a need for such information. It does not attempt to present all data; rather, it presents pertinent information and data in summary form.

APPLICABILITY

The general guidelines contained in this document apply to all soluble nickel compounds. Physical and chemical properties of several specific compounds are provided for illustrative purposes.

SUBSTANCE IDENTIFICATION

Nickel, metallic

- Formula: Ni
- Synonyms: Nickel catalyst; Raney nickel
- Appearance and odor: Silvery gray, metallic (or darker), odorless powder.

Nickel nitrate hexahydrate

- Formula: $\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$
- Synonyms: None
- Appearance and odor: Green, odorless solid.

Nickel sulfate hexahydrate

- Formula: $\text{NiSO}_4 \cdot 6\text{H}_2\text{O}$
- Synonyms: None
- Appearance and odor: Green, odorless solid.

PERMISSIBLE EXPOSURE LIMIT (PEL)

The current OSHA standard for nickel metal and soluble nickel compounds is 1 milligram of nickel metal

and soluble nickel compounds per cubic meter of air (mg/m^3) averaged over an eight-hour work shift. NIOSH has recommended that the permissible exposure limit for nickel be reduced to $0.015 \text{ mg}/\text{m}^3$ averaged over a work shift of up to 10 hours per day, 40 hours per week, and that nickel be regulated as an occupational carcinogen. The NIOSH Criteria Document for Inorganic Nickel and the Special Occupational Hazard Review for Nickel Carbonyl should be consulted for more detailed information.

HEALTH HAZARD INFORMATION

• Routes of exposure

Metallic nickel or soluble nickel compounds can affect the body if they are inhaled or if they come in contact with the eyes or skin. They can also affect the body if they are swallowed.

• Effects of overexposure

Nickel fumes are respiratory irritants and may cause pneumonitis. Skin contact may cause an allergic skin rash. Nickel and its compounds have been reported to cause cancer of the lungs and sinuses. Nickel itself is not very toxic if swallowed, but its soluble salts are quite toxic and, if swallowed, may cause giddiness and nausea. Exposure to nickel carbonyl (by inhalation or skin absorption) may cause both initial and delayed symptoms. Initial symptoms include headache, dizziness, shortness of breath, and vomiting. These symptoms generally disappear when the worker is exposed to fresh air. The delayed symptoms may develop 12 to 36 hours after exposure. The shortness of breath returns, a blue color of the skin may appear, and a fever may develop. The exposed person may become delirious. In some cases the symptoms may run together. Death may occur.

• Reporting signs and symptoms

A physician should be contacted if anyone develops any signs or symptoms and suspects that they are caused by exposure to nickel metal and soluble nickel compounds.

These recommendations reflect good industrial hygiene and medical surveillance practices and their implementation will assist in achieving an effective occupational health program. However, they may not be sufficient to achieve compliance with all requirements of OSHA regulations.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service Centers for Disease Control
National Institute for Occupational Safety and Health

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

• **Recommended medical surveillance**

The following medical procedures should be made available to each employee who is exposed to nickel metal and soluble nickel compounds at potentially hazardous levels:

1. Initial Medical Examination:

—A complete history and physical examination: The purpose is to detect pre-existing conditions that might place the exposed employee at increased risk, and to establish a baseline for future health monitoring. Persons with a history of asthma, allergies, or known sensitization to nickel metal and soluble nickel compounds would be expected to be at increased risk from exposure. Examination of the nasal cavities and lungs should be stressed. The skin should be examined for evidence of chronic disorders.

—14" x 17" chest roentgenogram: Nickel metal and soluble nickel compounds cause human lung damage and cancer of the lung. Surveillance of the lungs is indicated.

—FVC and FEV (1 sec): Nickel metal and soluble nickel compounds are respiratory irritants. Persons with impaired pulmonary function may be at increased risk from exposure. Periodic surveillance is indicated.

—Skin disease: Nickel metal and soluble compounds are defatting agents and can cause dermatitis on prolonged exposure. Persons with pre-existing skin disorders may be more susceptible to the effects of these agents.

2. Periodic Medical Examination: The aforementioned medical examinations should be repeated on an annual basis.

• **Summary of toxicology**

Metallic nickel and certain soluble nickel compounds as dust or fume cause sensitization dermatitis and probably produce cancer of the paranasal sinuses and the lung; nickel fume in high concentrations is a respiratory irritant. Severe but transient pneumonitis in two workers resulted from exposure to nickel fume; in one case, exposure was for 6 hours, and post-incident sampling suggested a nickel concentration of 0.26 mg/m³. "Nickel itch" is a dermatitis resulting from sensitization to nickel; the first symptom is usually itching, which occurs up to 7 days before skin eruption appears. The primary skin eruption is erythematous, or follicular; it may be followed by superficial discrete ulcers, which discharge and become crusted, or by eczema; in the chronic stages, pigmented or depigmented plaques may be formed. Nickel sensitivity, once acquired, is apparently not lost; recovery from the dermatitis usually occurs within 7 days of cessation of exposure, but may take several weeks. A worker who had developed cutaneous sensitization also developed apparent asthma from inhalation of nickel sulfate; immunologic studies showed circulating antibodies to the salt, and controlled exposure to a solution of nickel sulfate resulted in decreased pulmonary function and progressive dyspnea; the possibility of developing hypersensitivity pneumonitis could not be excluded. In animals, finely

divided metallic nickel was carcinogenic when introduced into the pleural cavity, muscle tissue, and subcutaneous tissues; rats and guinea pigs exposed to a concentration of 15 mg/m³ of powdered metallic nickel developed malignant pulmonary neoplasms. Several epidemiologic studies have shown an increased incidence of cancer of the paranasal sinuses and lungs among workers in nickel refineries and factories; suspicion of carcinogenicity has been focused primarily on respirable particles of nickel, nickel subsulfide, nickel oxide, and on nickel carbonyl vapor. Many of the studies also included exposures to other suspected carcinogens.

CHEMICAL AND PHYSICAL PROPERTIES

• **Physical data—Nickel, metallic**

1. Molecular weight: 58.7
2. Boiling point (760 mm Hg): 2730 C (4946 F)
3. Specific gravity (water = 1): 8.9
4. Vapor density (air = 1 at boiling point of metallic nickel): Not applicable
5. Melting point: 1453 C (2648 F)
6. Vapor pressure at 20 C (68 F): Essentially zero
7. Solubility in water, g/100 g water at 20 C (68 F): Insoluble
8. Evaporation rate (butyl acetate = 1): Not applicable

• **Physical data—Nickel nitrate hexahydrate**

1. Molecular weight: 290.8
2. Boiling point (760 mm Hg): 137 C (278 F) (loses water)
3. Specific gravity (water = 1): 2.05
4. Vapor density (air = 1 at boiling point of nickel nitrate hexahydrate): Not applicable
5. Melting point: 57 C (135 F)
6. Vapor pressure at 20 C (68 F): Essentially zero
7. Solubility in water, g/100 g water at 20 C (68 F): 60
8. Evaporation rate (butyl acetate = 1): Not applicable

• **Physical data—Nickel sulfate hexahydrate**

1. Molecular weight: 262.8
2. Boiling point (760 mm Hg): 103 C (217 F) (loses water)
3. Specific gravity (water = 1): 2.07
4. Vapor density (air = 1 at boiling point of nickel sulfate hexahydrate): Not applicable
5. Melting point: 53 C (127 F)
6. Vapor pressure at 20 C (68 F): Essentially zero
7. Solubility in water, g/100 g water at 20 C (68 F): 40
8. Evaporation rate (butyl acetate = 1): Not applicable

• **Reactivity**

1. Conditions contributing to instability: Heat (nickel only)
2. Incompatibilities: Contact of nickel with strong acids may form flammable and explosive hydrogen gas.

Contact with sulfur may cause evolution of heat. Contact of nickel nitrate with wood and other combustibles may cause fire.

3. Hazardous decomposition products: Toxic gases and vapors (such as nickel carbonyl and oxides of nitrogen) may be released in a fire involving nickel or in the decomposition of nickel compounds.

4. Special precautions: None

• **Flammability**

1. Flash point: Not applicable

2. Minimum ignition temperature: Not available

3. Minimum explosive concentration: Not available, but nickel sponge catalyst may ignite spontaneously in air.

4. Extinguishant: Dry powder, dry sand, dry dolomite, dry graphite

• **Warning properties**

Grant states that "workers employed in nickel plating involving nickel sulfate, sulfuric acid, and chlorine are said to have developed conjunctivitis and epiphora when ventilation was poor." Since, according to Grant, "both sulfuric acid mist and chlorine gas are known to cause burning and stinging of the eyes," and since the *AIHA Hygienic Guide* states that eye contact "does not present any problem peculiar to nickel," nickel metal and soluble compounds are not treated as eye irritants.

MONITORING AND MEASUREMENT PROCEDURES

• **General**

Measurements to determine employee exposure are best taken so that the average eight-hour exposure is based on a single eight-hour sample or on two four-hour samples. Several short-time interval samples (up to 30 minutes) may also be used to determine the average exposure level. Air samples should be taken in the employee's breathing zone (air that would most nearly represent that inhaled by the employee).

• **Method**

Sampling and analyses may be performed by collection on a cellulose membrane filter followed by treatment with nitric and perchloric acids, solution in nitric acid, and analysis with an atomic absorption spectrophotometer. An analytical method for nickel metal and soluble nickel compounds is in the *NIOSH Manual of Analytical Methods*, 2nd Ed., Vol. 5, 1979, available from the Government Printing Office, Washington, D.C. 20402 (GPO No. 017-033-00349-1), number PB 258 433).

RESPIRATORS

• Good industrial hygiene practices recommend that engineering controls be used to reduce environmental concentrations to the permissible exposure level. However, there are some exceptions where respirators may be used to control exposure. Respirators may be used when engineering and work practice controls are not

technically feasible, when such controls are in the process of being installed, or when they fail and need to be supplemented. Respirators may also be used for operations which require entry into tanks or closed vessels, and in emergency situations. If the use of respirators is necessary, the only respirators permitted are those that have been approved by the Mine Safety and Health Administration (formerly Mining Enforcement and Safety Administration) or by the National Institute for Occupational Safety and Health.

• In addition to respirator selection, a complete respiratory protection program should be instituted which includes regular training, maintenance, inspection, cleaning, and evaluation.

PERSONAL PROTECTIVE EQUIPMENT

• Employees should be provided with and required to use impervious clothing, gloves, face shields (eight-inch minimum), and other appropriate protective clothing necessary to prevent repeated or prolonged skin contact with powdered metallic nickel or solids or liquids containing soluble nickel compounds.

• If employees' clothing may have become contaminated with powdered metallic nickel or solid soluble nickel compounds, employees should change into uncontaminated clothing before leaving the work premises.

• Clothing contaminated with metallic nickel or soluble nickel compounds should be placed in closed containers for storage until it can be discarded or until provision is made for the removal of metallic nickel or soluble nickel compounds from the clothing. If the clothing is to be laundered or otherwise cleaned to remove the metallic nickel or soluble nickel compounds, the person performing the operation should be informed of these substances' hazardous properties.

• Non-impervious clothing which becomes contaminated with metallic nickel or soluble nickel compounds should be removed promptly and not reworn until the metallic nickel or soluble nickel compounds are removed from the clothing.

SANITATION

• Skin that becomes contaminated with metallic nickel or soluble nickel compounds should be promptly washed or showered with soap or mild detergent and water to remove any metallic nickel or soluble nickel compounds.

• Eating and smoking should not be permitted in areas where solids or liquids containing soluble nickel compounds are handled, processed, or stored.

• Employees who handle powdered metallic nickel or solids or liquids containing soluble nickel compounds should wash their hands thoroughly with soap or mild detergent and water before eating, smoking, or using toilet facilities.

• Areas in which exposure to nickel metal and soluble nickel compounds may occur should be identified by

signs or appropriate means, and access to these areas should be limited to authorized persons.

COMMON OPERATIONS AND CONTROLS

The following list includes some common operations in which exposure to nickel metal and soluble nickel compounds may occur and control methods which may be effective in each case:

Operation	Controls
Use during manufacture and fabricating of more than 3000 alloys; use in electronic tube parts, coins heavy machinery, tools, instrument parts, magnets, food and chemical processing equipment, flatware, jet engines, automotive parts, zippers, nickel anodes, surgical and dental instruments, and cooking utensils (they aid in corrosion- and heat-resistance, enhance ductibility, and increase thermal conductivity)	General dilution ventilation; local exhaust ventilation; personal protective equipment
Liberation during processing and refining of ore	General dilution ventilation; local exhaust ventilation; personal protective equipment
Use in manufacture of nickel-iron alloys, and non-ferrous-nickel alloys	Local exhaust ventilation; general dilution ventilation
Use during fabrication of nickel-plated materials	General dilution ventilation; local exhaust ventilation; personal protective equipment
Use in chemical synthesis as starting material of complex compounds; use as catalysts in hydrogenation of fats/oils	General dilution ventilation
Use in textile industry in dyeing and printing; and in ceramic industry in coloring	General dilution ventilation; local exhaust ventilation

Operation

Use of metal and salts during electroplating and electroless plating

Use in manufacture of nickel-iron alloys and non-ferrous-nickel alloys

Controls

General dilution ventilation; local exhaust ventilation; personal protective equipment

Local exhaust ventilation; general dilution ventilation

EMERGENCY FIRST AID PROCEDURES

In the event of an emergency, institute first aid procedures and send for first aid or medical assistance.

• Skin Exposure

If solids or liquids containing soluble nickel compounds get on the skin, immediately flush the contaminated skin with water. If solids or liquids containing soluble nickel compounds penetrate through the clothing, remove the clothing immediately and flush the skin with water. If irritation persists after washing, get medical attention. Metallic nickel should be removed from the skin by washing with soap or mild detergent and water.

• Breathing

If a person breathes in large amounts of metallic nickel or soluble nickel compounds, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible. If any nickel carbonyl has been inhaled, get medical attention promptly.

• Swallowing

When metallic nickel or solids or liquids containing soluble nickel compounds have been swallowed and the person is conscious, give the person large quantities of water immediately. After the water has been swallowed, try to get the person to vomit by having him touch the back of his throat with his finger. Do not make an unconscious person vomit. Get medical attention immediately.

• Rescue

Move the affected person from the hazardous exposure. If the exposed person has been overcome, notify someone else and put into effect the established emergency rescue procedures. Do not become a casualty. Understand the facility's emergency rescue procedures and know the locations of rescue equipment before the need arises.

SPILL AND DISPOSAL PROCEDURES

• Persons not wearing protective equipment and clothing should be restricted from areas of spills until cleanup has been completed.

• If nickel metal and soluble nickel compounds are spilled, the following steps should be taken:

1. Ventilate area of spill.

2. Collect spilled material in the most convenient and safe manner for reclamation or for disposal in a secured sanitary landfill. Liquid containing nickel should be absorbed in vermiculite, dry sand, earth, or a similar material.

• Waste disposal method:

Nickel metal and soluble nickel compounds may be disposed of in sealed containers in a secured sanitary landfill.

REFERENCES

- American Conference of Governmental Industrial Hygienists: "Nickel Ni," *Documentation of the Threshold Limit Values for Substances in Workroom Air* (3rd ed., 2nd printing), Cincinnati, 1974.
- American Industrial Hygiene Association: "Nickel (Except the Carbonyls)," *Hygienic Guide Series*, Detroit, Michigan, 1966.
- Browning, E.: *Toxicity of Industrial Metals* (2nd ed.), Butterworths, London, 1969.
- Committee on Medical and Biologic Effects of Environmental Pollutants, Division of Medical Sciences, National Research Council: *Nickel*, National Academy of Sciences, Washington, D.C., 1975.

• Gleason, M. N., Gosselin, R. E., Hodge, H. C., and Smith, R. P.: *Clinical Toxicology of Commercial Products* (3rd ed.), Williams and Wilkins, Baltimore, 1969.

• Grant, W. M.: *Toxicology of the Eye* (2nd ed.), C. C. Thomas, Springfield, Illinois, 1974.

• Hamilton, A., and Hardy, H.: *Industrial Toxicology* (3rd ed.), Publishing Sciences Group, Acton, Massachusetts, 1974.

• McConnell, L. H., et al.: "Asthma Caused by Nickel Sensitivity," *Annals of Internal Medicine*, 78:888-89

• National Institute for Occupational Safety and Health, U.S. Department of Health, Education, and Welfare: *Criteria for a Recommended Standard . . . Occupational Exposure to Inorganic Nickel*, HEW Publication No. (NIOSH) 77-164, GPO No. 017-033-00219-3, U.S. Government Printing Office, Washington, D.C., 1977.

• National Institute for Occupational Safety and Health, U.S. Department of Health, Education, and Welfare: *NIOSH Special Occupational Hazard Review for Nickel Carbonyl*, HEW Publication No. (NIOSH) 77-184, U.S. Government Printing Office, Washington, D.C., 1977.

• Patty, F. A. (ed.): *Toxicology*, Vol. II of *Industrial Hygiene and Toxicology* (2nd ed. rev.), Interscience, New York, 1963.

• von Oettingen, W. F.: *Poisoning: A Guide to Clinical Diagnosis and Treatment* (2nd ed.), Saunders, Philadelphia, 1958.

* SPECIAL NOTE

Nickel metal and soluble nickel compounds appear on the OSHA "Candidate List" of chemicals being considered for further scientific review regarding their carcinogenicity (*Federal Register*, Vol. 45, No. 157, pp. 5372-5379, 12 August 1980).

The International Agency for Research on Cancer (IARC) has evaluated the data on these chemicals and has concluded that they cause cancer. See *IARC Monographs on the Evaluation of Carcinogenic Risk of Chemicals to Man*, Volume 11, 1976.

RESPIRATORY PROTECTION FOR NICKEL METAL AND SOLUBLE COMPOUNDS

Condition	Minimum Respiratory Protection* Required Above 1 mg/m ³
Dust or Mist Concentration	
5 mg/m ³ or less	Any dust and mist respirator.
10 mg/m ³ or less	Any dust and mist respirator, except single-use or quarter-mask respirator.
50 mg/m ³ or less	A high efficiency particulate filter respirator with a full facepiece. Any supplied-air respirator with a full facepiece, helmet, or hood. Any self-contained breathing apparatus with a full facepiece.
1000 mg/m ³ or less	A powered air-purifying respirator with a high efficiency particulate filter. A Type C supplied-air respirator operated in pressure-demand or other positive pressure or continuous-flow mode.
2000 mg/m ³ or less	A Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure mode or with a full facepiece, helmet, or hood operated in continuous-flow mode.
Greater than 2000 mg/m ³ or entry and escape from known concentrations	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode. A combination respirator which includes a Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure or continuous-flow mode and an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.
Fire Fighting	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.

*Only NIOSH-approved or MSHA-approved equipment should be used.

RESPIRATORY PROTECTION FOR NICKEL METAL AND SOLUBLE COMPOUNDS

Condition	Minimum Respiratory Protection* Required Above 1 mg/m ³
Dust, Mist, or Fume Concentration	
10 mg/m ³ or less	Any fume respirator or high efficiency particulate respirator. Any supplied-air respirator. Any self-contained breathing apparatus.
50 mg/m ³ or less	A high efficiency particulate filter respirator with a full facepiece. Any supplied-air respirator with a full facepiece, helmet, or hood. Any self-contained breathing apparatus with a full facepiece.
1000 mg/m ³ or less	A powered air-purifying respirator with a high efficiency particulate filter. A Type C supplied-air respirator operated in pressure-demand or other positive pressure or continuous-flow mode.
2000 mg/m ³ or less	A Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure mode or with a full facepiece, helmet, or hood operated in continuous-flow mode.
Greater than 2000 mg/m ³ or entry and escape from unknown concentrations	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode. A combination respirator which includes a Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure or continuous-flow mode and an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.
Fire Fighting	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.

*Only NIOSH-approved or MSHA-approved equipment should be used.

APPENDIX C
JOBSITE POSTINGS, PERMITS, AND FORMS

PERMIT

Permit Issued To
 (Insert Employer's Name, Address and Telephone No.)

IT CORPORATION
 336 W. Anaheim Street
 Wilmington, CA 90744
 (800) 262-1900

No. _____
 Date December 29, 1995
 Region 3
 District 5
 Tel. (310) 516-3734

Type of Permit SCAFFOLDING - Annual permit 1996

Pursuant to Labor Code Sections 6500 and 6502, this Permit is issued to the above-named employer for the projects described below.

State Contractor's License Number 37422		Permit Valid through 12/31/96		
Description of Project	Location Address	City and County	Anticipated Dates	
			Starting	Completion
SCAFFOLDING This permit is issued subject to the condition that the work is performed by the same employer. The appropriate District office shall be notified in writing of location of job site prior to commencement. The IIP Program submitted for this permit is accepted by DOSH for permit purposes only. Although it addresses the primary points required, failure to implement it or assure its effectiveness, may result in a citation.	Various	Statewide	1/1/96	12/31/96

This Permit is issued upon the following conditions:

1. That the work is performed by the same employer. If this is an annual permit the appropriate District Office shall be notified, in writing, of dates and location of job site prior to commencement.
2. That employer will comply with all occupational safety and health standards or orders applicable to the above projects, and any other lawful orders of the Division.
3. That if any unforeseen condition causes deviation from the plans or statements contained in the Permit Application Form the employer will notify the Division immediately.
4. Any variation from the specification and assertions of the Permit Application Form or violation of safety orders may be cause to revoke the permit.
5. This permit shall be posted at or near each place of employment as provided in 8 CAC 341.4.

Bank of America #7724

Received From L. Chase		Received By Frank Perry	
<input type="checkbox"/> Cash	Amount	Date	
<input checked="" type="checkbox"/> Check	\$100.-	12/29/95	

Investigated by FE Perry III Safety Engr. 12-29-95 Date

Approved by B. E. McShee Dist. Manager 12-29-95 Date



680 Knox Street Suite 100
 Torrance CA 90502

PERMIT

Permit Issued To

(Insert Employer's Name, Address and Telephone No.)

IT CORPORATION
 336 W. Anaheim Street
 Wilmington CA 90744
 (800) 262-1900

No. _____

Date December 29, 1995

Region 3

District 5

Tel. (310) 516-3734

Type of Permit TRENCH/EXCAVATION - Annual permit 1996

Pursuant to Labor Code Sections 6500 and 6502, this Permit is issued to the above-named employer for the projects described below.

State Contractor's License Number 137422		Permit Valid through 12/31/96		
Description of Project	Location Address	City and County	Anticipated Dates	
			Starting	Completion
TRENCH/EXCAVATION This permit is issued subject to the condition that the work is performed by the same employer. The appropriate district office shall be notified in writing of location of job site prior to commencement. The IIP Program submitted for this permit is accepted by DOSH for permit purposes only. Although it addresses the primary points required, failure to implement it or assure its effectiveness, may result in a citation.	Various	Statewide	1/1/96	12/31/96

This Permit is issued upon the following conditions:

1. That the work is performed by the same employer. If this is an annual permit the appropriate District Office shall be notified, in writing, of dates and location of job site prior to commencement.
2. That employer will comply with all occupational safety and health standards or orders applicable to the above projects, and any other lawful orders of the Division.
3. That if any unforeseen condition causes deviation from the plans or statements contained in the Permit Application Form the employer will notify the Division immediately.
4. Any variation from the specification and assertions of the Permit Application Form or violation of safety orders may be cause to revoke the permit.
5. This permit shall be posted at or near each place of employment as provided in 8 CAC 341.4.

Bank of America #7723

Received From L. Chase		Received By Frank Perry	
<input type="checkbox"/> Cash	Amount	Date	
<input checked="" type="checkbox"/> Check	\$100.-	12/29/95	

Investigated by FE Perry III Safety Engr. 12-29-95 Date

Approved by D. E. McShee Dist. Manager 12-29-95 Date

ACTIVITY NOTIFICATION FORM FOR HOLDERS OF ANNUAL PERMITS Scaffolding Falsework Trenches/Excavations

§ CCR 341. (f) requires holders of annual permits to provide notification to the DOSH office nearest the project prior to commencement of any work. This form is provided for you convenience to use for such notification.

This form may be faxed to the nearest DOSH office to comply with the above. Please do not mail duplicate notification to follow-up fax notification.

FAX DATA: Faxed to : _____ DOSH District Office on: _____
DOSH FAX NO.: _____ By: _____

Company Name: _____	Field Phone: _____
Annual Permit Number: _____	Office Phone: _____
Issuing Region: _____	Issuing District: _____
Specific Activity Location: _____	Number of Employees: _____
Nearest Major Cross Street: _____	Starting Date: _____
City: _____	Anticipated Completion Date: _____
County: _____	High Voltage Lines in Proximity? No <input type="checkbox"/> Yes <input type="checkbox"/>

INSTRUCTIONS: The appropriate item(s) must be completed and signed by a person knowledgeable about the project for each activity covered by a permit. Please fill in or check off the blanks where appropriate.

Scaffolding: Height _____ Metal _____ Wood _____ Wood over 60 feet _____ Metal over 125 feet _____
Metal > 125 feet or Wood > 60 feet requires design by a California Registered Civil Engineer & plans at the site
[See § CCR 1644(c)(7)]

Falsework/Vertical Shoring: Maximum Height _____ Maximum Span _____ Material _____
Description: _____

Trenches/Excavations: Depth Range (Min/Max)* _____ Width Range (Min/Max)* _____ Total Length _____
Ground Protection Method: Shoring _____ Sloping _____ Trench Shield _____ Professional Engineer _____
Underground Services Alert (USA) Number _____ (NORTH 1-800-842-2444/SOUTH 1-800-422-413)
Soil Analysis to be done? Yes No If No, you must slope 1.5 to 1.

Competent Person: The holder of an Annual Permit who is notifying the District of the commencement of a Trench and/or Excavation project shall designate a competent person in accordance with the requirements of § CCR Section 1504, 1541, and 1541.1.

Description: _____

Ground protection methods for excavations deeper than 20 feet must be designed by a Registered Professional Engineer. See § CCR 1541.1, Appendix F.

I hereby certify that to the best of my knowledge, the above information and assertions are true and correct and that I/the applicant have knowledge of and will comply with the foregoing.

Signature: _____
Title: _____ Date: _____

APPENDIX D - DOSH DIRECTORY

DISTRICT	ADDRESS	TEL. NO.	FAX NO.
Anaheim	2100 E. Katella Ave., Suite 140, Anaheim 92806	(714)939-0145	(714)939-8518
Bakersfield	4800 Stockdale Hwy, Suite 212, Bakersfield 93309	(805)395-1718	(805)395-2841
Concord	1465 Enea Cir., Bldg E, Suite 900, Concord 94520	(510)676-5333	(510)676-0227
Covina	1123 So. Parkview, Suite 100, Covina 91724	(818)966-1166	(818)966-7041
Fresno	2550 Mariposa St., Rm. 4000, Fresno 93721	(209)445-5302	(209)445-5786
Los Angeles	3550 W. 6th St., Rm. 431, Los Angeles 90020	(213)736-3041	(213)736-4526
Oakland	7700 Edgewater Dr., Suite 125, Oakland 94621	(510)568-8602	(510)568-7092
Pico Rivera	9455 E. Stauson Ave., Pico Rivera 90660	(310)949-7827	(310)949-9880
Redding	381 Hemsted, Redding 96002	(916)224-4743	(916)224-4747
Sacramento	2424 Arden Way, Suite 165, Sacramento 95825	(916)263-2800	(916)263-2798
San Bernardino	242 E. Airport Dr., Suite 103, San Bernardino 92408	(909)383-4321	(909)383-6789
San Diego	7807 Convoy Ct., Suite 140, San Diego 92111	(619)637-5534	(619)279-4658
San Francisco	1390 Market St., Suite 718, San Francisco 94102	(415)557-1677	(415)
San Jose	2010 No. First St., Suite 401, San Jose 95131	(408)452-7288	(408)452-7287
San Mateo	1900 So. Norfolk St., Suite 215, San Mateo 94403	(415)573-3812	(415)573-3817
Santa Rosa	1221 Farmers Lane, Suite 300, Santa Rosa 95405	(707)576-2388	(707)576-2598
Torrance/Long Beach/South Bay	680 Knox St., Suite 100, Torrance 90502	(310)516-3734	(310)516-4253
Van Nuys	6150 Van Nuys Blvd., Suite 405, Van Nuys 91401	(818)901-5403	(818)901-5578
Ventura	1655 Mesa Verde, Rm. 150, Ventura 93003	(805)654-4581	(805)654-4852



October 28, 1994

IT CORPORATION
International Technology Corporation
2355 MAIN STREET, SUITE 100
IRVINE CA 92714

CONFIRMATION OF REGISTRATION

Your carcinogen "Report of Use", or Cal/OSHA Form 183A, has been received and the carcinogen(s) checked has(have) been recorded with your assigned registration number and effective date below:

REGISTRATION NUMBER: 2077

EFFECTIVE DATE: 9/23/77

<u>CODE</u>	<u>CARCINOGEN</u>	<u>SECTION</u>	<u>INDIVIDUAL</u>
015	Asbestos	1529, 5208, 5208.1	September 23, 1977
002	4-aminodiphenyl	5209	November 6, 1985
003	Benzidine(and its salts)	5209	November 6, 1985
004	3,3-Dichlorobenzidine(and its salts)	5209	November 6, 1985
005	4-Dimethylaminoazobenzene	5209	November 6, 1985
006	alpha-Naphthylamine	5209	November 6, 1985
007	beta-Naphthylamine	5209	November 6, 1985
008	4-Nitrobiphenyl	5209	November 6, 1985
009	N-Nitrosodimethylamine	5209	November 6, 1985
010	beta-Propiolactone	5209	November 6, 1985
011	bis-Chloromethyl ether	5209	November 6, 1985
012	Methyl chloromethyl ether	5209	November 6, 1985
013	4,4'-Methylenebis(2-chloroaniline)MBOCA	5215	November 6, 1985
014	Ethyleneimine	5209	November 6, 1985
016	Vinyl Chloride	5210	November 6, 1985
018	1,2-Dibromo-3-chloropropane(DBCP)	5212	November 6, 1985
019	Acrylonitrile	5213	November 6, 1985

**KEEP THIS DOCUMENT AS A RECORD OF YOUR REPORT.
PLEASE ADVISE THIS OFFICE OF CHANGES TO YOUR REPORT OF USE
WITHIN 15 CALENDAR DAYS PER THE CALIFORNIA CODE OF REGULA-
TIONS, TITLE 8, SECTIONS AS LISTED.**

FOR FURTHER ASSISTANCE CALL: (415) 703-5301, OCCUPATIONAL CARCINOGEN CONTROL UNIT.

CC: Frederick J. Mlakar, CIH, Dir, H&S, Environ. Svcs Div, W
Ltr dtd 10/18/94 updated registrations for 7 active locations; advised of
locations no longer occupied by IT Corp. Your registration number 2077
will represent all locations as you list - with 2355 Main St as the mailing
address and corporate hqtrs. Cal/OSHA 183C
May 1994

DEPARTMENT OF INDUSTRIAL RELATIONS
DIVISION OF OCCUPATIONAL SAFETY AND HEALTH

Occupational Carcinogen Control Unit
455 Golden Gate Avenue, Room 5202
San Francisco, CA 94102

ADDRESS REPLY TO
P.O. BOX 420803
San Francisco, CA 94142



October 28, 1994

IT CORPORATION
International Technology Corporation, Regional Office
2355 MAIN STREET, SUITE 100
IRVINE CA 92714

CONFIRMATION OF REGISTRATION

Your carcinogen "Report of Use", or Cal/OSHA Form 183A, has been received and the carcinogen(s) checked has(have) been recorded with your assigned registration number and effective date below:

REGISTRATION NUMBER: 2077

EFFECTIVE DATE: 9/23/77

<u>CODE</u>	<u>CARCINOGEN</u>	<u>SECTION</u>	<u>INDIVIDUAL</u>
020	Inorganic Arsenic	5214	November 6, 1985
021	Ethylene Dibromide(EDB)	5219	November 6, 1985
022	Ethylene Oxide(EtO)	5220	November 6, 1985
023	Formaldehyde	5217	October 18, 1994
024	Benzene	5218	August 30, 1991
025	Methylenedianiline(MDA)	1535, 5200	October 18, 1994
026	Cadmium	1532, 5207	October 18, 1994
001	2-acetylaminofluorene	5209	November 6, 1985

**KEEP THIS DOCUMENT AS A RECORD OF YOUR REPORT.
PLEASE ADVISE THIS OFFICE OF CHANGES TO YOUR REPORT OF USE
WITHIN 15 CALENDAR DAYS PER THE CALIFORNIA CODE OF REGULA-
TIONS, TITLE 8, SECTIONS AS LISTED.**

FOR FURTHER ASSISTANCE CALL: (415) 703-5301, OCCUPATIONAL CARCINOGEN CONTROL UNIT.

CC: Frederick J. Mlakar, CIH, Dir, H&S, Environ. Svcs Div, W
Ltr dtd 10/18/94 updated registrations for 7 active locations; advised of
locations no longer occupied by IT Corp. Your registration number 2077
will represent all locations as you list - with 2355 Main St as the mailing
address and corporate hqtra. Cal/OSHA 183C
May 1994

UNDERGROUND/OVERHEAD UTILITY CHECKLIST

Project Name/Number _____

Date _____

Location _____

This checklist must be completed for any intrusive subsurface work such as excavating or drilling. It records the fact that all underground and overhead structures and utilities in the work area are identified and located. The Project Manager must request utility markouts before the start of field operations to allow the client and utility companies to complete them. If complete information is not available, a magnetometer survey must be performed to locate obstacles prior to excavating or drilling.

PROCEDURE

A diagram of the project area depicting the proposed location of excavation or drilling sites must be attached to the Health and Safety Plan. The diagram must clearly indicate the areas checked for underground structures/utilities and overhead power lines. This form and the diagram must be signed by the Project Manager, the IT Field Supervisor and the client representative (if applicable).

CHECKLIST

TYPE OF STRUCTURE	PRESENT	NOT PRESENT	METHOD OF MARKOUT
Electric Power Line			
Natural Gas Line			
Telephone Line			
Water Line			
Product Line			
Steam Line			
Sewer Line			
Drain Line			
Underground Tank			
Overhead Power Line			
Overhead Product Line			
Septic Tank/Drain			

Client Representative _____

(If applicable)

(Signature)

(Date)

IT Project Manager _____

(Signature)

(Date)

IT Field Supervisor _____

(Signature)

(Date)

Working Area _____ Good for this date only _____ 19__

Specific vessel or equipment _____

Work to be done _____

TESTS

STATE EXACT LOCATION OF TEST	TIME	PERCENT LOWER EXPLOSION LIMIT	PERCENT OXYGEN	OTHERS

CHECK LIST

Operations/plant personnel have been informed of work to be performed _____

Lines/lines/valves are disconnected, blinded, or locked out. _____

Equipment and all attached piping has been cleaned and purged with:
(check blank) Water _____ Steam _____ Inert gas _____ Air _____

Electrical service has been locked out and tagged. _____

All grounding/bonding wire in place. _____

Surrounding equipment and operations are safe for hot work. _____

No open vessels or lines within 35 feet of hot work area. _____

No combustible items within 35 feet of hot work area or covered with wetted tarpaulins. _____

Fire Watch has been provided by Contractor. _____

No flammable gases greater than 10% LEL in hot work area. _____

All requirements of ITCPRO 9531 for Confined Space Entry have been met and ITC Form 9531-1 has been completed and posted.

If vessel contains leaded product, all requirements of ITCPRO 9531.3 have been met.

Initial

Yes Does Not Apply

PERSONNEL PROTECTIVE EQUIPM

- EYES**
- Chemical Goggles
 - Face Shield
 - Safety Glasses
 - Welders Mask
- BODY**
- Environmental Suit: PVC Neoprene
 - Heavy Suit: PVC Neoprene
 - Light PVC Suit
 - Yellow Tyvek Suit
 - White Tyvek Suit
- EXTREMITIES**
- Hard Hat
 - Gloves
 - Boots PVC Neoprene
 - Hoods PVC Neoprene
 - Foot Coverings, Disposable
- RESPIRATORY**
- Self-Contained Respirator
 - Hose Line Respirator
 - Hose Line W/Egress
 - Cartridge Respirator
- Cartridge Type _____
- Dust Respirator
- EQUIPMENT REQUIRED**
- Fire Extinguisher
 - Fire Blanket
 - Charged Water Hose
 - Combustible Gas Indicator

Special Instructions: _____

Completed by: _____

Name Printed

Signature

Date

Manager

**ENTRY PERMIT
PERMIT-REQUIRED CONFINED SPACE (PRCS)**

Division/Location _____ Job No. _____
 Customer _____ Address _____
 Location of Job _____ Identity of PRCS _____
 Describe Hazards of PRCS (Chemical, Physical) _____

 Chemical introduced into Space _____

 Purpose This Permit Authorized _____

CHECKLIST	YES	DOES NOT APPLY	PERSONAL PROTECTIVE EQUIPMENT (PPE)
			(Cross)
All lines leading to and from confined space have been banded or disconnected			EYEFACE Chemical Goggles Face Shield Safety Glasses
Electrical service disconnected or locked out			EXTREMITIES Hard Hat Gloves (Material _____) Hoops Boots (Material _____) Boots
All grounding and bonding cables in place			BODY Suit Level _____, Material _____
All lighting, fittings, power equipment, and extension cords are explosion-proof			RESPIRATORY SCBA Air Line Egress System Air Purifying (Cartridge _____) Powered Air Purifying (Cartridge _____)
Ground Fault Circuit Indicator (GFCI) checked and functioning			OTHER Hearing Protection Harness & Lifeline Chest or Pockets
All ignition sources have been isolated			RESCUE EQUIPMENT Mechanical Extraction Device First Aid Kit SCBA Other (Specify) _____
All respiratory equipment and alarms checked and functional			NON-IT RESCUE TEAM Instructions to Rescuer Roles _____ _____
All safety harnesses and life lines checked			COMMUNICATION Lifeline "Tag" Signals (See NIOSH) Air Powered Horn Signals (See NIOSH) Other _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____
All required PPE checked and in use			
All entrants are confined space trained			
All entrants are trained in the use, care, and limitations of respirators and PPE			
Attendant trained in emergency procedures			
Attendant(s) trained in rescue procedures			
Outside rescue service will be used and they have been notified of this entry			
Appropriate rescue equipment available and checked			
Ventilation system in use and effective			
Entrant(s) can achieve a gas-o2 test with respirator			
Entrant(s) are not wearing contact lenses			
All tests have been completed and entries that entrance requirements have been met			
Appropriate warning signs have been posted and unauthorized personnel have been excluded from the PRCS and area			

IF THE ANSWER TO ANY OF THE ABOVE QUESTIONS IS NO, ENTRY IS NOT PERMITTED.

OTHER PERMITS ISSUED FOR WORK IN PRCS: _____

OTHER HAZARD CONTROL PROCEDURES OR INSTRUCTIONS: _____



SUPERVISOR'S EMPLOYEE INJURY REPORT

This is an official document to be initiated by the employee's supervisor. Please answer all questions completely. This report is forwarded to the employee's Regional Health and Safety office within 24 hours of the injury.

Injured's Name _____ Sex _____ S.S. No. _____ Birthdate _____
Home Address _____ City _____ State _____ Zip _____ Phone _____
Job title _____ Employee's P.C. _____ Hire date _____ Hourly wage _____

Date of incident _____ Time _____ Time reported _____ To whom? _____
Client name _____ Client address _____ Time shift began _____
Exact location of incident _____ Did employee leave work? No Yes When _____
Has employee returned to work? No Yes When _____ Did employee miss a regularly scheduled shift? No
Doctor/Hospital name _____ Address _____
Witness name(s) _____ Statements attached? No
Nature of injury _____ Exact body part _____
Medical attention: None First aid on site Doctor's office Hospital ER Hospital
Job assignment at time of incident _____ Job: _____ Phase: _____ Task: _____ Subtask: _____
Describe incident _____

SUPERVISOR

What unsafe physical condition or unsafe act caused the incident? _____

What corrective action has been taken to prevent recurrence? _____

Supervisor/Foreman _____
(Print) Signature Date

MANAGER

Comments on incident and corrective action _____

Manager's name _____
(Print) Signature Date

MANAGER

HEALTH AND SAFETY

Concur with action taken? No Yes Remarks _____

OSHA Classification:

Incident only First aid No lost workdays Lost workdays Restricted activity Fatal

Days away from work _____ Days restricted work _____ Total days charged _____

State jurisdiction Federal L&H Date ER submitted _____ Which claims office _____

Coding: A. Injury type or illness _____ B. Injured body parts _____ C. Activity at time of accident _____ D. Injury cause code _____

E. Agent code _____ F. Safety rule violated code _____ G. Accident prevention code _____

Name _____
(Print) Signature Date

HEALTH AND SAFETY

IT CORPORATION WORKERS COMPENSATION ACCIDENT CODING

A. TYPE OF INJURY OR ILLNESS

- 10 Laceration
- 11 Puncture
- 12 Contusion
- 13 Abrasion
- 14 Crushing Injury
- 20 Foreign Body
- 22 Burn-Thermal
- 24 Burn-Chemical
- 26 Fracture
- 28 Amputation
- 30 Hernia/Inguinal
- 31 Hernia/Other
- 32 Strain
- 34 Sprain
- 36 Dislocation
- 38 Heat Exhaustion/Heat Stress
- 40 Drowning
- 42 Asphyxiation
- 44 Systemic Poisoning
- 46 Dermatitis
- 48 Inflammation/Irritation
- 49 Pneumoconiosis
- 50 Respiratory Condition Due to Toxic Agents
- 51 Radiation
- 52 Heart Disease
- 54 Liver Damage
- 56 Kidney Damage
- 58 Mental Stress/Psychiatric
- 60 Repeated Trauma
- 62 Hearing Loss
- 64 Cancer
- 66 Other Occupational Disease
- 68 Fatality
- 70 Infectious Respiratory Disease
- 72 Miscellaneous-Not Otherwise Coded
- 74 Not Work Related

B. INJURED BODY PARTS

- 10 Head
- 12 Face
- 14 Ear
- 16 Eye
- 17 Nose
- 18 Teeth/Mouth
- 20 Neck
- 22 Shoulder
- 24 Chest
- 26 Abdomen
- 28 Upper Arm
- 30 Elbow
- 32 Lower Arm
- 34 Wrist
- 36 Hand
- 38 Thumb
- 40 Fingers
- 42 Back/Spine
- 44 Hip/Pelvis
- 46 Thigh
- 48 Knee
- 50 Lower Leg
- 52 Ankle
- 54 Heel
- 56 Metatarsal
- 58 Toes
- 60 Lungs
- 62 Heart
- 64 Liver
- 66 Other Internal Organs
- 68 Psyche
- 70 Not Otherwise Coded

C. ACTIVITY AT TIME OF ACCIDENT

- 10 Driving

- 14 Operating Heavy Equipment
- 16 Hot Work
- 18 Hydroblasting
- 19 Washing
- 20 Cutting
- 22 Lifting Or Manual Carrying
- 24 Walking
- 26 Running
- 28 Jumping
- 30 Hammering
- 32 Sampling
- 34 Loading/Unloading Vacuum Trucks
- 36 Pulling Vacuum Hoses
- 38 Climbing
- 40 Shoveling
- 41 Sweeping
- 42 Pulling
- 44 Pushing
- 46 Opening Or Closing
- 48 Reaching Or Stretching
- 50 Standing, Observing Or Inspecting
- 52 Piling Or Stacking
- 54 Maintenance
- 56 Training
- 58 Chemical Packaging
- 60 Laboratory Analysis
- 62 Washing Glassware
- 64 Tank Cleaning
- 66 Asbestos Removal
- 68 Nuclear Decontamination
- 70 Drilling
- 72 Pond Maintenance
- 74 Using Hand Tools
- 76 Not Otherwise Classified

D. INJURY CAUSE CODE

STRUCK BY

- 01 Falling Object
- 02 Flying Object
- 03 Swinging Object
- 04 Tripping, Sliding Or Rolling Object
- 05 Motor Vehicle
- 06 Altercation
- 07 All Other Moving Objects

STRAIN OR OVEREXERTION

- 10 Lifting (Back)
- 11 Lifting (Other Than Back)
- 12 Pulling Or Pushing
- 13 Reaching, Twisting Or Over Extending
- 14 Cumulative Trauma

FALL FROM ELEVATION

- 20 Manway Opening
- 21 Ladder Or Scaffold
- 22 Machinery Or Stationary Equipment
- 23 Piled Materials
- 24 Stairs
- 25 Heavy Equipment
- 26 Vacuum Trucks
- 27 Other Trucks

FALL FROM SAME LEVEL

- 30 Slip
- 31 Trip

STRUCK AGAINST

- 40 Moving Object
- 41 Stationary Object
- 42 Sharp Object

CAUGHT IN, UNDER OR BETWEEN

- 50 Running Or Meshing Objects
- 51 Point Of Operation (Machinery Or Equipment)
- 52 Other Than Point Of Operation
- 53 Moving And Stationary Objects
- 54 Two Moving Objects

EXPOSURE TO

- 60 Cold
- 61 Heat
- 62 Electric Current
- 63 Chemicals
- 64 Radiation
- 65 Noise
- 66 Dust
- 68 Poison Oak/Ivy

MISCELLANEOUS

- 70 Inhalation
- 71 Ingestion
- 72 Absorption
- 73 Job Stress
- 74 Insect Or Animal Bites

E. AGENT CODE

- 10 Grading/Compacting Equipment
- 11 Excavating/Drilling Equipment
- 12 Crane
- 14 Vacuum Truck
- 16 End Dump Truck
- 18 Automobile
- 19 All Other Motor Vehicles
- 20 Hand Tools
- 22 Power Tools
- 24 Laboratory Glassware
- 26 Laboratory Equipment
- 28 Sampling Equipment
- 30 Hoses
- 32 Hydroblaster
- 34 High Pressure Washing
- 36 Hand Truck
- 38 Ladder
- 40 Scaffold
- 42 Stairs
- 44 Slippery Surface
- 45 Ice Or Snow
- 46 Uneven Surface
- 48 Hot Liquid/Gases
- 50 Toxic Material
- 52 Oxygen Deficient Atmosphere
- 54 Flammable Materials
- 56 Electric Current
- 58 Radiation
- 60 Door
- 62 Compressed Gas
- 64 Gas Cylinder
- 66 Respirator/Breathing Apparatus
- 68 Protective Clothing
- 70 Other Clothing/Jewelry
- 72 Mobile Treatment Equipment
- 73 Fixed Treatment Facility

F. SAFETY RULE VIOLATED CODE

- 01 IT Safety Rule
- 02 Client Safety Rule
- 03 Compressed Air
- 05 Wire Rops, Clips And Slings
- 06 Locking Out Equipment
- 07 Piling And Blocking Of Materials
- 08 High Voltage Rules
- 09 Eye And Face Protection
- 10 Portable Ladders
- 11 Underground Construction

- 12 Cold Weather Hazards
- 13 Loading/Unloading
- 14 Hand Tools
- 15 Cleaning And Repair To T.
- 16 Protective Clothing And A.
- 17 Flammable And Combustible Liquids
- 18 Job Procedure
- 19 Portable Electrical Tools
- 21 Flammable Gases
- 22 Fall Protection
- 23 Grinding Wheel
- 24 Machine Guarding
- 25 Scaffolding
- 26 Handling Materials
- 27 Horse Play And Fighting
- 28 Housekeeping
- 29 Unauthorized Walkways
- 30 Welding Equipment
- 31 Machine Operations
- 32 Hand Tools
- 35 Crane Rules
- 37 Acids And Caustics
- 38 Tripping And Slipping Hazards
- 42 Respirator Protection
- 43 Hearing Protection
- 44 Confined Space
- 45 Late Report Of Minor Accidents
- 46 Temporary Cords And Leads
- 47 Improper Operation Of Equipment
- 48 Hydroblaster
- 50 Motor Vehicle
- 51 Driving Under The Influence
- 52 Fork Lifts
- 54 Air Compressors And Receivers
- 60 No Safety Rule Violation
- 62 Did Not Review Job With Health and Safety

G. ACCIDENT PREVENTION CODE

- 02 Install Guards Or Safety Devices
- 04 Install Warning System
- 06 Store Flammables And Combustibles In Approved M
- 08 Block Or Secure Material On Machinery Against Unexpected Movement
- 10 Additional Housekeeping Needed
- 12 Remove Protruding Objects
- 14 Maintain Necessary Clearance
- 16 Control Or Remove Atmospheric Conditions
- 18 Maintain Proper Piling Of Stor
- 20 Install Additional Illumination
- 22 Personal Protective Equipment
- 24 Review Project with Health & S

INSTRUCTION/RE-INSTRUCTION

- 50 Use Of Equipment
- 52 Proper Operation Or Working Speed
- 54 Use Of Warning Devices
- 56 Proper Use Of Safety Devices
- 58 Use Of Tools In Good Repair
- 60 Proper Lifting Practices
- 62 De-Energizing Equipment Before Adjusting Or Repairing
- 64 Stay Off Moving Equipment
- 66 Horse Play
- 68 Wearing Of Personal Protective Equipment
- 70 Proper Chemical Handling Procedure
- 72 Safety Work Rules
- 74 IT Training Class

MUST BE COMPLETED WITHIN 72 HOURS

ACCIDENT/INJURY INVESTIGATION

Date _____ Profit/Cost Center _____ Date of Accident/Injury _____
Employee Name _____
Supervisor Name _____
Job Number/Name _____ / _____
Location of Accident/Injury _____

• **Accident/Injury Classification**

<u>Injury</u>	<input type="checkbox"/> Near Miss	<u>Vehicle</u>	<input type="checkbox"/> Chargeable	<u>DOT</u>	<input type="checkbox"/> DOT Vehicle
	<input type="checkbox"/> First Aid		<input type="checkbox"/> Non-Chargeable		<input type="checkbox"/> DOT Reportable
	<input type="checkbox"/> OSHA Recordable		<input type="checkbox"/> Not at Fault		
	<input type="checkbox"/> Lost Workday			<u>General Liability</u>	<input type="checkbox"/>

• **Description (Provide facts, describe how incident occurred, provide diagram (on back) or photos)**

• **Analysis 1 (What unsafe acts or conditions contributed to the incident?)**

• **Analysis 2 (What systematic or management deficiencies contributed to incident?)**

• **Corrective Action(s) (List corrective action items, responsible person, scheduled completion date)**

• **Witnesses (Attach statements or indicate why unavailable)**

Investigated By _____
Print Name Signature Date

Manager _____
Print Name Signature Date



ACCIDENT REVIEW BOARD REPORT

DATE: _____ LOCATION: _____

BOARD MEMBERS _____

ACCIDENT DATE: _____ TYPE _____

INVESTIGATION COMPLETE? YES _____ NO _____

EMPLOYEE(S) _____
PRINT NAME SIGNATURE

PRINT NAME SIGNATURE

SUPERVISOR(S) _____
PRINT NAME SIGNATURE

CAUSE OF ACCIDENT _____

ACTION BY BOARD _____

ACCEPTED: _____

EMPLOYEE

ACCEPTED: _____

MANAGER

APPROVED

(HS MANAGER)

REJECTED FOR:

APPROVED

(REGIONAL GENERAL MANAGER)

REJECTED FOR:

APPROVED

(DIVISION DIRECTOR)

REJECTED FOR:



VEHICLE ACCIDENT REPORT

IT Vehicle

DRIVER _____ ACCIDENT DATE _____ DRIVERS LICENSE _____ ST. _____
 ADDRESS _____
 CITY _____ STATE _____ STATE _____ ZIP _____
 WORK PHONE # (_____) _____ SSN _____ PCP _____
 VEHICLE # _____ YEAR _____ MAKE _____ MODEL _____ LICENSE PLATE # _____
 STATE _____ VEHICLE OWNER: IT CORP. LEASED/RENTED PRIVATE VEHICLE
 VEHICLE TYPE: COMMERCIAL MOTOR VEHICLE NON-COMMERCIAL
 IF NOT OWNED: OWNER _____ PHONE (_____) _____
 ADDRESS _____ STATE _____ ZIP _____
 VEHICLE DAMAGE _____
 # OF VEHICLES TOWED FROM SCENE _____ NUMBER OF INJURIES _____ NUMBER OF FATALITIES _____
 WERE HAZARDOUS MATERIALS RELEASED? YES NO IF YES, DESCRIBE MATERIALS _____

O. /ehicle(s)
Use separate sheet if more than one

DRIVER _____ DRIVERS LICENSE _____ STATE _____
 ADDRESS _____
 CITY _____ STATE _____ STATE _____ ZIP _____
 PHONE # (_____) _____ SSN _____
 OWNERS NAME (CHECK IF SAME AS DRIVER) _____
 ADDRESS _____
 CITY _____ STATE _____ ZIP _____
 INSURANCE COMPANY _____ POLICY # _____
 AGENT'S NAME _____ PHONE # (_____) _____
 ADDRESS _____
 CITY _____ STATE _____ ZIP _____
 VEHICLE: YEAR _____ MAKE _____ MODEL _____ PLATE # _____ STATE _____
 VEHICLE DAMAGE _____
 PASSENGERS: YES (List on reverse) NO INJURIES: YES (List names & addresses on reverse) NO

Accident Description

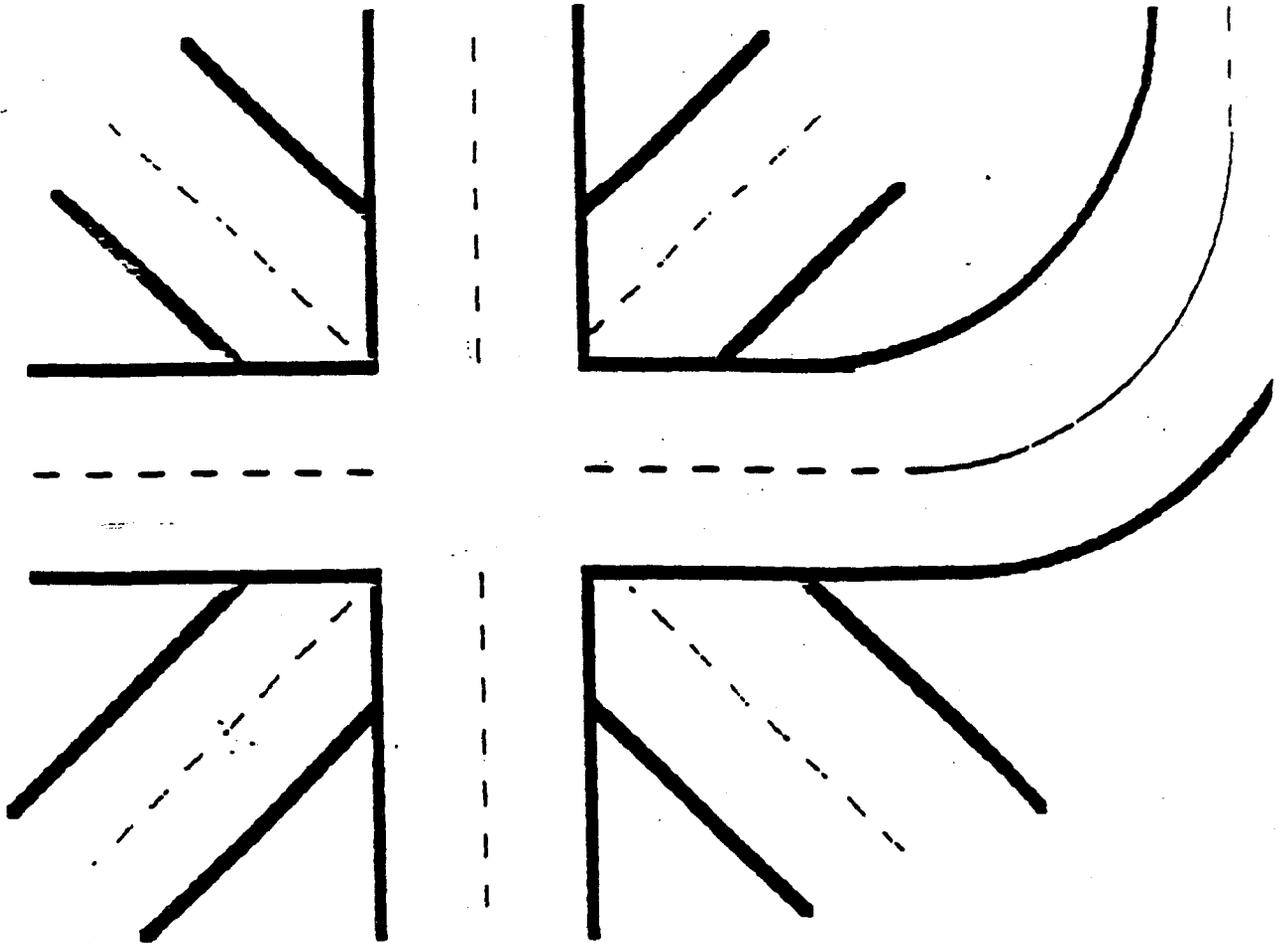
DATE _____ TIME _____ A.M. _____
 LOCATION (CITY, STATE) _____
 DESCRIPTION OF ACCIDENT _____

 WITNESS _____ PHONE # (_____) _____
 ADDRESS _____
 POLICE OFFICER'S NAME _____ DEPARTMENT _____

EMPLOYEE _____ (PRINT) _____ (SIGNATURE) _____ DATE _____
 SUPERVISOR _____ (PRINT) _____ (SIGNATURE) _____ DATE _____

PHONE OR FAX TO CORPORATE HEALTH & SAFETY AND JOHN McCARTHY
 WITHIN 24 HOURS, OR NOT LATER THAN NEXT BUSINESS DAY.
 IT PHONE: (314) 378-8823 IT FAX: (314) 791-8827

VEHICLE ACCIDENT REPORT ACCIDENT DIAGRAM



INSTRUCTIONS

1. USE SECTION OF DIAGRAM WHICH MOST CLOSELY RESEMBLES ACCIDENT SETTING.
2. LABEL ALL STREETS. USE AN ARROW TO INDICATE NORTH. USE ARROWS TO INDICATE TRAFFIC FLOW. NOTE SPEED LIMIT.
3. INDICATE POSITION OF VEHICLES JUST PRIOR TO ACCIDENT AND INDICATE POINT OF COLLISION OR ACCIDENT.
4. INDICATE ANY OBSTACLES, OBSTRUCTIONS OR OTHER ITEMS WHICH MIGHT HAVE INFLUENCED ACCIDENT. FOR EXAMPLE INDICATE CONSTRUCTION, OBSTRUCTIONS TO VIEW, ICY OR WET PATCHES, ETC.

DATE:

SKETCH BY:

LOCATION:



GENERAL LIABILITY, PROPERTY DAMAGE, AND LOSS REPORT

Date Claim Submitted
Agent

DIVISION/SUBSIDIARY _____ DATE / /

ADDRESS _____

HOW DID DAMAGE OR LOSS OCCUR: _____

DESCRIPTION OF DAMAGE OR LOSS: _____

IDENTIFICATION OF DAMAGED OR LOST PROPERTY: _____

LOCATION OF DAMAGED OR LOST PROPERTY (Before Loss): _____

DATE AND TIME OF DAMAGE OR LOSS: Date / / Time _____ AM
PM

OWNER OF DAMAGED OR LOST PROPERTY:

Name _____ Phone No. _____

Address _____ City _____

Employer _____

INJURED PARTIES (Complete also a Supervisors Employee Injury Report if an IT Employee):

1. Name _____ Phone No. _____

Address _____ City _____

Employer's Name & Address _____

Nature Of Injury _____

2. Name _____ Phone No. _____

Address _____ City _____

Employer's Name & Address _____

Nature Of Injury _____

WITNESSES:

1. Name _____ Phone No. _____

Address _____ City _____

Employer's Name & Address _____

2. Name _____ Phone No. _____

Address _____ City _____

Employer's Name & Address _____

WERE PICTURES TAKEN YES NO

WERE POLICE NOTIFIED YES NO

DEPT. _____

COMPLETED BY: _____ Date / /

Name Printed

Signature

Manager _____ Date / /

Signature



TAILGATE SAFETY MEETIN

ion/Subsidiary _____ Facility _____

Date _____ Time _____ Job Number _____

Customer _____ Address: _____

Specific Location _____

Type of Work _____

Chemicals Used _____

SAFETY TOPICS PRESENTED

Protective Clothing/Equipment _____

Chemical Hazards _____

Physical Hazards _____

Emergency Procedures _____

Hospital / Clinic _____ Phone () _____ Paramedic Phone () _____

ital Address _____

Special Equipment _____

Other _____

ATTENDEES

NAME PRINTED

SIGNATURE

Meeting conducted by:

NAME PRINTED

SIGNATURE

Supervisor _____

Manager _____

EMERGENCY

AMBULANCE _____

FIRE - RESCUE _____

HOSPITAL _____

PHYSICIAN _____

ALTERNATE _____

POLICE _____

CAL/OSHA _____

[POSTING IS REQUIRED BY TITLE 8 SECTION 1512(e)]



STATE OF CALIFORNIA
DEPARTMENT OF INDUSTRIAL RELATIONS
DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
P.O. Box 802, San Francisco CA 94142-0603
420603

WORKERS' COMPENSATION NOTICE

INTERNATIONAL TECHNOLOGY CORPORATION
(EMPLOYER)

Notice is hereby given that this employer is insured with.....

NATIONAL UNION FIRE INSURANCE COMPANY
(NAME OF INSURANCE COMPANY)

for Workers' Compensation, in compliance with the laws of the state of California.....

Address of nearest claims office and telephone number..... CONSTITUTION STATE SERVICE COMPANY

215 LENNON LANE / P.O. BOX 8112 / WALNUT CREEK, CA (510) 945-4.....

Under the California Labor Code, in the event of injury, you have the right to request a change of treating physician if original treating physician is selected initially by the employer. Thirty (30) days after reporting an injury you can be treated by a physician of your own choice. Upon selecting a physician thirty (30) days after reporting the injury, you should immediately notify your employer of the name and address of the physician selected.

If you wish direct initial medical treatment, other than appropriate emergency or first aid treatment, by your own designated physician in the event of injury, you must notify your employer of your choice in writing prior to injury.

If you are unable to return to work due to the injury, you have the right to receive temporary or permanent disability income and, if eligible, vocational rehabilitation services.

Additional benefits are available if the injury results in death.

Report any work-related injury or illness to your supervisor or employer as soon as possible. Provide all necessary information regarding injury or illness.

For further information, please contact your supervisor or employer. You may also contact an Information and Assistance Officer at the Office of Benefit Assistance and Enforcement located at.....

CSSC / 215 LENNON LANE / P.O. BOX 8112 / WALNUT CREEK, CA (800) 832-783.....

EMERGENCY TELEPHONE NUMBERS

Doctor..... DR. ELAINE THEIRZALUT (EMR)..... (800) 229-3674.....

Hospital..... ().....

Ambulance..... ().....

Fire Department ()..... Police Department ().....

OFF-DUTY ACTIVITIES OF EMPLOYEE(S)

Your employer or its insurance company may not be responsible for compensation because of an injury due to the employee's voluntary participation in any off-duty recreational, social, or athletic activity that is not part of the employee's work-related activities.

ACCESS TO MEDICAL AND EXPOSURE RECORDS

BY CAL/OSHA REGULATION
- GENERAL INDUSTRY SAFETY ORDER 3204 -
YOU HAVE THE RIGHT TO SEE AND COPY:

- Your medical records and records of exposure to toxic substances or harmful physical agents.
- Records of exposure to toxic substances or harmful physical agents of other employees with work conditions similar to yours.
- Material Safety Data Sheets or other information that exists for chemicals or substances used in the workplace, or to which employees may be exposed.

THESE RECORDS ARE AVAILABLE AT: IT Corporation
(Location)

4585 Pacheco Blvd., Martinez, CA 94553

FROM: H&S Dept.
(Person Responsible)

A COPY OF GENERAL INDUSTRY SAFETY ORDER 3204
IS AVAILABLE FROM: (same)

Posting the above information is required by GISO 3204. This posting may be done by use of this placard or any similar method the employer chooses.



December 1989
S-11

State of California
Department of Industrial Relations
Cal/OSHA Communications
P.O. Box 603
San Francisco, CA 94101



NOTICE

EMPLOYEE POLYGRAPH PROTECTION ACT

The Employee Polygraph Protection Act prohibits most private employers from using lie detector tests either for pre-employment screening or during the course of employment.

PROHIBITIONS

Employers are generally prohibited from requiring or requesting any employee or job applicant to take a lie detector test, and from discharging, disciplining, or discriminating against an employee or prospective employee for refusing to take a test or for exercising other rights under the Act.

EXEMPTIONS*

Federal, State and local governments are not affected by the law. Also, the law does not apply to tests given by the Federal Government to certain private individuals engaged in national security-related activities.

The Act permits polygraph (a kind of lie detector) tests to be administered in the private sector, subject to restrictions, to certain prospective employees of security service firms (armored car, alarm, and guard), and of pharmaceutical manufacturers, distributors and dispensers.

The Act also permits polygraph testing, subject to restrictions, of certain employees of private firms who are reasonably suspected of involvement in a workplace incident (theft, embezzlement, etc.) that resulted in economic loss to the employer.

EXAMINEE RIGHTS

Where polygraph tests are permitted, they are subject to numerous strict standards concerning the conduct and length of the test. Examinees have a number of specific rights, including the right to a written notice before testing, the right to refuse or discontinue a test, and the right not to have test results disclosed to unauthorized persons.

ENFORCEMENT

The Secretary of Labor may bring court actions to restrain violations and assess civil penalties up to \$10,000 against violators. Employees or job applicants may also bring their own court actions.

ADDITIONAL INFORMATION

Additional information may be obtained, and complaints of violations may be filed, at local offices of the Wage and Hour Division, which are listed in the telephone directory under U.S. Government, Department of Labor, Employment Standards Administration.

THE LAW REQUIRES EMPLOYERS TO DISPLAY THIS POSTER WHERE EMPLOYEES AND JOB APPLICANTS CAN READILY SEE IT.

**The law does not preempt any provision of any State or local law or any collective bargaining agreement which is more restrictive with respect to lie detector tests.*

U.S. DEPARTMENT OF LABOR
EMPLOYMENT STANDARDS ADMINISTRATION

Wage and Hour Division
Washington, D.C. 20210

* U.S. GPO: 1980 - 250-011

WH Publication 1482
September 1980

NOTICE TO ALL EMPLOYEES

Working on Federal or Federal Financed Construction Project

MINIMUM WAGES

You must be paid not less than the wage rate in the schedule posted with this Notice for the kind of work you perform.

OVERTIME

You must be paid not less than one and one-half times your basic rate of pay for all hours worked over 8 a day or 40 a week—whichever is greater. There are some exceptions.

APPRENTICES

Apprentice rates apply only to apprentices properly registered under approved Federal or State apprenticeship programs.

PROPER PAY

If you do not receive proper pay, contact the Contracting Officer listed below:

or you may contact the nearest office of the Wage and Hour Division, U.S. Department of Labor. The Wage and Hour Division has offices in several hundred communities throughout the country. They are listed in the U.S. Government section of most telephone directories under:
**U.S. Department of Labor
Employment Standards Administration**

Working on Government Contracts

This establishment is performing Government contract work
subject to the—

**Service Contract Act
or
Public Contracts Act**

During the period of performance on the contract
the following requirements must be observed:

Minimum Wages

Your rate must be at least \$3.35 an hour:

A higher rate may be required for Service contracts if a wage determination applies or if a predecessor contractor has paid a higher rate for your classification pursuant to a collective bargaining agreement. Such higher rates for Service contracts will be posted as an attachment to this Notice.

Fringe Benefits

Service contract wage determinations may require fringe benefit payments (or a cash equivalent). Supply contracts do not require fringe benefits.

Overtime Pay

You must be paid 1½ times your basic rate of pay for all hours worked over 40 in a week. There are some exceptions.

Safety and Health

The work must be performed under conditions that are sanitary, and not hazardous or dangerous to the employees' health and safety.

No person under 16 years of age may be employed on a Supply Contract.

Information

Further information on the wage provisions of the Service Contract Act or the Walsh-Healey Public Contracts Act may be obtained from the Wage and Hour Division. Information relating to the safety and health provisions may be obtained from the Occupational Safety and Health Administration. Offices are located in principal cities. Check your telephone directory under U.S. Government, Department of Labor, Wage and Hour Division or the Occupational Safety and Health Administration.

U.S. Department of Labor
Employment Standards Administration
Wage and Hour Division
Washington, D.C. 20210

Walsh-Healey Public Contracts Act

General Provisions—This act applies to contracts which exceed or may exceed \$10,000 entered into by any agency or instrumentality of the United States for the manufacture or furnishing of materials, supplies, articles, or equipment. The act requires the contractor to be qualified as a manufacturer or regular dealer, establishes minimum wage, maximum hours, and safety and health standards for work on such contracts, and prohibits the employment on contract work of convict labor (unless certain conditions are met) and children under 16 years of age. The employment of homeworkers (except handicapped clients of bona fide sheltered workshops) on a covered contract is not permitted. The act also requires the keeping of certain records.

In addition to its coverage of prime contractors, the act under certain circumstances applies to secondary contractors performing work under contracts awarded by the Government prime contractor.

All provisions of the act except the safety and health requirements are administered by the Wage and Hour Division.

Minimum Wage—Covered employees must currently be paid not less than \$3.35 an hour.

Overtime—Covered workers must be paid at least one and one-half times their basic rate of pay for all hours worked in excess of 40 a week. Overtime is due on the basis of the total hours spent in all work. Government and non-Government, performed by the employee in any week in which covered work is performed.

Child Labor—Employers may protect themselves against unintentional child labor violations by obtaining certificates of age. State employment or age certificates are acceptable.

Safety and Health—No covered work may be performed in plants, factories, buildings, or surroundings or under work conditions that are unsanitary or hazardous or dangerous to the health and safety of the employees engaged in the performance of the contract. The safety and health provisions of the Walsh-Healey Public Contracts Act are administered by the Occupational Safety and Health Administration.

Posting—During the period that covered work is being performed on a contract subject to the act, the contractor must post copies of Notice to Employees Working on Government Contracts in a sufficient number of places to permit employees to observe a copy on the way to or from their place of employment.

Responsibility for Secondary Contractors—Prime contractors are liable for violations of the act committed by their covered secondary contractors.

General Provisions—The Service Contract Act applies to contract entered into by the United States or the District of Columbia, the principal purpose of which is to furnish service to the United States through the use of service employees. Contractors and subcontractors performing on such Federal contract observe minimum wage and safety and health standards, and maintain certain records, unless a specific exemption applies.

Wages and Fringe Benefits—Every service employer performing any of the Government contract work under a service contract in excess of \$2,500 must be paid not less than the major wages, and must be furnished the fringe benefits, which Secretary of Labor has determined to be prevailing in the locality for the classification in which the employee is working or the rates and fringe benefits (including any accrued or pro-rated wage rates and fringe benefits) contained in a predecessor contractor's collective bargaining agreement. The wage rates and fringe benefits required are usually specified in the contract. Wage determination has been made applicable to the contract employees performing work under the contract must be paid less than the minimum wage provided in section 6(a)(1) of the Labor Standards Act, currently \$3.35 an hour.

All employees doing work necessary to the performance of contract must also be paid not less than the minimum wage provided in section 6(a)(1) of the Fair Labor Standards Act.

Service contracts which do not exceed \$2,500 are not subject to prevailing rate determinations or to the safety and health requirements of the act. However, the act does require employees performing work on such contracts be paid not less than the above minimum wage rate provided by section 6(a) of the Fair Labor Standards Act.

All provisions of the act except the safety and health requirements are administered by the Wage and Hour Division.

Overtime—Service contracts in excess of \$2,500 which require or involve the use of laborers or mechanics require payment of overtime under the Contract Work Hours and Safety Standards Act at time and one-half the basic rate for all hours worked on the contract in excess of 40 a week.

Safety and Health—The act provides that no part of the services in contracts in excess of \$2,500 may be performed in buildings or surroundings or under working conditions, provided by or under the control or supervision of the contractor or subcontractor, which are unsanitary or hazardous or dangerous to the health or safety of service employees engaged to furnish the services. The safety and health provisions of the Service Contract Act are administered by the Occupational Safety and Health Administration.

Notice to Employees—On the date a service employee commences work on a contract in excess of \$2,500, the contractor (or subcontractor) must provide the employee with a notice of the compensation required by the act. The posting of the notice (including any applicable wage determination) contained on the reverse in a location where it may be seen by all employees performing on the contract will satisfy this requirement.

Notice in Subcontracts—The contractor is required to insert in all subcontracts the labor standards clauses specified by the regulations in 29 CFR 4 for Federal service contracts exceeding \$2,500.

Other Obligations—Observance of the labor standards of these acts does not relieve the employer of any obligation he may have under any other laws or agreements providing for higher labor standards.



U.S. Department of Labor
Employment Standards Administration
Wage and Hour Division
Occupational Safety and Health Administration

Additional Information—Additional information and copies of the acts and applicable regulations and interpretations may be obtained from the nearest office of the Wage and Hour Division or the National Office in Washington, D.C. Information pertaining to safety and health standards may be obtained from the nearest office of the Occupational Safety and Health Administration or the National Office in Washington, D.C.



IT CORPORATION

NOTICE

YOU HAVE THE RIGHT TO REVIEW:

- RECORDS OF WORKPLACE TESTS FOR TOXIC SUBSTANCES OR HARMFUL PHYSICAL AGENTS
- YOUR MEDICAL RECORDS
- MATERIAL SAFETY DATA SHEETS OR OTHER INFORMATION THAT EXISTS FOR CHEMICALS OR SUBSTANCES USED IN YOUR WORK
- OSHA HEALTH & SAFETY REGULATIONS

**THIS INFORMATION IS AVAILABLE
THROUGH YOUR REGIONAL HEALTH
AND SAFETY OFFICE.**

CONTACT

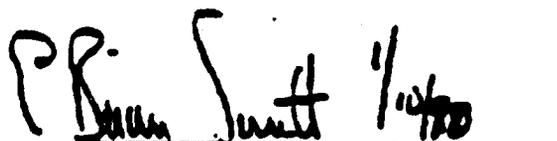
Health & Safety Department
(510) 372-9100

We hereby pledge our full support to IT Corporation's Affirmative Action Program and policy of nondiscrimination and equal opportunity, in compliance with Executive Order 11246, as amended. IT Corporation will recruit, hire, train and promote persons in all job titles without regard to race, creed, color, religion, age, marital status, sexual orientation, disability or national origin, except where sex is a bona-fide occupational qualification. We will insure that hiring and promotion decisions are in accord with equal employment opportunity principles by imposing only requirements which are job-related and do not have an adverse impact, and that other employment decisions further the principle of equal employment opportunity. IT Corporation will insure that all personnel actions such as compensation, benefits, Company sponsored training, education, tuition assistance, transfer, demotion, termination, layoff, return from layoff, and social and recreation programs will be administered without regard to race, creed, color, religion, age, sex, marital status, sexual orientation, disability or national origin.

Equal opportunity can only be achieved through demonstrated leadership and aggressive implementation of a viable Affirmative Action Program. Our Affirmative Action Program sets forth specific affirmative action and equal employment opportunity responsibilities of managers, supervisors, and all employees. It is incumbent that employees not discriminate in any policy, practice or procedure on the basis of race, creed, color, religion, age, sex, marital status, sexual orientation, disability or national origin.

All employees are expected to make every reasonable effort to carry out their Affirmative Action Program responsibilities in spirit as well as in letter to assure that equal opportunity is available to all. We further expect all employees to demonstrate sensitivity to and respect for all other employees and to demonstrate commitment to the Company's equal employment opportunity and affirmative action objectives.


Murray H. Hutchinson
Chairperson of the Board


E. Brian Smith
President

WORKERS' COMPENSATION NOTICE

INTERNATIONAL TECHNOLOGY CORPORATION

EMPLOYER:

Notice is hereby given that this employer is insured with.....

(NAME OF INSURANCE COMPANY)

for Workers' Compensation, in compliance with the laws of the state of California.....

Address of nearest claims office and telephone number.....

Under the California Labor Code, in the event of injury, you have the right to request a change of treating physician if the original treating physician is selected initially by the employer. Thirty (30) days after reporting an injury you can be treated by a physician of your own choice. Upon selecting a physician thirty (30) days after reporting the injury, you should immediately notify your employer of the name and address of the physician selected.

If you wish direct initial medical treatment, other than appropriate emergency or first aid treatment, by your own designated physician in the event of injury, you must notify your employer of your choice in writing prior to injury.

If you are unable to return to work due to the injury, you have the right to receive temporary or permanent disability income and, if eligible, vocational rehabilitation services.

Additional benefits are available if the injury results in death.

Report any work-related injury or illness to your supervisor or employer as soon as possible. Provide all necessary information regarding injury or illness.

For further information, please contact your supervisor or employer. You may also contact an Information and Assistance Officer at the Office of Benefit Assistance and Enforcement located at.....

EMERGENCY TELEPHONE NUMBERS

Doctor.....().....

Hospital.....().....

Ambulance.....().....

Fire Department ()..... Police Department ().....

OFF-DUTY ACTIVITIES OF EMPLOYEE(S)

Your employer or its insurance company may not be responsible for compensation because of an injury due to the employee's voluntary participation in any off-duty recreational, social, or athletic activity that is not part of the employee's work-related activities.

YOUR RIGHTS UNDER THE FAMILY AND MEDICAL LEAVE ACT OF 1993

FMLA requires covered employers to provide up to 12 weeks of unpaid, job-protected leave to "eligible" employees for certain family and medical reasons. Employees are eligible if they have worked for a covered employer for at least one year, and for 1,250 hours over the previous 12 months, and if there are at least 50 employees within 75 miles.

REASONS FOR TAKING LEAVE:

Unpaid leave must be granted for any of the following reasons:

- to care for the employee's child after birth, or placement for adoption or foster care;
- to care for the employee's spouse, son or daughter, or parent, who has a serious health condition; or
- for a serious health condition that makes the employee unable to perform the employee's job.

At the employee's or employer's option, certain kinds of paid leave may be substituted for unpaid leave.

ADVANCE NOTICE AND MEDICAL CERTIFICATION:

The employee may be required to provide advance leave notice and medical certification. Taking of leave may be denied if requirements are not met.

- The employee ordinarily must provide 30 days advance notice when the leave is "foreseeable."
- An employer may require medical certification to support a request for leave because of a serious health condition, and may require second or third opinions (at the employer's expense) and a fitness for duty report to return to work.

JOB BENEFITS AND PROTECTION:

- For the duration of FMLA leave, the employer must maintain the employee's health coverage under any "group health plan."
- Upon return from FMLA leave, most employees must be restored to their original or equivalent positions with equivalent pay, benefits, and other employment terms.
- The use of FMLA leave cannot result in the loss of any employment benefit that accrued prior to the start of an employee's leave.

UNLAWFUL ACTS BY EMPLOYERS:

FMLA makes it unlawful for any employer to:

- interfere with, restrain, or deny the exercise of any right provided under FMLA;
- discharge or discriminate against any person for opposing any practice made unlawful by FMLA or for involvement in any proceeding under or relating to FMLA.

ENFORCEMENT:

- The U.S. Department of Labor is authorized to investigate and resolve complaints of violations.
- An eligible employee may bring a civil action against an employer for violations.

FMLA does not affect any Federal or State law prohibiting discrimination, or supersede any State or local law or collective bargaining agreement which provides greater family or medical leave rights.

FOR ADDITIONAL INFORMATION:

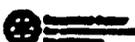
Contact the nearest office of the Wage and Hour Division, listed in most telephone directories under U.S. Government, Department of Labor.

This poster may be ordered pursuant to requests of Small Family and Medical Leave Act requests by the Department of Labor.

State and Federal Government Printing available through Order Form G, Post Office, P.O. Box 480858, Dallas, TX 75248-0858 (5025)
Call toll free 1-800-878-0171 to order Government Printing 4700-0102, (Federal Register) 4700-0102, (Statistical Abstract) 4700-0102, (Federal Reserve) 4700-0102
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U. S. Department of Labor,
Employment Standards Administration
Wage and Hour Division,
Washington, D.C. 20209





Serving the People of California

NOTICE TO EMPLOYEES

THIS EMPLOYER IS REGISTERED UNDER THE CALIFORNIA UNEMPLOYMENT INSURANCE CODE, AND IS REPORTING WAGE CREDITS THAT ARE BEING ACCUMULATED FOR YOU TO BE USED AS A BASIS FOR

UNEMPLOYMENT INSURANCE

(Paid for entirely by EMPLOYERS' taxes)

and

DISABILITY INSURANCE

(Paid for entirely by WAGE EARNERS' taxes)

- **WHEN YOU ARE UNEMPLOYED AND READY, WILLING AND ABLE TO WORK, YOU MAY BE ELIGIBLE TO RECEIVE UNEMPLOYMENT INSURANCE.**
 - You must file a claim for Unemployment Insurance at the nearest Employment Development Department Office, and register for work.**
- **IF YOU WORK LESS THAN YOUR NORMAL FULL-TIME HOURS, YOU MAY ALSO BE ELIGIBLE TO RECEIVE BENEFITS.**
 - You must file a claim for Unemployment Insurance at the nearest Employment Development Department Office.**
- **WHEN YOU ARE UNABLE TO WORK BECAUSE OF SICKNESS OR INJURY, YOU MAY BE ELIGIBLE TO RECEIVE DISABILITY INSURANCE BENEFITS.**
 - 1. If this firm operates under an approved Voluntary Plan of Disability Insurance and you have chosen to be covered by it, claim forms should be obtained from your employer.**
 - 2. For State Disability Insurance, claim forms may be obtained from your doctor, hospital, or any Employment Development Department Office. The "First Claim" must be mailed not later than the 41st day after the first day for which benefits are payable if you are to receive credit from the time you first became disabled. Earlier filing will speed your payment.**
- **GET FULL INFORMATION AT YOUR LOCAL EMPLOYMENT DEVELOPMENT DEPARTMENT OFFICE.**

CLAIMS SHOULD BE FILED PROMPTLY. YOU MAY LOSE BENEFITS TO WHICH YOU WOULD OTHERWISE BE ENTITLED IF YOU DELAY FILING OF YOUR CLAIM.

STATE OF CALIFORNIA
DEPARTMENT OF INDUSTRIAL RELATIONS
DIVISION OF LABOR STANDARDS ENFORCEMENT

PAY DAY NOTICE

(IT CORPORATION)

REGULAR PAY DAYS FOR EMPLOYEES OF ~~Instructions Technology~~
(FIRM NAME)

~~Corporation~~

SHALL BE AS FOLLOWS:

Salaried Employees	Bi-weekly
Hourly Employees	Weekly

THIS IS IN ACCORDANCE WITH SECTIONS 204, 204A, 204B, AND 205
OF THE CALIFORNIA LABOR CODE.

BY

C. L. Perrignon

TITLE

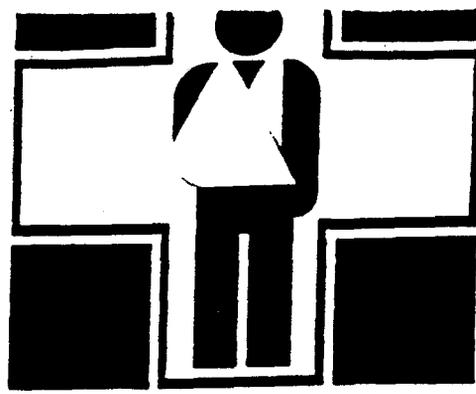
Human Resources

C.L.PERRIGNON
MANAGER, HUMAN RESOURCES

DLSE 8 (REV. 12-88)
O 09P



PLEASE POST



If A Work Injury Occurs...

... you're automatically protected by workers compensation insurance. California law provides certain benefits to employees who are injured or become ill because of the job.

Workers' Compensation Benefits Include...

- **Medical Care.** All medical treatment required to cure the injury or illness—without deductible or dollar limit. You should never see a bill, since all costs are paid directly by your employer's insurance company.

Your employer will arrange for medical care, usually by a specialist for the particular injury. If you want to change doctors, please ask your supervisor. (In addition, 30 days after reporting the injury you can be treated by a doctor of your choice. Or you can be treated by your own personal physician if you've notified your employer in writing before the injury. For further information, please contact your supervisor.)

- **Rehabilitation.** If the injury or illness prevents returning to your usual job, you may be eligible for vocational rehabilitation. If so, all costs are paid by your employer's insurance company.
- **Payment for Lost Wages.** Employees disabled by job injuries or illnesses receive tax-free income while unable to work. The payments are two-thirds of your average weekly pay, up to a maximum set by State law. (Payments are not made for the first three days, however, unless you're hospitalized or unable to work more than 21 days.)

Additional payments also will be made after recovery if the injury or illness results in a permanent handicap. If the injury or illness results in death, benefits will be paid to surviving dependents.

In The Event Of A Work Injury...

1. Be sure first aid is given.
2. See that the injured employee is taken to a doctor or hospital, if necessary.
3. Report every injury IMMEDIATELY to your supervisor. Any delay in reporting an accident may delay workers' compensation benefits.
4. If you have any questions about workers' compensation, please see your supervisor.

Emergency Telephone Numbers

Doctor

Police

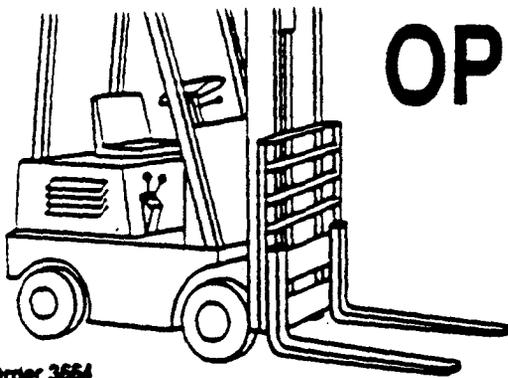
Hospital

Fire

Ambulance

Workers' Compensation Is Provided By

**NATIONAL UNION FIRE INSURANCE COMPANY
OF PITTSBURGH, PENNSYLVANIA
3699 Wilshire Boulevard
Los Angeles, California 90010
(213) 480-3400**



OPERATING RULES



Operating rules for industrial trucks through Register 85. A. Other rules may also apply to industrial trucks and industrial equipment. Office of the Division of Cal/OSHA Communication.

General Industry Safety Order 3654

Operating Rules

(a) Every employer using industrial trucks or industrial tow tractors, shall post and enforce a set of operating rules including the appropriate rules listed below:

(1) Only drivers authorized by the employer and trained in the safe operations of industrial trucks or industrial tow tractors shall be permitted to operate such vehicles. Methods shall be devised to train operators in safe operation of powered industrial trucks.

(2) Stunt driving and horseplay are prohibited.

(3) No riders shall be permitted on vehicles unless provided with adequate riding facilities.

(4) Employees shall not ride on the forks of lift trucks.

(5) Employees shall not place any part of their bodies outside the running lines of an industrial truck or between mast uprights or other parts of the truck where shear or crushing hazards exist.

(6) Employees shall not be allowed to stand, pass, or work under the elevated portion of any industrial truck, loaded or empty, unless it is effectively blocked to prevent it from falling.

(7) Drivers shall check the vehicle at least once per shift, and if it is found to be unsafe, the matter shall be reported immediately to a foreman or mechanic, and the vehicle shall not be put in service again until it has been made safe. Attention shall be given to the proper functioning of tires, horn, lights, battery, controller, brakes, steering mechanism, cooling system, and the lift system of fork lifts (forks, chains, cable, and lift switches).

(8) No truck shall be operated with a leak in the fuel system.

(9) Vehicles shall not exceed the authorized or safe speed, always maintaining a safe distance from other vehicles, keeping the truck under positive control at all times and all established traffic regulations shall be observed. For trucks traveling in the same direction, a safe distance may be considered to be approximately 3 truck lengths or preferably a time lapse—3 seconds—passing the same point.

(10) Trucks traveling in the same direction shall not be passed at intersections, blind spots, or dangerous locations.

(11) The driver shall slow down and sound the horn at cross aisles and other locations where vision is obstructed. If the load being carried obstructs forward view, the driver shall be required to travel with the load trailing.

(12) Operators shall look in the direction of travel and shall not move a vehicle until certain that all persons are in the clear.

(13) Trucks shall not be driven up to anyone standing in front of a bench or other fixed object of such size that the person could be caught between the truck and object.

(14) Grades shall be ascended or descended slowly.

(A) When ascending or descending grades in excess of 10 percent, loaded trucks shall be driven with the load upgrade.

(B) On all grades the load and load engaging means shall be tilted back if applicable, and raised only as far as necessary to clear the road surface.

(C) Motorized hand and hand/rider trucks shall be operated on all grades with the load-engaging means downgrade.

(15) The forks shall always be carried as low as possible, consistent with safe operations.

(16) When leaving a vehicle unattended, either:

(A) The power shall be shut off, brakes set, the mast brought to the vertical position, and forks left in the down position. When left on an incline, the wheels shall be blocked; or

(B) The power may remain on provided the brakes are set, the mast brought to the vertical position, forks are left in the down position, and the wheels shall be blocked, front and rear.

Note: When the operator is over 25 feet (7.6 meters) from or out of sight of the industrial truck, the vehicle is "unattended."

(17) When the operator of an industrial truck is dismounting within 25 feet (7.6 meters) of the truck which remains in the driver's view, the load engaging means shall be fully lowered, controls disengaged, and the brakes set to prevent movement.

(18) Vehicles shall not be run onto any elevator unless it is specifically authorized to do so. Before entering an elevator, the operator shall determine that the capacity of the elevator will not be exceeded. Once on an elevator, the power shall be shut off and the brakes set.

(19) Motorized hand trucks shall enter elevators or other areas with the load end forward.

(20) Vehicles shall not be operated on floors, sidewalk or platforms that will not safely support the loaded vehicle.

(21) Prior to driving onto trucks, trailers and railroad cars, the flooring shall be checked for breaks and other structural weaknesses.

(22) Vehicles shall not be driven in and out of highway truck trailers at loading docks until such trucks or trailers are securely latched or restrained and the brakes set.

(23) To prevent railroad cars from moving during loading and unloading operations, the car brakes shall be set, wheel chocks or other recognized positive stops used, and blue flags or lights displayed in accordance with applicable regulations promulgated by the Public Utilities Commission.

(24) The width of one tire on the powered industrial truck shall be the minimum distance maintained from the edge by the truck when on any elevated dock, platform, freight car or truck.

(25) Railroad tracks shall be crossed diagonally, wherever possible. Parking closer than 8-1/2 feet from the centerline of railroad tracks is prohibited.

(26) Trucks shall not be loaded in excess of their rated capacity.

(27) A loaded vehicle shall not be moved until the load is safely secured.

(28) Extreme care shall be taken when tilting loads. Tilting the load with the load engaging means elevated shall be prohibited except when picking up a load. Elevated loads shall not be tilted forward except when the load is being deposited onto a storage rack or equivalent. Stacking or tiering, backward tilt shall be limited to that necessary to stabilize the load.

(29) The load engaging device shall be placed in such a manner that the load will be securely held or supported.

(30) Special precautions shall be taken in the securing and unloading of loads by trucks equipped with attachments, and during the operation of these trucks after the loads have been removed.

(31) When powered industrial trucks are used to open and close doors, the following provisions shall be complied with:

(A) A device specifically designed for opening or closing doors shall be attached to the truck.

(B) The force applied by the device to the door shall be applied parallel to the direction of travel of the door.

(C) The entire door opening operation shall be in full view of the operator.

(D) The truck operator and other employees shall be clear of the area where the door might fall while being opened.

(32) If loads are lifted by two or more trucks working in unison, the total weight of the load shall not exceed the combined rated capacity of all trucks involved.

General Industry Safety Order 3657

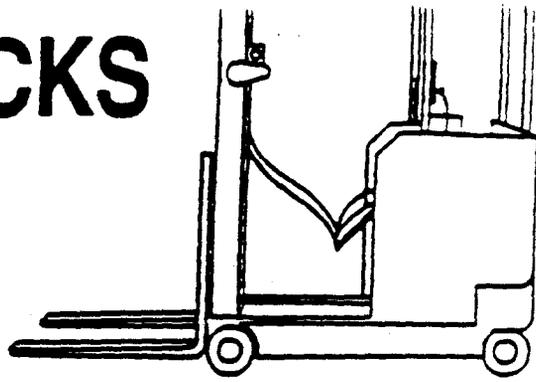
Elevating Employees With Lift Trucks

(a) When it is necessary to elevate employees using an industrial truck, the following shall be accomplished:

(1) The platform shall be of sufficient size, but not less than 24" (.61 meters x .61 meters) to accommodate the employee and material being elevated.

FOR INDUSTRIAL TRUCKS

Contents contained on this poster are current as of California Code of Regulations. Containing rules covering industrial safety and health are available from the nearest State Office of Industrial Safety and Health or by writing to Box 603, San Francisco, CA 94101.



(2) The platform shall be secured to the forks or mast to prevent tipping, slipping or falling.

(3) The platform shall meet the guardrail and toeboard requirements of Section 3210.

(4) The platform floor shall have no spaces or holes greater than one inch; and

(5) The platform floor shall have a slip resistant surface.

(b) Where a clearance restriction or the nature of the work prohibits the use of guardrails, a safety belt or harness with lanyard shall be used as described in Section 3656(e).

(c) Wherever the truck is operated under conditions which expose the operator to danger from falling objects, the truck shall be equipped with overhead protection.

(d) There shall be an operator in the control position on the truck while employees are on the elevated platform.

(e) Whenever a truck is equipped with vertical only, or vertical and horizontal controls elevatable with the lifting carriage or forks, means shall be provided whereby personnel on the platform can shut off the motive power of the truck.

(f) Means shall be provided to render inoperative all operating controls other than those on the elevatable platform when the controls on the elevatable platform have been selected for use. Only one location of controls shall be capable of being operated at one time.

(g) All bridge cranes or other moving or motorized equipment which could overrun or otherwise injure the elevated worker shall be shut down or locked out.

(h) Operating Rules Whenever Elevating Personnel. Before elevating personnel, employees shall be instructed to:

(1) Use a securely attached safety platform.

(2) Make sure the lifting mechanism is operating smoothly.

(3) Make sure that the mast is vertical. The mast shall not be tilted forward or rearward while persons are elevated.

(4) Place truck in neutral and set parking brake.

(5) Lift and lower smoothly and with caution.

(6) Watch for overhead obstructions.

(7) Keep hands and feet clear of controls other than those in use.

(8) Never travel with personnel on the work platform other than to make minor movements for final positioning of the platform.

General Industry Safety Order 3658

Operator Platforms

(a) Every end control, reach, narrow aisle and motorized hand/ride truck shall be equipped with an operator platform of sufficient size to contain the operator's feet within its periphery and strong enough to withstand a compression load equal to the weight of the loaded truck applied longitudinally against a flat vertical surface.

(b) When installed, operator enclosures shall not restrict movement to and from the operating position.

General Industry Safety Order 3659

Back Guards

(a) The side of the platform nearest the mast frame truss shall be guarded on every high-lift industrial truck where employees ride up or down. This guard shall consist of a substantial frame covered with 1/2 inch expanded metal, laminated safety glass, or equivalent providing effective guarding to a height of 7 feet.

(b) If the type of load presents a hazard, high-lift industrial trucks shall be equipped with a load backrest extension high enough to reach the center of the top row of the maximum height load handled or other positive means acceptable to the Division shall be used to prevent parts of the load falling onto the operator or into the operator's compartment. The openings shall not be greater than the smallest parcel carried.

General Industry Safety Order 3660

Rated Capacity

(a) The rated capacity of all industrial lift trucks and tractors shall be displayed at all times on the vehicle in such a location that it is readily visible to the operator.

(b) Industrial lift trucks and industrial tractors equipped with a load capacity indicator shall not be loaded beyond their designated capacity.

General Industry Safety Order 3661

Brakes and Warning Devices

(a) Every industrial truck and tractor shall be equipped with one or more effective devices adequate to bring the vehicle to a safe stop while fully loaded.

(b) Every industrial truck and tractor shall be equipped with a parking brake or other effective device to prevent the vehicle from moving when unattended.

(c) Every industrial truck and industrial tow tractor, except those operated by a walking operator, shall be equipped with a warning horn, whistle, gong, or other device which can be heard above the normal industrial noises in the places of employment.

General Industry Safety Order 3662

Internal Combustion Engines

Internal combustion engine-driven equipment shall be operated only in open areas or outside of buildings or enclosed structures, only when such operation will not result in harmful exposure to concentrations of dangerous gases or fumes. (See Section 5146.)

General Industry Safety Order 3663

Maintenance of Industrial Trucks

(a) Industrial truck repair operations involving open flames or other sources of ignition shall not be performed in Class I, II and III locations, unless and until tests show that a maximum concentration of flammable or combustible vapors does not exceed 20 percent L.E.L. of such flammable or combustible material and until precautions are taken to maintain the atmosphere at or below 20 percent L.E.L. Such precautions could include, but not be limited to, removal of flammable material, provision for adequate ventilation.

(b) Water mufflers shall be filled daily or as frequently as is necessary to prevent depletion of the supply of water below 75 percent of rated capacity. Vehicles with mufflers having screens or other parts which may become clogged shall not be operated while such screens or parts are clogged. Any vehicle that emits hazardous sparks or flames from the exhaust system shall immediately be removed from service, and returned to service until the cause for the emission of such sparks or flames has been eliminated.

(c) Industrial trucks shall be kept in a clean condition free of dirt, oil, and grease.

(d) Batteries on all powered trucks shall be disconnected before repairs to the primary electrical system unless power is necessary for testing and repair. On trucks equipped with systems capable of storing residual energy, that energy shall be safely discharged before work on the primary electrical system begins.

(e) Replacement parts for industrial trucks shall be equivalent to the original parts.

(f) Those repairs to the fuel and ignition systems of industrial trucks which involve fire hazards shall be conducted only in locations designated as safe for such repairs.

AFFIRMATIVE ACTION PROGRAM HANDICAPPED INDIVIDUALS AND VETERANS OF THE VIETNAM ERA

IT Corporation complies with Section 503 of the Rehabilitation Act of 1973, which requires affirmative action to employ and advance in employment qualified handicapped individuals. IT Corporation also complies with Section 402 of the Vietnam Era Veterans Readjustment Assistance Act of 1974, which requires affirmative action to employ and advance in employment qualified disabled veterans and veterans of the Vietnam Era. If you have a handicap, or are disabled veteran covered by this Program, and would like to be considered under our Affirmative Action Program, please tell us. Submission of this information is voluntary and your refusal to provide it will not cause you to be subjected to discharge or other disciplinary treatment. Information obtained concerning your handicap or status as a disabled veteran will be kept confidential, except that: (i) supervisors and managers may be informed regarding necessary restrictions on your work or duties as a result of your handicap or disabled status, and regarding necessary accommodations; (ii) first aid personnel may be informed, when and to the extent appropriate, if your condition might require emergency treatment; and (iii) government officials investigating compliance with either of the above-mentioned Acts shall be informed. If you are a disabled veteran or are otherwise handicapped, we would like to include you under our Affirmative Action Program. It would assist us if you would tell us about (1) any special methods, skills and procedures which qualify you for positions which you might otherwise not be able to do because of your handicap or disability, and (2) any accommodations that we could make to enable you to perform any job properly and safely, including special equipment, changes in the physical layout of the job, elimination of certain duties relating to the job, or other accommodations. Any employee or applicant upon request may review our Affirmative Action Program during business hours in the Human Resources Department.

If you are a handicapped person, disabled veteran, or veteran of the Vietnam Era, you should know that, whether an employee or applicant for employment, you are protected from coercion, intimidation, interference, or discrimination for filing any complaint or assisting in any investigation under the Rehabilitation Act of 1973 or the Vietnam Era Veterans Readjustment and Assistance Act.

Human Resources Department
March 1993

NOTICE

ON THE JOB INJURIES

Report all injuries immediately to your foreman or supervisor.

Authorization for medical treatment must be obtained from your employer.

ORDER 4-89
 Title 8, California
 Code of Regulations
 Section 11049
 Replaces former Order 4-88,
 incorporating changes contained
 in WFC Order MW-88
 Effective July 1, 1989

Please Post With This Side Showing

OFFICIAL NOTICE



INDUSTRIAL WELFARE COMMISSION ORDER NO. 4-89, REGULATING

WAGES, HOURS, AND WORKING CONDITIONS IN PROFESSIONAL, TECHNICAL, CLERICAL, MECHANICAL, AND SIMILAR OCCUPATIONS

TAKE NOTICE: The Industrial Welfare Commission (IWC) of the State of California, having proceeded in accord with the authority vested in it by Labor Code Sections 1171 through 1204 and Article 14, Section 1 of the Constitution of the State of California, reviewed certain sections of Order 4-88 for the Professional, Technical, Clerical, Mechanical, and Similar Occupations for the purpose of amending Section 1, Applicability, and Section 3, Hours and Days of Work. The IWC held investigative hearings, called a wage board, held public hearings on proposed language to amend these sections, and considered all written materials and information submitted prior to adopting its amendments to Sections 1 and 3 of Order 4-88. In printing this order, the IWC incorporated the amendments made by IWC Order No. MW-88 to Section 4, Minimum Wages, and Section 10, Meals and Lodging.

This order also incorporates the nonsubstantive revisions previously made in accord with the statewide review mandated by Government Code Section 11340 and reflected in the provisions of Title 8 of the California Code of Regulations, Section 11049. Because of the amendments and changes to Order 4-88 described above and for purposes of clarity in this printing, the IWC renumbered Order 4-88 to Order 4-89.

1. APPLICABILITY OF ORDER

This Order shall apply to all persons employed in professional, technical, clerical, mechanical, and similar occupations whether paid on a time, piece rate, commission, or other basis, unless such occupation is performed in an industry covered by an industry order of this Commission, except that:

(A) Provisions of Sections 3 through 12 shall not apply to persons employed in administrative, executive, or professional capacities. No person shall be considered to be employed in an administrative, executive, or professional capacity unless one of the following conditions prevails:

ployee is suffered or permitted to work, whether or not required to do so.
 (I) "Minor" means, for the purpose of this Order, any person under the age of eighteen (18) years.

(J) "Outside Salesperson" means any person, 18 years of age or over, who customarily and regularly works more than half the working time away from the employer's place of business selling tangible or intangible items or obtaining orders or contracts for products, services or use of facilities.

(K) "Primarily" as used in Section 1, Applicability, means more than one half the employee's work time.

(L) "Split shift" means a work schedule which is interrupted by non-paid non-working periods established by the employer, other than bona fide rest or meal periods.

(M) "Teaching" means, for the purpose of Section 1 of this Order, the profession of teaching under a certificate from the Commission for Teacher Preparation and Licensing or teaching in an accredited college or university.

(N) "Wages" [See California Labor Code, Section 200]

(O) "Workday" means any consecutive 24 hours beginning at the same time each calendar day.

(P) "Workweek" means any seven (7) consecutive days starting with the same calendar day each week. "Workweek" is a fixed and regularly recurring period of 168 hours, seven (7) consecutive 24 hour periods.

3. HOURS AND DAYS OF WORK

(A) The following overtime provisions are applicable to employees eighteen (18) years of age or over and to employees sixteen (16) years of age or over who are not minors:

may consist of an individual employee as long as the criteria for identifiable work unit in this subsection are met.

(C) Provisions of subsections (A) and (B) above shall not apply to any employee whose earnings exceed one and one half (1 1/2) times the minimum wage if more than half (1/2) of that employee's compensation represents commissions.

(D) One and one half (1 1/2) times a minor's regular rate of pay shall be paid for all work over forty (40) hours in any workweek except that non-minors (18) and seven-year-olds (17) years old who are not required to attend school and may function be employed for the same time as an adult are subject to subsections (A) or (B) above.

(VIOLATIONS OF CHILD LABOR LAWS are subject to civil penalties of \$100 to \$5,000 as well as criminal penalties provided hereby. Refer to California Labor Code Sections 1295 to 1311 and 1290 to 1298 for additional restrictions on the employment of minors. Employees should ask school officials about required work permits.)

(E) An employee may be employed on seven (7) workdays in a workweek with no overtime pay required when the total hours of employment during such workweek do not exceed thirty (30) and the total hours of employment in any one workday thereof do not exceed six (6).

(F) If a meal period occurs on a shift beginning or ending at or between the hours of 10 p.m. and 6 a.m., facilities shall be available for eating hot food or drink or for heating food or drink and a suitable cleaned place shall be provided in which to consume such food or drink.

(G) Except as provided in subsections (I), (J) and (K), this order shall not apply to any employee covered by a collective bargaining agreement if said agreement provides for a different overtime rate.

and independent judgment, and for which the remuneration is not less than \$1100 per month; or

(2) The employee is licensed or certified by the State of California and is engaged in the practice of one of the following recognized professions: law, medicine, dentistry, pharmacy, optometry, architecture, engineering, teaching, or accounting, or is engaged in an occupation commonly recognized as a learned or artistic profession; provided, however, that registered nurses shall not be considered to be exempt professional employees for the purposes of this subsection (2) of this order, unless they individually meet the administrative, executive, or professional criteria described in subsection (A) (f) above.

(B) The provisions of this Order shall not apply to employees directly employed by the State or any county, incorporated city or town or other municipal corporation, or to outside salespersons.

(C) Provisions of this Order shall not apply to any individual who is the parent, spouse, child, or legally adopted child of the employer.

2. DEFINITIONS

(A) "Commissioner" means the Industrial Welfare Commission of the State of California.

(B) "Division" means the Division of Labor Standards Enforcement of the State of California.

(C) "Professional, Technical, Clerical, Mechanical, and Similar Occupations" includes professional, semiprofessional, managerial, supervisory, laboratory, research, technical, clerical, office work, and mechanical occupations. Said occupations shall include, but not be limited to the following: accountants; agents; appraisers; artists; attendants; audio-visual technicians; bookkeepers; bundlers; billposters; carriers; clerks; cashiers; checkers; clerks; collectors; communications and sound technicians; compilers; copy holders; copy readers; copy writers; computer programmers and operators; demonstrators and display representatives; dispatchers; distributors; door-keepers; drafters; elevator operators; estimators; editors; graphic arts technicians; guards; guides; hosts; inspectors; installers; instructors; interviewers; investigators; librarians; laboratory workers; machine operators; mechanics; messengers; singers; medical and dental technicians and technologists; models; nurses; packagers; photographers; parlers and cleaners; process servers; printers; proof readers; salespersons and sales agents; secretaries; sign Erectors; sign painters; social workers; collectors; stationers; stenographers; teachers; telephone, radio-telephone, telegraph and call out operators; tellers; ticket agents; tracers; typists; vehicle operators; x-ray technicians; their assistants and other related occupations listed as professional, semiprofessional, technical, clerical, mechanical, and kindred occupations.

(D) "Emergency" means an unpredictable or unavoidable occurrence at uncheduled intervals requiring immediate action.

(E) "Employ" means to engage, suffer, or permit to work.

(F) "Employee" means any person employed by an employer.

(G) "Employer" means any person as defined in Section 16 of the Labor Code, who directly or indirectly, or through an agent or any other person, employs or exercises control over the wages, hours, or working conditions of any person.

(H) "Hours worked" means the time during which the employee is engaged in the performance of his or her duties, whether or not the employee is actually working.

employee receives one and one-half (1 1/2) times such employee's regular rate of pay for all hours worked over forty (40) hours in the workweek. Employment beyond eight (8) hours in any workday or more than six (6) days in any workweek is permissible provided the employee is compensated for such overtime at not less than:

(1) One and one-half (1 1/2) times the employee's regular rate of pay for all hours worked in excess of eight (8) hours up to and including twelve (12) hours in any workday, and for the first eight (8) hours worked on the seventh (7th) day of work; and

(2) Double the employee's regular rate of pay for all hours worked in excess of twelve (12) hours in any workday and for all hours worked in excess of eight (8) hours on the seventh (7th) day of work in any workweek.

(B) No employer shall be deemed to have violated the provisions of this Section 3, Hours and Days of Work, by instituting, pursuant to a written agreement voluntarily executed by the employer and by at least two-thirds (2/3) of the employees in the affected work unit following a secret ballot and before the performance of the work, a regularly scheduled week of work consisting of such hours and days as shall be agreed upon consistent with both of the following provisions: the premium wage rate provisions of one and one-half (1 1/2) times the employee's regular rate of pay shall apply to all hours worked in any workday in excess of the regularly scheduled hours established by the agreement for that workday up to twelve (12) hours a workday, or to all hours worked in excess of 40 hours per week; and the premium wage rate provisions of double the employee's regular rate of pay shall apply to all hours worked in excess of twelve (12) hours per day and to all hours worked in excess of eight (8) hours on those days worked beyond the regularly scheduled number of workdays in the written agreement.

(1) Prior to the secret ballot vote, any employer who proposes to institute an alternative schedule shall make a disclosure in writing to the affected employees, including the effects of the proposed schedule on the employees' wages, hours, and benefits. Such a disclosure shall include meetings duly noticed for the specific purpose of discussing the effects of alternative scheduling. Failure to comply with this section shall make the election null and void.

(2) Any employer who institutes a regularly scheduled week of work pursuant to this subsection shall make a reasonable effort to find an alternative work assignment for any employee who participated in the vote which authorized the schedule and is unable or unwilling to work it. An employer shall not be required to offer an alternative work assignment to an employee if an alternative work assignment is not available or if the employee was hired after the adoption of the alternative schedule.

(3) After a lapse of twelve (12) months and upon petition of one-third (1/3) of the affected employees, a new vote by secret ballot shall be held and a two-thirds (2/3) vote of the affected employees will be required to revoke the agreement above. If such agreement is revoked the employer shall comply within 90 days. Upon a proper showing by the employer of undue hardship, the Division may grant an extension of time for compliance.

(4) For purposes of Section 3(B), affected employees must be

ment of Transportation Code of Federal Regulations, Title 49, sections 395.1 to 395.13, Hours of Service of Drivers, or (2) Title 13 of the California Code of Regulations, Subchapter 6.5, section 1200 and following sections, regulating hours of drivers.

(1) No employee shall be terminated or otherwise disciplined for refusing to work more than 72 hours in any workweek, except in an emergency as defined in Section 2(D).

4. MINIMUM WAGES

(A) Every employer shall pay to each employee wages not less than four dollars and twenty five cents (\$4.25) per hour for all hours worked, effective July 1, 1988, except:

(1) LEARNERS Employees 18 years of age or over, during their first one hundred and sixty (160) hours of employment in occupations in which they have no previous similar or related experience, may be paid not less than eighty five percent (85%) of the minimum wage rounded to the nearest nickel.

(2) MINORS may be paid not less than eighty five percent (85%) of the minimum wage rounded to the nearest nickel provided that the number of minors employed at said lesser rate shall not exceed twenty five percent (25%) of the persons regularly employed in the establishment. An employer of less than ten (10) persons may employ three (3) minors at said lesser rate. The twenty five percent (25%) limitation on the employment of minors shall not apply during school vacations.

NOTE: Under certain conditions, the full minimum wage may be required for minors. See Labor Code Section 1391.2 (b).

(B) Every employer shall pay to each employee, on the established payday for the period involved, not less than the applicable minimum wage for all hours worked in the payroll period, whether the remuneration is measured by time, piece, commission, or otherwise.

(C) When an employee works a split shift, one hour's pay at the minimum wage shall be paid in addition to the minimum wage for that work day, except when the employee resides at the place of employment.

(D) The provisions of this section shall not apply to apprentices being duly indentured under the State Division of Apprenticeship Standards.

5. REPORTING TIME PAY

(A) Each workday an employee is required to report for work and does not report, but is not put to work or is furnished less than half said employee's usual or scheduled day's work, the employer shall be paid for half the usual or scheduled day's work, but in no event for less than two (2) hours nor more than four (4) hours, at the employee's regular rate of pay, which shall not be less than the minimum wage.

(B) If an employee is required to report for work a second time in any one workday and is furnished less than two hours of work on the second reporting, said employee shall be paid for two hours at the employee's regular rate of pay which shall not be less than the minimum wage.

(C) The foregoing reporting time pay provisions are not applicable when:

(1) Operations report comes

cause not within the employer's control.

(D) This section shall not apply to an employee on paid standby status who is called to perform assigned work at a time other than the employee's scheduled reporting time.

6. LICENSES FOR HANDICAPPED WORKERS

A license may be issued by the Division authorizing employment of a person whose earning capacity is impaired by physical disability or mental deficiency at less than the minimum wage. Such licenses shall be granted only upon joint application of employer and employee and employee's representative if any.

A special license may be issued to a nonprofit organization such as a sheltered workshop or rehabilitation facility fixing special minimum rates to enable the employment of such persons without requiring individual licenses of such employees.

All such licenses and special licenses shall be renewed on a yearly basis or more frequently at the discretion of the Division.

(See California Labor Code, Sections 1191 and 1191.5)

7. RECORDS

(A) Every employer shall keep accurate information with respect to each employee including the following:

- (1) Full name, home address, occupation and social security number.
- (2) Birthdate, if under 18 years, and designation as a minor.
- (3) Time records showing when the employee begins and ends each work period. Meal periods, split shift intervals and total daily hours worked shall also be recorded. Meal periods during which operations cease and authorized rest periods need not be recorded.
- (4) Total wages paid each payroll period, including value of board, lodging, or other compensation actually furnished to the employee.
- (5) Total hours worked in the payroll period and applicable rates of pay. This information shall be made readily available to the employee upon reasonable request.
- (6) When a piece rate or incentive plan is in operation, piece rates or an explanation of the incentive plan formula shall be provided to employees. An accurate production record shall be maintained by the employer.
- (7) Every employer shall semiannually or at the time of each payment of wages furnish each employee, either as a detachable part of the check, draft, or voucher paying the employee's wages, or separately, an itemized statement in writing showing: (1) all deductions; (2) the inclusive dates of the period for which the employee is paid; (3) the name of the employee or the employee's social security number; and (4) the name of the employer, provided all deductions made on written orders of the employee may be aggregated and shown as one item.

(C) All required records shall be in the English language and in ink or other indelible form, properly dated, showing month, day and year, and shall be kept on file by the employer for at least three years at the place of employment or at a central location within the State of California. An employee's records shall be available for inspection by the employee

Room shared	\$ 10.00 per week
Apartment— two-thirds (2/3) of the ordinary rental value, and in no event more than	\$ 240.00 per month
Where a couple are both employed by the employer, two-thirds (2/3) of the ordinary rental value, and in no event more than	\$ 255.00 per month
Meals:	
Breakfast	\$ 1.00
Lunch	\$ 2.00
Dinner	\$ 2.00

(C) Meals evaluated as part of the minimum wage must be bona fide meals consistent with the employee's work shift. Deductions shall not be made for meals not received nor lodging not used.

(D) If, as a condition of employment, the employee must live at the place of employment or occupy quarters owned or under the control of the employer, then the employer may not charge rent in excess of the values listed herein.

11. MEAL PERIODS

(A) No employer shall employ any person for a work period of more than five (5) hours without a meal period of not less than thirty (30) minutes, except that when a work period of not more than six (6) hours will complete the day's work the meal period may be waived by mutual consent of employer and employee. Unless the employee is relieved of all duty during a thirty (30) minute meal period, the meal period shall be considered an "on duty" meal period and counted as time worked. An "on duty" meal period shall be permitted only when the nature of the work prevents an employee from being relieved of all duty and when by written agreement between the parties an on-the-job paid meal period is agreed to.

(B) In all places of employment where employees are required to eat on the premises, a suitable place for that purpose shall be designated.

12. REST PERIODS

Every employer shall authorize and permit all employees to take rest periods, which insofar as practicable shall be in the middle of each work period. The authorized rest period time shall be based on the total hours worked daily at the rate of ten (10) minutes rest time per hour (4) hours or major fraction thereof.

However, a rest period need not be authorized for employees whose total daily work time is less than three and one-half (3 1/2) hours. Authorized rest period time shall be counted as hours worked for which there shall be no deduction from wages.

13. CHANGE ROOMS AND RESTING FACILITIES

(A) Employers shall provide suitable lockers, closets, or equivalent for the safekeeping of employees' outer clothing during working hours, and when required, for their work clothing during nonworking hours. When the occupation requires a change of clothing, change rooms or equivalent space shall be provided in order that employees may change their clothing in reasonable privacy and comfort. These rooms or spaces may be adjacent to but shall be separate from toilet rooms and shall be

21. SEPARABILITY

If the application of any provision of this Order, or any section, subdivision, sentence, clause, phrase, word, or portion of this Order should be held invalid or unconstitutional or unauthorized or prohibited by statute, the remaining provisions thereof shall not be affected thereby, but shall continue to be given full force and effect as if the part so held invalid or unconstitutional had not been included herein.

22. POSTING OF ORDER

Every employer shall keep a copy of this Order posted in an area frequently queried by employees where it may be easily read during the work day. Where the location of work or other conditions make this impractical, every employer shall keep a copy of this Order and make it available to every employee upon request.

Order 4-88 becomes effective on July 1, 1989. The provisions of Order 4-88 remain in full force and effect until the date this order becomes effective. NWC Order MW 88 remains in full force and effect and its amendments to Order 4-88 will be incorporated in this Order 4-88 on July 1, 1989. The provisions of Order 4-88 which were not amended are carried forward as part of Order 4-88.

Dated September 23, 1988 at San Francisco, California
INDUSTRIAL WELFARE COMMISSION
STATE OF CALIFORNIA

Lynell Puffer, Chairperson
Muel Merse David Padilla
Michael Callahan James Pludo

QUESTIONS ABOUT ENFORCEMENT of the Industrial Welfare Commission orders and reports of violations should be directed to the Division of Labor Standards Enforcement. Consult the white pages of your telephone directory under CALIFORNIA, State of, Industrial Relations for the address and telephone number of the office nearest you. The Division has offices in the following cities: Berkeley, El Centro, Eureka, Fresno, Hollywood, Inglewood, Long Beach, Los Angeles, Marysville, Napa, Oakland, Pomona, Redding, Sacramento, Salinas, San Bernardino, San Diego, San Francisco, San Jose, San Mateo, San Rafael, Santa Ana, Santa Barbara, Santa Monica, Santa Rosa, Stockton, Van Nuys, Van Nuys, Walnut

SUMMARIES IN OTHER LANGUAGES

The Department of Industrial Relations will make summaries of wages and hour requirements in this Order available in Spanish, Chinese and other languages when it is feasible to do so. If you request for such summaries to the Department at P.O. Box 602, San Francisco, CA 94101.

RESUMEN EN OTROS IDIOMAS

El Departamento de Relaciones Industriales proporcionará un resumen de los requisitos de salarios y horas de este Decreto en español, chino y otros idiomas cuando sea posible hacer lo. Para más detalles o pedir el resumen de Departamento a P.O. Box 602, San Francisco, CA 94101.

STATEMENT AS TO THE BASIS UPON WHICH INDUSTRIAL WELFARE COMMISSION ORDER NO. 4-89 REGULATING WAGES, HOURS, AND WORKING CONDITIONS IN PROFESSIONAL, TECHNICAL, CLERICAL, MECHANICAL, AND SIMILAR OCCUPATIONS IS PREDICATED

The Industrial Welfare Commission's (IWC) legal authority for promulgating and enforcing this order are set forth under the heading "Take Notice." The IWC offers the following statement as to the basis for the various sections of this order:

1. APPLICABILITY

This section provides, in part, that employees employed in executive and administrative capacities are exempt from Sections 2 through 12 of this order if they meet two tests: (1) duties appropriate to such capacity, and (2) a specified remuneration. These are appropriate and well-established criteria for determining whether a person designated as an executive or administrator should be protected by the minimum standards in the order, most significantly by the requirement for premium pay for overtime work. For this reason, when the IWC began its investigation of overtime issues, it included Section 1, Applicability, in that review.

The IWC rejected the California Hospital Association's (CHA) position in regard to all of the IWC Orders by adopting new standards that more closely resemble the federal rules for the executive and administrative exemption, including a standard for "primary" duties. The IWC resorted to identical position that it preferred the term "primary" to "primary" because the former afforded employees greater protection. Additionally, "primary" was defined in a way to assist enforcement, and changing to the federal standard would create no new problems for enforcement staff. The IWC also rejected CHA's request to adopt a "high salary provision" which would exempt certain employees paid very high salaries regardless of duties or responsibilities. The salary levels suggested by CHA would automatically exempt many overtime eligible employees, such as nurses, and the IWC wanted to continue protecting such employees unless duties or responsibilities clearly indicated that an exemption was in order.

While employer representatives on three wage boards were unopposed in their attempts to convince their colleagues to recommend adoption of language similar to that requested by CHA, the majority of each wage board recommended that the IWC adopt a proposal to increase the specified remuneration caused by the same percentage as any minimum wage increase. The IWC recognized that this recommendation was reasonable and proposed language which would apply to employees covered by all of the order under review, including this one. The IWC received testimony during the public hearing process which led it to conclude that the contractual relationship between the amount of minimum wage and the amount of the remuneration specified in Section 1, which added upon the promulgation of the 1983 Order, was more and should be maintained.

but was not limited to, a critical nursing shortage that placed more demands than ever on nurses, the IWC concluded that registered nurses still needed its protection and adopted language which clearly did not exclude nurses in a categorical professional exemption under subsection (2), but allowed nurses to be exempt as administrators, executives, or professionals if they individually met the criteria for an exemption under subsection (1).

This section of the statement as to the basis of Section 3 was reviewed as changes adopted on September 21, 1988. The statements as to the basis for the remaining parts of this section are contained in prior printings of this order. These parts have not changed, and there is no need for an explanation because the IWC is continuing in effect regulations that have previously become a part of the standard working conditions for employees in this state. The IWC received no compelling evidence and concluded that there was no rationale to warrant making any other changes in this section.

2. DEFINITIONS

The wage board for this industry generally accepted definitions as they stood in the 1978 order. Several wage boards asked the IWC to insert the definition for "primary." The IWC found that the substance of the definition proposed was in accord with the Division's established administrative policy that an employee who spends as much as half his or her work time performing the tasks of non-exempt employees is covered by this order.

The IWC received no compelling evidence, and concluded there was no rationale to warrant making any other changes in the provisions of this section, except in the list of occupations covered in subsection (C). This list was revised when the IWC defined the scope of the occupations to be considered by the wage board to reflect technological changes since it was last compiled, and it was approved unanimously by the wage board. Subsection (D), defining "emergency," was inserted because the word is used in a subsection (F) in the section on Hours and Days of Work. It is the same definition that has been used in IWC Order 15, and the IWC had no compelling evidence to justify changing it.

3. HOURS AND DAYS OF WORK

During the investigative phase of its overtime review, the IWC heard and read testimony which suggested that some employees and employers wanted the opportunity to implement work schedules which could be used as alternatives to the 8-hour day within a 48-hour week. This testimony indicated that the IWC regulations requiring premium pay after eight hours a day did not provide enough flexibility, and that the "top ten" work schedule, permitted since 1978, was not

adequate. A regularly scheduled week of work should exist over a period of time, and the language permitting a new secret ballot vote to be held only after one year confirmed this. The IWC intended that alternative schedules could include different professional alternating schedules during designated periods, for example, peak periods of work due to seasonal or holiday schedules or regular alternating schedules as long as these schedules were included as part of the original agreement associated by the State of the employees in the affected work unit following a secret ballot and before the performance of work. Finally, the IWC stated it intended for alternative schedules to be defined in terms of a certain number of hours and days in a week of work, but persons on alternative schedules did not necessarily have to work on the same specific day during each week of work.

The section of the statement as to the basis of Section 3 was reviewed as changes adopted on September 21, 1988. The statements as to the basis for the remaining parts of this section are contained in prior printings of this order. These parts have not changed, and there is no need for an explanation because the IWC is continuing in effect regulations that have previously become a part of the standard working conditions for employees in this state. The IWC received no compelling evidence and concluded that there was no rationale to warrant making any other changes in this section.

The IWC considered all of the information it received during the entire course of its overtime review and indicated that although it was not yet ready to endorse the straight 48-hour approach contained in the Fair Labor Standards Act, it did recognize that special changes demanded greater scheduling flexibility than currently permitted under the IWC order so that employees and employers could work together for the benefit of both. The IWC acknowledged that the 8-hour day was no longer the only acceptable standard in California as shown by the acceptance of the "top ten" workweek, the language recommended by the wage board for Order 18, the provision contained in Order 15 to allow persons working in 12-hour hospitals to work up to 12 hours a day at straight time pay, the "one eighth" plan in place for Los Angeles city employees, and various other alternative workweek available to employees in the public sector.

On September 22, 1988, the IWC concluded its overtime review, as it pertained to this section of its order, by adopting the language contained in its original proposal with minor modifications. The modified language contained both an exemption, including but not limited to a regularly scheduled week of work, a two day work week for affected employees, a secret ballot election, a written disclosure requirement, and a reasonable

schedule. "A regularly scheduled week of work" should exist over a period of time, and the language permitting a new secret ballot vote to be held only after one year confirmed this. The IWC intended that alternative schedules could include different professional alternating schedules during designated periods, for example, peak periods of work due to seasonal or holiday schedules or regular alternating schedules as long as these schedules were included as part of the original agreement associated by the State of the employees in the affected work unit following a secret ballot and before the performance of work. Finally, the IWC stated it intended for alternative schedules to be defined in terms of a certain number of hours and days in a week of work, but persons on alternative schedules did not necessarily have to work on the same specific day during each week of work.

The section of the statement as to the basis of Section 4 was reviewed as changes adopted on September 21, 1988. The statements as to the basis for the remaining parts of this section are contained in prior printings of this order. These parts have not changed, and there is no need for an explanation because the IWC is continuing in effect regulations that have previously become a part of the standard working conditions for employees in this state. The IWC received no compelling evidence and concluded that there was no rationale to warrant making any other changes in this section.

4. MINIMUM WAGES

The IWC examined the minimum wage in the context of a wage adequate to supply the necessary cost of proper living to, and maintain the health and welfare of an employee in California, while considering the large wage increase provided in the Cal State 1975 Ch 1087, sec. 11, which provides "in the interest of the people of the State in enacting this act that the Industrial Welfare Commission interpret these provisions [amendments to the Labor Code, including but not limited to sections 1172, 1173, and 1174.5] in a manner which does not cause undue hardship and loss of employment opportunities in any segment of industry in California."

During the early stages of its minimum wage review, the IWC studied historic, demographic, statistical and economic data and testimony and reports presented prior to and in connection with law investigations in large testimony and data from employee representatives, including the California Labor Federation, who stated that an increase was necessary to offset the decline in purchasing power since the last increase in 1981 and to adjust for overall increased inflation. The evidence stated that an increase in the minimum

wage was certainly in order with the belief that too significant an increase could harm employees by contributing to a decrease in their employment opportunities. On September 11, 1987, the IWC proposed to increase the minimum wage to \$4.00 per hour, an amount which falls well within the upper and lower limits of the range of suggested rates, as well as an amount considered reasonable, relative to all of the evidence before the IWC.

The IWC cited its authority to set overtime the minimum wage often enough has passed to measure the economic effects of any increase and then evaluate the need for any further change of that type.

The IWC held three public hearings on its minimum wage proposals. Advocates representing unions, neighborhood organizations, and other groups of nearly urban workers urged a "real" minimum wage of at least \$5.00 an hour. These groups also expressed concern for families of minimum wage earners and pointed out that \$4.00 per hour, or \$8000 per year, was still below the poverty level for a family of three. If a player contended that the minimum wage was established to support an individual, not an entire household, the IWC also studied additional information which indicated that some economic models may have overestimated the negative effects attributed to an increase in the minimum wage and that previous projections of job losses resulting from an increase may have been too high. The IWC also received an early copy of the Industrial Areas Foundation National's Southern California which showed that urban business appeared any increase in the minimum wage, others who supported a substantial increase.

The IWC reconsidered all of the information it received during the entire course of its minimum wage review. It re-evaluated the reasons for its original \$4.00 proposal and concluded that while raising the wage was warranted, the justification for such a rate would not have as great an impact on unemployment as previously assumed by employers and that some employees may support an increase above \$4.00 per hour. In doing so, it had to ensure the IWC, maintaining the fact that historically it had always based on a single individual as received in a family unit to determine the effects of the minimum wage and concluded that the minimum wage in the wage necessary to support the cost of proper living for a single worker and not intended to support a family nor support public assistance programs. The IWC

\$1100 per month, proportional to the most recent increase in the minimum wage, as well as proportional to other recent increases made by the NWC with respect to the meals and lodging credits.

During its overtime investigation the NWC learned that the professional exemption, as distinct from the administrative or executive exemption contained in the NWC Order, was the restrictive barrier as it did not recognize the constant and technological changes that have occurred and will occur in years to come. Emerging occupations, such as those in the fields of science and high technology, and other occupations requiring advanced knowledge, the exercise of discretion and independent judgment and/or invention, imagination or talent in a recognized field of artistic endeavor, which exempt under federal law, rarely, if ever, qualified for a professional exemption under the NWC Order. Testimony indicated that this differentiation generated confusion and resulted in disadvantages both to employees and employers. The NWC also received information about enforcement problems due to the fact that there was very little flexibility in interpretation and/or enforcement of professional exemptions based on actual duties and responsibilities. In response to these concerns, and based upon evidence received in the CNA petition, written materials, and oral and written public testimony, the NWC decided that the professional exemption relied too much on education. Consequently, the NWC proposed language which would add persons engaged in an occupation commonly recognized as a "learned or artistic" profession to the broad language which would eliminate the need for the NWC to modify the list (as it did to add pharmacists in 1979) each time it wished to recognize a new group as professionals, because it would allow enforcement staff to consider individual situations and actual duties when applying the exemption. The language also would permit, but would not be limited to, use of the federal guidelines for purposes of interpretation.

With respect to an exemption for nurses as professionals, the NWC received testimony from the California Association of Hospitals and Health Systems (formerly the California Hospital Association) and individual nurses who urged the NWC to recognize nurses as professionals because they are considered professionals under the FLRA and professional status is consistent with the true nature of nurses' duties and responsibilities. On the other hand, the California Nurses Association (CNA) strongly opposed any modification of the applicability section which would exempt nurses "as a class" of professionals to which would preclude nurses from an exemption based on the other factors in subsection (1). Instead, CNA argued, each professional exemption should be covered individually, and decisions regarding professional status for registered nurses should depend on actual duties and responsibilities. The NWC heard and read testimony which indicated that professional recognition and a professional exemption under the NWC Order were not synonymous. CNA testified that as long as employers fail to provide registered nurses with the rights and privileges generally conferred on a professional, i.e., consistent exercise of discretion and independent judgment, control over one's practice, and full integration in the decision making process, professional recognition and a professional exemption will remain mutually exclusive. Based on the evidence presented which also included,

caption from daily overtime up to 12 hours a week with a 48 hour workweek. The North American Association of Inventory Services petitioned for an exemption for persons working less than 48 hours per week, with overtime pay after 48 hours at either the state or federal premium rate, whichever is higher. The California Teamsters Public Affairs Council (Teamsters) submitted a petition requesting amendment of the NWC Order by providing certain additional protective conditions whenever an alternative workweek arrangement is allowed.

The wage board for Order 4-88 discussed amending Section 2 to delete the requirement that premium overtime compensation be paid for hours worked in excess of eight but less than 12 in any workday. A simple majority of the wage board suggested that the NWC modify the "four day" workweek to allow employees to work four 8 hour days and one 4 hour day a week so long as certain protective provisions were provided. Since this recommendation was not supported by at least two thirds of the members of the wage board, the NWC was not required under Labor Code Section 1162 to adopt it, and chose not to. The NWC noted, however, the wage board's discussion suggested that flexibility under protective conditions was desirable for persons covered by Order 4, and both employers and employees could benefit from alternative scheduling.

After considering all of the evidence and testimony received during its investigation, and after deliberating on the wage board report, the NWC concluded that employees should have more choices with respect to their hours and days of work and proposed an amendment to Section 3 which allowed employees the option of entering into a "regularly scheduled workweek" consisting of such hours and days as they be agreed upon "up to 12 hours a day within a 48 hour week. According to the provisions contained in the proposal, the employer and two thirds of the employees in the affected work unit must voluntarily execute a written agreement before implementing the new schedule. The proposal provided premium pay for hours worked in excess of the regular schedule, or for all hours in excess of 19 per day or 48 per week. The proposal also included some of the protective conditions suggested in the Teamsters' petition, such as a secret ballot, as well as additional protective conditions including a written disclosure by the employer of the effects of the proposed schedule on the employee's hours and pay, a reasonable accommodation clause, and a mechanism for reviewing the agreement after one year. In addition the proposal listed some appropriate examples of work units, as well as provided for two consecutive days off within a workweek.

The NWC did not propose or adopt the language suggested in the Teamsters petition which would require employers to let alternative work schedules with the duration of 10 hour Standards Enforcement. The NWC determined that the burden of a long requirement would outweigh any significant benefit for employees, and create additional paperwork for employers as well as enforcement staff. The NWC also declined to propose or adopt the Teamsters language which stipulated that alternative schedules be valid for no longer than three years. The NWC concluded that the reversed provision which permitted employees to petition for a new secret ballot vote after one year provided adequate protection for employees.

During the public comment period on the proposal to amend the overtime provisions contained in NWC Order

the one.

The NWC retained the language which provided that weeks of work be "regularly scheduled." The NWC was not persuaded by testimony which suggested that employees' interests could best be met by allowing employees to work different hours every week within a 48 hour weekly limitation. The NWC agreed that if employees wanted to take advantage of an alternative schedule, they should have the built-in protection of limiting that schedule to a certain number of hours and number of days in a week. This would allow employees to plan for their transportation and child care needs, educational pursuits, family and recreation time, and other personal activities.

The NWC also retained the language requiring a "secret ballot" in order to assure freedom of choice for the employer. The NWC reasoned that only a secret ballot would remove the threat of employer coercion and/or retaliation by allowing employees to anonymously vote on an alternative schedule without regard to the outcome of the vote or the time delay between the vote and the signing of the written agreement. Anonymity is particularly important to the employee during this period because it allows the employee the freedom to reflect on the effects of the alternative schedule without undue influence or pressure from the employer.

The NWC also retained the language which cited examples of a "regularly schedulable work unit," including language which said a work unit may consist of an individual employee "as long as the criteria of an identifiable work unit in this subsection are met," because it recognized that one person could constitute a work unit and a single employee should have the option of working longer than eight hours a day without overtime pay. The NWC also retained the language which allowed reasonable accommodation for employees who were unable to comply with the new schedule. The NWC concluded that employees should have a choice with regard to their hours of work, and that employees should make a reasonable effort to find an alternative work arrangement for persons who are unable or unwilling to work the new schedule.

The NWC made minor amendments to its original proposal, including changes in wording from "work week" to "week of work" and "day" to "workday"; these changes clarified and were consistent with similar language contained in the NWC Order. Hours of pay was changed to "wages, hours and benefits" for purposes of clarity and consistency with language contained in the Labor Code.

The original language proposed by the NWC included provisions "to not less than two consecutive days off within a workweek." The NWC ultimately rejected this language because many employees would not actually receive two consecutive days off by virtue of working longer but fewer days within the 48 hour work week. The NWC also recognized that some employees who had seasonal obligations, such as educational pursuits, which required schedules with specified non-consecutive days off as opposed to two consecutive days off. Finally, based upon testimony heard at public hearings the NWC determined that this provision would hinder and might prevent working shifts, a beyond and above practice advocated by some employees.

Upon adopting its final language the NWC made clear to the NWC did not intend to establish any "four day" workweek agreement entered into prior to the effective date of the order, nor did the NWC intend to

hold his (or her) head consistently above the official poverty level." Advocates also pointed out that the Governor and the Legislature had recognized the adequacy of the minimum wage by establishing \$5.14 as the base hourly wage in the "GAIN or Washlaw" program. The California Retailers Association and other employer groups opposed any minimum wage increase until such an increase occurred at the federal level. These groups testified that the adverse consequences of an increase, including but not limited to unemployment, underemployment and reduced hours of employment, and said that an increase would have a detrimental impact on employees, particularly youth and minorities, whom they identified as most vulnerable to these adverse effects. In addition, employees pointed out that jobs would be lost in California companies because employers would tend to establish new businesses in states with more favorable minimum wage rates.

With respect to the NWC's 1987 Minimum Wage Board, the NWC noted that although the report contained no recommendation on a minimum wage adequate to supply the cost of proper living, it did include a motion that the minimum wage remain at \$3.21 per hour until the federal minimum wage changed. Other motions made by members of the wage board were to increase the minimum wage to \$4.50 to \$5.50 per hour, tied to certain factors. The NWC decided not to tie the minimum wage to the Consumer Price Index, the California Necrosis Index, the Employment Cost Index, or any other index, including the average hourly manufacturing wage, because of complete historical economic factors such as inflation, deflation, recession, unemployment, and specific local/regional factors which affect these indices, and because of the complex relationship between work indices and the factors underlying the adequacy of the minimum wage. The NWC also decided that tying the minimum wage to "State's Budget," a budget bill reintroduced in 1987 for a full supporting budget, was no longer appropriate because such a budget could not be made the result of every program when the standard and would not accurately reflect the covered needs of working people including men.

With respect to the \$5.14 base hourly wage used in the GAIN program, the NWC concluded that \$5.14 is not a wage but rather the figure used to calculate the number of hours of service owed to persons on ADSE check and related to jobs requiring shift working hours. The NWC also noted that the minimum wage rate, such as minimum wage jobs.

The NWC also considered state and federal action with respect to the minimum wage. It stated that the "State Office of Research and Statistics" also reported the consequences of increasing California's minimum wage and made note of the fact that members of the Legislature voted to increase the minimum wage in 1987 to \$4.25 per hour. The NWC also considered federal legislation proposing a minimum wage increase in the minimum wage to between \$3.00 to \$4.25 per hour. Finally, the NWC stated that minimum wage rates in other states and noted that as of the time of its deliberations, only one state had rates near \$3.21 per hour and the rates ranged from \$1.17 to \$3.95. The NWC also noted that federal legislation proposed to raise the minimum wage to \$4.25 per hour.

In considering all of the relevant evidence during its

investigation, the NWC concluded that the minimum wage should be increased to \$4.25 per hour. The NWC considered many other factors, including the fact that the Legislature had previously proposed a minimum wage of \$4.25 per hour. On December 18, 1987, the NWC concluded that the minimum wage of \$4.25 per hour was appropriate and not a burden on business and that of employees' representatives.

On October 31, 1988, the Minimum Wage Board in its report to the Governor and the Legislature held that provision of the minimum wage for working in an alternative minimum wage for employees in the United States. The NWC also noted that the minimum wage for the regular employees has been obtained from NWC Order 4-88, the effect of enactment of the new law of the state is to increase the minimum wage to \$4.25 per hour and to provide a minimum wage to \$4.25 per hour. Additionally, all increases in the minimum wage and adjustments in alternative minimum wage to the regular employees' level should be determined as in the future.

With respect to establishing alternative minimum wages for certain employees. After its initial motion, the NWC stated that the minimum wage may be adequate to supply the person's need for living and a wage board. The NWC also noted that the minimum wage should be tied to the Consumer Price Index, or any other index, including the average hourly manufacturing wage, because of complete historical economic factors such as inflation, deflation, recession, unemployment, and specific local/regional factors which affect these indices, and because of the complex relationship between work indices and the factors underlying the adequacy of the minimum wage. The NWC also decided that tying the minimum wage to "State's Budget," a budget bill reintroduced in 1987 for a full supporting budget, was no longer appropriate because such a budget could not be made the result of every program when the standard and would not accurately reflect the covered needs of working people including men.

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In considering all of the relevant evidence during its

language in the proposal was both unclear and probably inherently difficult to enforce, the NRC decided to withdraw its proposed alternative minimum wage for all State standards under 2).

[The section of the statement as to the basic adjustments these revisions or changes adopted on October 10, 1967. The statements as to the basic to the remaining parts of this section are contained in prior printings of this order. These parts have not changed and there is no need for an explanation because the NRC is continuing to effect regulations that have previously become a part of the standard working conditions for employees in this state.]

8. REPORTING TIME PAY

The requirement for reporting time pay historically has been included in the NRC's orders on the basis that it is necessary to employers' welfare that they be notified in advance when changes in their starting time must be made. It has deemed a maximum of four hours' pay adequate to encourage proper notice and scheduling.

The NRC received no compelling evidence, and concluded there was no rationale, to warrant making any change in the provisions of this section, which date back to 1948. Exceptions to the requirement date to 1974.

9. LICENSES FOR HANDICAPPED WORKERS

This section, being a part of the order, is intended to allow a lower rate only for those so seriously incapacitated that they cannot approach normal productivity. It is a re-statement of Labor Code Sections 1001 and 1101. The word "permanent" was changed to "chronic" to conform more closely to the statute.

The NRC received no compelling evidence, and concluded there was no rationale, to warrant making any other change in the provisions of this section.

7. RECORDS

Employee welfare requires that data on wages and hours of work be furnished to employees, in order to assist in the resolution of disputes and in the employment of a dealings with taxing agencies.

In response to employee demands for more information on checkbooks, the NRC concluded that it is not feasible at this time to require employers to provide such written information. It did find it appropriate and reasonable to require that employees keep information on applicable rates of pay and hours worked and make it available to the employee on reasonable request, as specified in (A) (9).

The NRC received no compelling evidence, and concluded there was no rationale, to warrant making any other change in the provisions of this section.

8. CASH SHORTAGE AND BREAKAGE

Some prohibition against deductions from pay for shortage or breakage has existed in NRC Orders since 1959. It is apparent that the employee's welfare thereby would be best served and his or her employment thereby would be of value if the employee could be charged for shortages without the protection of this section.

It is the NRC's intent that the employee can only de-

duct for cash shortages or breakage if they are caused by the dishonest or willful act or gross negligence of the employee. No compelling reason was demonstrated for changing the word "stolen" to "proven" because the NRC intends that the burden of proof rests with the employer in all cases.

The NRC felt it was not necessary to refer to Labor Code Sections 488-419 and deleted that reference.

The NRC received no compelling evidence, and concluded there was no rationale, to warrant making any other change in the provisions of this section.

9. UNIFORMS AND EQUIPMENT

The NRC historically has required employers to pay for uniforms, tools and equipment as basically provided in the section, because such standard conditions of labor are necessary to the welfare of employees. There was no compelling evidence before the NRC to warrant a change in the basic provisions of Subsection (A), but clarification of the NRC's intent is appropriate here. The definition and over-coverage policy is sufficiently flexible to allow the employer to specify basic workable items which are usual and generally usable in the occupation, such as white shirts, dark pants and black shoes and belts, all of unspecified design, without requiring the employer to furnish such items, if a required black or white uniform or accessory does not meet the test of being generally usable in the occupation the employer may not be required to pay for it. The NRC also concluded that present provisions in the order adequately protect the employee against bearing the cost of maintenance.

The NRC did have evidence to justify amending (B) to allow employers to require regularly substituted appliances to provide their own tools, such as aprons, customers may have a color investment in their tools and usually are covered of an alternate wage exceeding two times the minimum wage, and in addition that working conditions prescribed by the Division of Apprenticeship Standards.

Notes were inserted to clarify the boundaries of the respective jurisdictions of the NRC and the Occupational Safety and Health Standards Board in the course of consultation with the OSHA Standards Board.

In some cases, the procedure for establishing funds in which to hold deposits in accord with Labor Code Sections 488-419, as provided in this section, are the same as those to be practiced and an alternative is needed. There was considerable comment in wage boards by deleting the provision for a deposit, which could be a substantial burden on a starting employee. The NRC found that employees are responsible in their instances that employees have an obligation to other return items belonging to the employer or pay for the cost of them. The NRC's intent is that only the actual cost of the item may be withheld from the final check, pending return of the item within a reasonable time after the employment terminates. The balance of the check must be paid promptly as required by the Labor Code.

The NRC received no compelling evidence, and concluded there was no rationale, to warrant making any other change in the provisions of this section.

10. MEALS AND LODGING

Historically, the NRC has fixed the amount of credit for meals and lodging that could be used as an offset against the employee's minimum wage obligation. The

NRC asked the 1967 Minimum Wage Board to make recommendations on this provision consistent with the health and welfare of employees. Although that board was unable to agree on any recommendation, it did discuss a matter relating to credit increases which would proportionately equal any increases in the minimum wage. Employer representatives argued that such "increases would potentially benefit employees by increasing the probability of being offered meals and lodging connected with a job" and pointed out that employees could "choose to reject such offers as part of their employment package." They also noted that "the meals and lodging received are substantially below a fair market value." Employee representatives disputed whether "employees have the unrestricted option of a full minimum wage or a reduced wage with meals and/or lodging."

The NRC proposed that the level of the amounts credited for meals and lodging be proportionate with the proposed increase in the minimum wage, and although no one testified in support of this specific proposal, several persons indicated support of all the proposals. Others suggested, however, that an increase in the meals and lodging credits would merely offset any increase in the minimum wage. The NRC decided that the relationship between the minimum wage and meals and lodging credits which existed upon the promulgation of the 1959 order was proper and concluded that the same relationship should be maintained. On December 18, 1967, the NRC adopted a proposal to increase the meals and lodging credits 25 percent, proportionate to the increase in the minimum wage.

[This section of the statement as to the basic adjustments these revisions or changes adopted on October 10, 1967. The statements as to the basic to the remaining parts of this section are contained in prior printings of this order. These parts have not changed and there is no need for an explanation because the NRC is continuing to effect regulations that have previously become a part of the standard working conditions for employees in this state.]

11. MEAL PERIODS

A "duty free" meal period is necessary for the well-being of employees. This section is sufficiently flexible to allow for situations where that is not possible.

The NRC received no compelling evidence, and concluded that there was no rationale to warrant any change in this section, the basic provisions of which date back more than 20 years. Administrative comments are available if warranted under provisions of Section 17 of this order.

12. REST PERIODS

The NRC received no compelling evidence, and concluded that there was no rationale to warrant any change in the section, the basic provisions of which date back to 1922. It also noted that administrative comments are available if warranted under provisions of Section 17 of this order.

With regard to substantial testimony from employees that the health and welfare was being adversely affected by continued use of video display terminals, the NRC does not have sufficient information at this time to warrant modifying the rest period requirement for such employees. It further...

13. CHANGE ROOMS AND RESTING FACILITIES

The NRC's intent historically has been that employer facilities should be provided for the safekeeping of employees' outer clothing and street clothes. This does not always mean that lockable change lockers are required. It has sometimes meant, for example, the provision of coat racks upon the view of the employees, showers or bins in some employee's custody, or supervised check rooms. Over the years the number of problems in this area has been minimal. (See also Labor Code Section 2000.)

The word "sanitary", previously used in connection with change rooms, was dropped to reinforce the NRC's intent that there be no overlap with the jurisdiction of the Occupational Safety and Health Standards Board.

The NRC requested a note to clarify the boundaries of the respective jurisdictions of the NRC and the Occupational Safety and Health Standards Board in the course of consultation with the OSHA Standards Board.

No compelling evidence was received, and the NRC concluded there was no rationale, to warrant any other change in the provisions of this section.

14. SEATS

The basic requirement for seats has been in NRC orders since the earliest "Sanitary Regulations", and in 1915 the Legislature made a similar provision in statute. The NRC added the words "when it does not interfere with the performance of their duties" because of evidence that such clarification of the section was necessary.

The NRC received no compelling evidence, and concluded there was no rationale to warrant any other change in the section.

15. TEMPERATURE

In view of the promulgation of Federal and State safety guidelines the NRC has endeavored to order in these guidelines.

The NRC received no compelling evidence, and concluded there was no rationale to warrant any other change in the section, the basic provisions of which date back more than 20 years.

16. ELEVATORS

To require employers to work their rights of steps up and down on a holiday is deemed to be a common sense and welfare. This section is not intended to apply to the use of safety of elevators, which is regulated by the Occupational Safety and Health Standards Board.

The NRC received no compelling evidence, and concluded there was no rationale, to warrant making any change in the provisions of this section, which date back more than 20 years.

LIFTING

The NRC received no compelling evidence, and concluded there was no rationale, to warrant making any change in the provisions of this section, which date back more than 20 years.

conclusion as to whether lifting during business operations is a necessary part of the employee's work and whether such lifting is a part of the job.

The NRC received no compelling evidence, and concluded there was no rationale to warrant any other change in the provisions of this section, which date back more than 20 years.

16. FILING REPORTS

The NRC does not require employers to maintain records on the progress of the order. The NRC received no compelling evidence, and concluded there was no rationale, to warrant any other change in the provisions of this section.

19 INSPECTION

Under Labor Code Section 1177 a larger, the NRC conducting duty to ascertain the safety of employees in this state, and to ascertain the compliance of labor and employment in the enforcement of labor and safety laws. The NRC received no compelling evidence, and concluded there was no rationale, to warrant any other change in the provisions of this section.

The NRC received no compelling evidence, and concluded there was no rationale, to warrant any other change in the provisions of this section.

20. PENALTIES

The section relating to the form of the order is a re-statement of Labor Code Sections 1001 and 1101. The NRC received no compelling evidence, and concluded there was no rationale, to warrant any other change in the provisions of this section.

21. SEPARABILITY

This section is intended to provide for the effect of the order in the event of any change in the order. The NRC received no compelling evidence, and concluded there was no rationale, to warrant any other change in the provisions of this section.

22 POSTING

The NRC received no compelling evidence, and concluded there was no rationale, to warrant any other change in the provisions of this section, which date back more than 20 years.

The NRC received no compelling evidence, and concluded there was no rationale, to warrant any other change in the provisions of this section, which date back more than 20 years.

JOB SAFETY & HEALTH PROTECTION

The Occupational Safety and Health Act of 1970 provides job safety and health protection for workers by promoting safe and healthful working conditions throughout the Nation. Provisions of the Act include the following:

Employers

All employers must furnish to employees employment and a place of employment free from recognized hazards that are causing or are likely to cause death or serious harm to employees. Employers must comply with occupational safety and health standards issued under the Act.

Employees

Employees must comply with all occupational safety and health standards, rules, regulations and orders issued under the Act that apply to their own actions and conduct on the job.

The Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor has the primary responsibility for administering the Act. OSHA issues occupational safety and health standards, and its Compliance Safety and Health Officers conduct joint inspections to help ensure compliance with the Act.

Inspection

The Act requires that a representative of the employer and a representative authorized by the employees be given an opportunity to accompany the OSHA inspector for the purpose of aiding the inspection.

Where there is no authorized employee representative, the OSHA Compliance Officer must consult with a reasonable number of employees concerning safety and health conditions in the workplace.

Complaint

Employees or their representatives have the right to file a complaint with the nearest OSHA office requesting an inspection if they believe unsafe or unhealthful conditions exist in their workplace. OSHA will withhold, on request, names of employees complaining.

The Act provides that employees may not be discharged or discriminated against in any way for filing safety and health complaints or for otherwise exercising their rights under the Act.

Employees who believe they have been discriminated against may file a complaint with their nearest OSHA office within 30 days of the alleged discriminatory action.

Citation

If upon inspection OSHA believes an employer has violated the Act, a citation alleging such violations will be issued to the employer. Each citation will specify a time period within which the alleged violation must be corrected.

The OSHA citation must be prominently displayed at or near the place of alleged violation for three days, or until it is corrected, whichever is later, to warn employees of dangers that may exist there.

Proposed Penalty

The Act provides for mandatory penalties against employers of up to \$1,000 for each serious violation and for optional penalties of up to \$1,000 for each nonserious violation. Penalties of up to \$1,000 per day may be proposed for failure to correct violations within the proposed time period. Also, any employer who willfully or repeatedly violates the Act may be assessed penalties of up to \$10,000 for each such violation.

There are also provisions for criminal penalties. Any willful violation resulting in death of an employee, upon conviction, is punishable by a fine of up to \$250,000 (or \$500,000 if the employer is a corporation), or by imprisonment for up to six months, or both. A second conviction of an employer doubles the possible term of imprisonment.

Voluntary Activity

While providing penalties for violations, the Act also encourages efforts by labor and management, before an OSHA inspection, to reduce workplace hazards voluntarily and to develop and improve safety and health programs in all workplaces and industries. OSHA's Voluntary Protection Programs recognize outstanding efforts of this nature.

OSHA has published Safety and Health Program Management Guidelines to assist employers in establishing or perfecting programs to prevent or control employee exposure to workplace hazards. There are many public and private organizations that can provide information and assistance in this effort, if requested. Also, your local OSHA office can provide considerable help and advice on solving safety and health problems or can refer you to other sources for help such as training.

Consultation

Free assistance in identifying and correcting hazards and in improving safety and health management is available to employers, without reason or penalty, through OSHA-supported programs in each State. These programs are usually administered by the State Labor or Health department or a State university.

Posting Instructions

Employers in States operating OSHA approved State Plans should obtain and post the State's equivalent poster.

Under provisions of Title 29, Code of Federal Regulations, Part 1802.2(a)(1) employers must post this notice (or facsimile) in a conspicuous place where notices to employees are customarily posted.

More information

Additional information and copies of the Act, specific OSHA safety and health standards, and other applicable regulations may be obtained from your employer or from the nearest OSHA Regional Office in the following locations:

Atlanta	(404) 347-3673
Boston	(617) 988-7164
Chicago	(312) 353-2220
Dallas	(214) 767-4731
Denver	(303) 844-3081
Kansas	(816) 428-6861
New York	(212) 337-2325
Philadelphia	(215) 596-1201
San Francisco	(415) 985-5672
Seattle	(206) 442-5930

Elizabeth Dale, Secretary of Labor

U.S. Department of Labor

Occupational Safety and Health Administration

Washington, D.C.
1988 (Revised)
OSHA 2203



California has provided the safety and health protection for workers through Cal/OSHA program. This program requires the most responsible and experienced employers to cooperate with the state's safety and health laws and regulations. The law requires that the employer do the following to do an effective job in a variety of up to 27,000.)

WHAT AN EMPLOYER MUST DO:

An employer must provide work and information that are safe and healthful. In other words, as an employer, you must know what your governing law says and must: **Failure to do so can result in a threat to the life or health of workers, and substantial monetary penalties.**

You must ensure that safety and health of the job can be aware of basic rights and responsibilities.

You must have a written and effective injury and illness prevention program for your employees to follow.

You must be aware of hazards your employees face on the job and when necessary, warning them about potential and their workers in the relevant areas to each job assignment.

You must correct any hazardous condition that you know may result in serious injury or illness. Failure to do so could result in criminal charges, monetary penalties, and even imprisonment.

You must notify the nearest Cal/OSHA office of any serious injury or illness occurring on the job. Be sure to do this immediately after taking an emergency step to assist the injured employee.

WHAT AN EMPLOYER MUST NEVER DO:

Never permit an employee to do work that violates Cal/OSHA law.

Never permit an employee to be exposed to serious hazardous work involving asbestos abatement.

Never allow an untrained employee to perform hazardous work.

EMPLOYEES HAVE CERTAIN RIGHTS IN WORKPLACE SAFETY & HEALTH:

As an employee, you or someone acting for you have the right to be a concerned and receive an education in your workplace's operations. There are unions or non-unions. This is done by contacting the state office of the Division of Occupational Safety and Health (OSHA). Your name is not revealed by Cal/OSHA, unless you request otherwise.

You also have the right to bring written or oral complaints to the attention of the Cal/OSHA investigator without an investigation of your workplace. Such request, Cal/OSHA will protect the names of employees who make or make statements during an investigation or investigation.

Any employee has the right to refuse to perform work that would violate a Cal/OSHA or any occupational safety or health standard or other statute which violation would create a real and apparent hazard to the employee or other employees.

You may not be fired or discriminated in any way for filing a complaint about unsafe or unhealthy working conditions, or using any other right given to you by Cal/OSHA law. If you feel that you have been fired or punished for exercising your rights, you may file a complaint about the type of discrimination by contacting the nearest office of the Department of Industrial Relations, Division of Labor Standards Enforcement (State Labor Commissioner) or the San Francisco office of the U.S. Department of Labor, Occupational Safety and Health Administration. (Employees in state or local government agencies may only file these complaints with the State Labor Commissioner.) Consult your local newspaper directory for the office nearest you.

EMPLOYEES ALSO HAVE RESPONSIBILITIES:

To keep the workplace and your co-workers safe, you should tell your employer about any hazards that could result in an injury or illness to anyone on the job.

When working, you must always obey state job safety and health laws.

HELP IS AVAILABLE:

To learn more about job safety rules you may contact the Cal/OSHA Consultant Service for free information, required forms and assistance. You can also contact a local district office of the Division of Occupational Safety and Health. If you prefer, you may retain a competent private consultant, or hire your own competent consultant service for guidance in following regulations.

SPECIAL RULES APPLY IN WORK INVOLVING HAZARDOUS SUBSTANCES:

Employers who use any substance listed as a hazardous substance in Section 230 of Title 8 of the California Code of Regulations, or listed in the Federal Hazardous Substances Registry (29 CFR 1910.1202), must provide additional and specific information on the employee or Material Safety Data Sheet (MSDS), or employee information about the substance that must be provided to use the substance safely.

Employers must also provide on a safety and health basis a Material Safety Data Sheet on each chemical substance in the workplace and information on employees on employee activities regarding transportation, or an employee's physician.

Employees have the right to see and copy their medical records and history of exposure to hazardous substances or various workplace agents.

Employers must allow access by employees or their representatives to accurate records of employee exposures to hazardous substances or various workplace agents, and every employee of any substance in the workplace of those exceeding the exposure limits allowed by Cal/OSHA standards.

Any employee has the right to identify, reporting or measuring of employee exposure to hazardous substances in Cal/OSHA regulations.

WHEN CAL/OSHA COMES TO THE WORKPLACE:

A trained Cal/OSHA safety inspector or investigator requires that personally visit the workplace to make sure your company is following job safety and health laws.

An inspection will also be conducted when a complaint against a firm by an employee with the Division of Occupational Safety and Health.

Cal/OSHA also goes to the workplace to complete a serious injury or illness. When an inspection occurs, the Cal/OSHA investigator will show official identification from the Division of Occupational Safety and Health.

The employer, or someone the employer chooses, will be given an opportunity to accompany the investigator during the inspection. A representative of the employees will be given the same opportunity. Where there is no authorized employee representative, the investigator will talk to a reasonable number of employees about safety and health conditions at the workplace.

VIOLATIONS, CITATIONS & PENALTIES:

If the investigator finds that the employer has violated a safety and health standard or order, then the Division of Occupational Safety and Health issues a citation. Each citation identifies a date by which the violation must be fixed. A citation, which carries no monetary penalty, may be issued in lieu of a citation for certain non-serious violations.

Citations carry penalties of up to \$7,000 for each regulatory, general or serious violation. Additional penalties of up to \$7,000 per day may be assessed for each failure to correct a violation by the employer's due date on the citation. A penalty of less than \$5,000 may more than \$70,000 may be assessed on an employer who willfully violates any occupational safety and health standard or order. The maximum fine for each day that an employer fails to correct a violation is \$70,000. A willful violation that causes death or permanent impairment of the body of any employee results, upon conviction, in a fine of not more than \$70,000, or imprisonment of not more than six months, or both.

While government officials may be fined on the same basis as other employees, and employers must file, and penalties will not be assessed.

The law provides that employers may appeal citations within 15 working days of receipt by the Occupational Safety and Health Appeals Board.

An employer who receives a citation, Order to Take Immediate Action, or Special Order must post it prominently at or near the place of the violation for three working days, or until the citation is corrected, whichever is longer, to each employee of employer who may read them. Any employee may request the law stated for enforcement of the citation to the Division of Occupational Safety and Health or the Occupational Safety and Health Appeals Board.

OFFICES OF THE DIVISION OF OCCUPATIONAL SAFETY AND HEALTH

HEADQUARTERS: 485 Golden Gate Ave.—Room 8202, San Francisco CA 94102 — Telephone (415) 763-4341

District & Field Offices

Alameda	2100 East Main Ave.—Room 142, 94505	(714) 839-0145	Tulare	680 Main St.—Suite 102, 93202	(714) 816-3734
Antelope	4800 Sacramento Highway—Suite 212, 95620	(916) 385-5710	Ukiah	600 Main Court—Suite 8, 95402	(707) 482-4765
Chico	305 Pine Lane—Suite A, 95925	(916) 885-4781	Van Nuys	8120 Van Nuys Blvd.—Suite 402, 91401	(818) 991-8483
Colusa	1400 State Center—Bldg. E Suite 202, 94520	(916) 576-4333	Ventura	1025 Main Street—Room 102, 93902	(805) 684-4881
Contra Costa	1123 South Parkway—Suite 102, 94724	(916) 885-1108			
Essex	610 Superior St.—Room 102, 95821	(707) 445-0811	Regional Offices		
Fresno	2820 Mariposa St.—Room 402, 93721	(209) 445-8322	Alameda	2100 East Main Ave.—Room 142, 94505	(714) 839-0111
Los Angeles	3220 West Sixth St.—Room 421, 90020	(213) 726-3941	Los Angeles	2820 West Sixth St.—Suite 412, 90020	(213) 726-4911
Maricopa	1200 Westmore Ave.—Suite C-4, 92520	(619) 576-8280	Sacramento	3424 Arden Way—Suite 122, 95825	(916) 839-6127
Merced	7700 Sacramento Ct.—Suite 122, 94821	(516) 885-8882	San Francisco	1200 Market St.—Suite 822, 94102	(415) 557-8848
Placer	9425 East Division Ave., 95620	(916) 845-7827			
Redding	321 Fremont Dr., 95902	(916) 294-4743			
Sacramento	3424 Arden Way—Suite 102, 95825	(916) 839-6123			
Santa Clara	1104 Market St.—Suite 1, 95005	(408) 443-8880			
San Bernardino	242 East Airport Ct.—Suite 102, 92405	(714) 283-4321			
San Diego	7827 Conway Court—Suite 142, 92111	(619) 527-7225			
San Francisco	1200 Market St.—Suite 712, 94102	(415) 557-1577			
San Jose	2910 North First St.—Suite 401, 95131	(408) 485-7228			
San Mateo	1000 South Main St.—Suite 212, 94402	(415) 573-8912			
Santa Fe	1271 Parkway Lane—Suite 202, 95405	(707) 576-8280			

CAL/OSHA CONSULTATION SERVICE

Headquarters: 485 Golden Gate Ave.—Room 8202, San Francisco CA 94102 — (415) 763-4341

Alameda	1001 North Gateway—Suite 102, 94527-1005	(916) 484-1285
San Bernardino	3424 Arden Way—Suite 410, 95825	(916) 839-6127
San Diego	7827 Conway Court—Suite 142, 92111	(619) 576-3771
San Mateo	3 Western Park Dr.—Suite 222, 94402	(415) 576-8844
Santa Fe Springs	18200 Mariposa Park Dr.—Suite 201, 94579	(916) 944-8888

Employees of Cal/OSHA, its safety and health standards is established by the Division of Occupational Safety and Health, under the California Department of Industrial Relations, which has primary responsibility for administering the Cal/OSHA program. Safety and health standards are developed by the Occupational Safety and Health Administration, U.S. Department of Labor, which has primary responsibility for administering the California Occupational Safety and Health Plan under the San Francisco Regional Office of the Occupational Safety and Health Administration (OSHA), U.S. Department of Labor (Tel: 415/763-4341). OSHA enforces the company of state laws in cases that involve serious or imminent danger.



DISCRIMINATION IN EMPLOYMENT

Because of

- Race
- Color
- Ancestry
- Religious Creed
- National Origin
- Physical Handicap (Including AIDS)
- Medical Condition (Cancer)
- Sex
- Age
- Marital Status

IS PROHIBITED BY LAW

The California Fair Employment and Housing Act

(Part 2.8 (commencing with Section 12900) of Div. 3 of Title 2 of the Government Code)

- permits job applicants to file complaints with the Department of Fair Employment and Housing (DFEH) against an employer, employment agency, or labor union which fails to grant equal employment as required by law.
- requires employers not to discriminate against any job applicant or worker in hiring, promotions, assignments, or discharge. On-the-job segregation is also prohibited, and employers may file complaints against workers who refuse to cooperate in compliance.
- requires employers, employment agencies, and unions to preserve applications, personnel and employment referral records for a minimum of two years.
- requires employers to provide leaves of up to four months to employees disabled because of pregnancy, maternity, or childbirth.
- requires employment agencies to serve all applicants equally; to refuse discriminatory job orders; to refrain from prohibited pre-hiring inquiries or help-wanted advertising.
- requires unions not to discriminate in member admissions or dispatching to jobs.
- forbids any person to interfere with efforts to comply with the act. Authorizes the DFEH to work affirmatively with cooperating employers to review hiring and recruiting practices in order to expand equal opportunity.
- prohibits harassment of employees or applicants and requires employers to take all reasonable steps to prevent harassment.

REMEDIES TO INDIVIDUALS, OR PENALTIES FOR VIOLATION MAY INCLUDE:
hiring, back pay, promotion, reinstatement, cease-and-desist order.

JOB APPLICANTS AND EMPLOYEES: If you believe you have experienced discrimination, DFEH will investigate without cost to you.

For information contact the nearest office of the Department of Fair Employment and Housing:

BAKERSFIELD
1001 Tower Way, # 250
Bakersfield, CA 93309
(805) 395-2728

EL CAMINO AREA
(415) 353-3430
Write or Visit
San Diego District Office
110 West C Street, # 1702
San Diego, CA 92101

FRESNO
1900 American Mall, # 120
Fresno, CA 93721
(209) 445-5373

LOS ANGELES
322 West First Street, # 2126
Los Angeles, CA 90012-3112
(213) 428-2618
TDD (213) 629-3189

OAKLAND
1330 Broadway, # 1326
Oakland, CA 94612
(415) 444-4095

SACRAMENTO
2000 "O" Street, # 120
Sacramento, CA 95814
(916) 445-9918
TDD (916) 294-1678

SAN BERNARDINO
1845 S. Business Center Drive, Suite 127
San Bernardino, CA 92408
(714) 383-4711

SAN DIEGO
110 West C Street, # 1702
San Diego, CA 92101
(619) 237-7485

SAN FRANCISCO
30 ... Avenue, # 2000
San Francisco, CA 94102
(415) 557-2005

SAN JOSE
111 N. Market Street, # 810
San Jose, CA 95113
(408) 277-1264

SANTA ANA
28 Civic Center Plaza, # 528
Santa Ana, CA 92701
(714) 558-4199

VENTURA
5729 Robson Street, # 202
Ventura, CA 93003
(805) 664-4512

This notice must be conspicuously posted in hiring offices, on employee bulletin boards, in employment agency waiting rooms, union halls, etc. For copies contact the nearest DFEH office.

APPENDIX D

ACTIVITY HAZARD ANALYSIS

NOTE: EACH ACTIVITY MUST BE REANALYZED FOR EACH DELIVERY ORDER

- **Mobilization/Site Preparation**
- **Removal Operations/Video Survey**
- **Sampling of Liquids and Solids**
- **Soil/Debris Separation**
- **Setup and Operation of Soil Filter Press Equipment**
- **Equipment Decontamination (Filter Press and Associated Equipment)**
- **Equipment Decontamination**

ACTIVITY HAZARD ANALYSIS MOBILIZATION/SITE PREPARATION

ANALYZED BY/DATE _____ REVIEWED BY/DATE _____

Activity	Potential Hazards	Recommended Controls
Placement/unloading of materials	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs. require assistance or mechanical equipment; size-up the load. Recommend wearing a back support if possible.
	Noise	Hearing protection is mandatory above 85 dBA.
	Falling objects	Hardhat, stay alert and clear of materials suspended overhead, steel-toed boots.
	Flying debris, dirt, dust etc.	Wear eye protection.
	Pinch points	Keep hands and feet clear of moving/suspended materials and equipment.
		Stay alert at all times!
		Beware of contact points.
	Fire	Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
		Fire lanes providing access to all areas shall be established and maintained free of obstruction (the minimum space between one-story non-fire-resistant buildings shall be 20 feet). Initial survey of the suitability and effectiveness of fire prevention and protection measures and facilities at each installation shall be made by competent persons.
	High winds	Mobile/portable facilities shall be anchored to withstand high winds.
	Hot work	Refer to H&S Policy HS 314.
	Vehicle traffic	Pay attention at all times.
		Make sure that operators of vehicles know that you are near their equipment.
		A spotter will aid in the backing of all vehicles with poor rear visibility.
		Traffic diversion equipment will be used for all work being conducted in roadways.
		Safety vest will be worn by all personnel

Activity	Potential Hazards	Recommended Controls
Placement/unloading of materials	Contact With Utilities	Above and underground utilities shall be located. A qualified person shall install required utilities in compliance with national, state, and local codes.
	Slip, trip, and fall hazards	Determine best access route before transporting equipment.
		Good housekeeping, keep work area picked up and clean as feasible. Continually inspect the work area for slip, trip, and fall hazards.
		Look before you step, ensure safe and secure footing.
	Cut hazards	Wear adequate hand protection.
	Biological hazards	Inspect work area carefully and avoid placing hands or feet into concealed areas.
		Be alert for bees, spiders, ticks, and snakes.
	Hazardous plants (poison oak prevalent), insects, snakes, etc. (biological)	Remove vegetation, identify hazardous plants, insects, etc.
	Flood potentials	Check meteorology/climatology of area; history of flooding
	Toilets (sanitary)	Chemical toilets provided in accordance with SHSP.
	Heat stress	Refer to SHSP.
	Fire	Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
		Fuel will be transported and stored in approved containers.
	Contact with moving equipment/vehicles	Ground personnel to make eye contact with equipment/vehicle operators prior to traffic zone entry. Ground personnel will avoid blind spots directly in front of and directly behind equipment/vehicles. Work area will be barricaded/demarcated.
	Hazard communications	Label all containers as to contents (fuel cans, etc.)
		Obtain Material Safety Data Sheets for materials brought on site.
	Cross contamination and contact with potentially contaminated materials	No Exclusion Zone activities are associated with this task.

Activity	Potential Hazards	Recommended Controls
Placement/unloading of materials	Strains and sprains	Use the proper tool for the job being performed.
		Get assistance if needed.
		Avoid twisting/turning while pulling on tools, materials, etc.
	Unattended worker	"Buddy system" visual contact will be maintained between personnel during site activities.
		Apply gravel if needed to prevent mud or standing water. Loader (if used for spreading or grading) must meet all safety requirements.
	Clearing hazards	If clearing is necessary, tree cutting will comply with chain saw equipment manufacturer's safety standards.
	Heavy equipment operations	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.
		Equipment shall be inspected before being placed into service and at the beginning of each shift.
		Preventive maintenance procedures recommended by the manufacturer shall be followed.
		All lockout-tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.
		Machinery and mechanized equipment shall be operated only by designated personnel.
		Getting off or on any equipment while it is in motion is prohibited.
		Machinery or equipment requiring an operator shall not be permitted to run unattended.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
	Heavy equipment operations	All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.

Activity	Potential Hazards	Recommended Controls
Equipment to be Used	Inspection Requirements	Training Requirements
<ul style="list-style-type: none">•Hand tools•Heavy equipment•Vendor trucks	<ul style="list-style-type: none">•Pre-post maintenance•Visual prior to use	<ul style="list-style-type: none">•Tailgate Safety Meeting•Site specific orientation•Hazard communication

ACTIVITY HAZARD ANALYSIS REMOVAL OPERATIONS/VIDEO SURVEY

ANALYZED BY/DATE _____ REVIEWED BY/DATE _____

Activity	Potential Hazards	Recommended Controls
Placement/unloading of materials	Vehicle traffic	Safety Traffic vest will be worn by all personnel.
		Use flagman or other equipment to alert and/or divert traffic.
		Work area will be barricaded/demarcated.
	Slip, trip and fall hazards	Good housekeeping, keep work area picked up and as clean as feasible. Continually inspect the work area for slip, trip and fall hazards.
	Pinch points	Keep feet and hands clear of moving/suspended materials and equipment.
		Beware of contact points.
		Stay alert at all times!
	Strains and sprains	Use proper lifting techniques, lifts greater than 60 lbs. require assistance or mechanical equipment. Size up the lift. Recommend wearing a back support if possible.
	Heavy equipment operations	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.
		Equipment shall be inspected before being placed into service and at the beginning of each shift.
		Preventive maintenance procedures recommended by the manufacturer shall be followed.
		All lockout-tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.
		Machinery and mechanized equipment shall be operated only by designated personnel.
		Machinery or equipment requiring an operator shall not be permitted to run unattended.
		All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.

Activity	Potential Hazards	Recommended Controls
Placement/unloading of materials	Heavy equipment operations	All repairs on machinery or equipment will be made at a location which provides protection from traffic for repair persons.
Camera/video survey	Strains and sprains	Use proper lifting techniques, lifts greater than 60 lbs. Require assistance or mechanical equipment. Size up the lift. Recommend wearing a back support if possible.
	Fall hazard	No employee will be exposed to a fall of every 6 feet without being adequately protected.
	Contact with blood borne pathogens	Adhere to HS512 "Handling of blood or other potentially infectious material."
	Contact with potentially contaminated materials	Real-time air monitoring will take place. Proper personal protective clothing and equipment will be utilized.
	Confined space	IT policy and procedure HS300 "Confined Spaces" will be adhered to at all times when applicable.
		Confined space entry permit shall be completed, reviewed, and approved by SHSO and posted outside the confined space prior to entry.
		The entrant must have successfully completed confined space entry training.
	Toxic atmosphere	Atmospheric tests with PID and Detector tubes to be completed prior to entry and during work cycle. Tests to be done by qualified person.
	Deficient O ₂ ; flammable atmosphere	Atmospheric tests for O ₂ levels and % LEL to be completed prior to entry and during work cycle. O ₂ must be between 20% and 23.5%. LEL must be 10% or less. Test to be done by qualified person.
	Skin or contact hazard	At a minimum, modified level D protection must be worn by all confined space entrants.
Removal of Liquids/Sediments	Faulty or damaged equipment	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.
		Equipment shall be inspected before being placed into service and at the beginning of each shift.
	Fall hazard	No employee will be exposed to a fall of over 6 feet without being adequately protected.
	Contact with blood borne pathogens	Adhere to HS512 "Handling of blood or other potentially infectious material"
	Contact with potentially contaminated materials	Real-time air monitoring will take place. Proper personal protective clothing and equipment will be utilized.

Activity	Potential Hazards	Recommended Controls
Removal of Liquids/Sediments		Good housekeeping will be stressed to safe guard against cross contamination of surrounding areas and eliminate safety hazards.
		All site personnel will practice good personal hygiene.
Pressure washing	High pressures	IT Policy and Procedure HS303 "Pressurized water cleaning and cutting equipment" shall be adhered to at all times.
	Unqualified operators	Machinery and mechanized equipment shall be operated only by designated personnel.
	Out of control equipment	Machinery or equipment requiring an operator shall not be permitted to run unattended.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
	Noise	Noise levels above 85 dBA mandates hearing protection.
	Activation during repairs	All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.
	Pinch points	Keep feet and hands clear of moving/suspended materials and equipment.
		Stay alert at all times!
	Falling objects	Hardhats, remove unsecured tools and materials before operating equipment.
	Falling objects	Stay alert and clear of materials suspended overhead.
	Flying debris	Splash shield will be used.
	Contact with potentially contaminated materials	Appropriate PPE will be required.
Pumping Liquids/Vacuum Truck Operations	Faulty Equipment	Equipment will be inspected prior to being placed into service and at the beginning of each shift
Equipment to be Used	Inspection Requirements	Training Requirements
<ul style="list-style-type: none"> •Pumps •Piping •Hand Tools •Vacuum Truck •High Pressure Set 	<ul style="list-style-type: none"> •Pre-post maintenance •Visual prior to use 	<ul style="list-style-type: none"> •Tailgate safety meeting •Site-specific orientation •Hazardous waste operations •Hazardous communications •CSE

**ACTIVITY HAZARD ANALYSIS
SAMPLING OF SOLIDS, LIQUIDS AND ANALYSIS**

ANALYZED BY/DATE _____ REVIEWED BY/DATE _____

Activity	Potential Hazards	Recommended Controls
Pond Sludge Sampling	Cross-contamination and contact with potentially contaminated materials	Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination.
		Plywood will be used as planking to gain access to sampling locations to minimize employee contact with pond sludge.
		Only essential personnel will be in the work area.
		Initial real-time air monitoring will take place before and during sampling activities.
		All personnel will follow good hygiene practices.
		Proper decontamination procedures will be followed.
		All liquids and materials used for decontamination will be contained and disposed of in accordance with Federal, State and Local regulations.
Staging equipment	Slip, trip and fall hazards	Determine best access route before transporting equipment.
		Good housekeeping, keep work area picked up and clean as feasible. Continually inspect the work area for slip, trip and fall hazards.
		Look before you step, insure safe and secure footing.
	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs. require assistance or mechanical equipment; size-up the lift. Recommend wearing a back support if possible.
	Falling objects	Stay alert and clear of materials suspended overhead. Use steel-toed boots and hard hat.
	Flying debris, dirt, dust etc.	Use safety glasses/goggles. Ensure that eye wash is in good working order.
	Pinch points	Keep hands, fingers, and feet clear of moving/suspended materials and equipment.
		Beware of contact points.
		Stay alert at all times!

Activity	Potential Hazards	Recommended Controls
Staging equipment	Bees, spiders and snakes	Inspect work area carefully and avoid placing hands and feet into concealed areas.
	Cut hazards	Wear adequate hand protection. Use care when handling glassware.
	Fire	Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
	Fire/chemical exposure	All solvents will be transported in UL/FM approved containers and sources of ignition will be prohibited.
		Initial real time air monitoring will take place.
	Contact with moving equipment/vehicles	Work area will be barricaded/demarcated.
	Contact with moving equipment/vehicles	Equipment will be laid out in an area free of traffic flow.
	Hazard communication	Label all containers as to contents and dispose of properly.
		Obtain Material Safety Data Sheets for solvents, etc. that are being used.
	Noise	Sound levels above 85 dBA mandates hearing protection.
	Cut hazards	Use care when handling glassware.
		Wear adequate hand protection.
Sample Collection	Hazard communication	Label all containers as to contents.
	Strains/sprains	Use the proper tool for the job being performed.
		Get assistance if needed.
		Good housekeeping will be stressed to safeguard against cross contamination of nearby areas and eliminate safety hazards.
		The work area will be demarcated. All unnecessary personnel will be kept out of the work area and in an upwind location.
		IT Policy and Procedure HS601 - "Respiratory Protective Devices" will be adhered to at all times.
Equipment decontamination	Chemical exposure	Maintain MSDS's for all chemicals such as methanol or hexane and follow protection procedures.

Activity	Potential Hazards	Recommended Controls
Moving and shipping collected samples	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs. require assistance or mechanical equipment; size-up the lift. Recommend wearing a back support if possible.
	Pinch points	Keep hands, fingers, and feet clear.
		Beware of contact points.
		Stay alert at all times!
	Cut hazards	Wear adequate hand protection. Use care when handling glassware.
	Hazard communication	Label all containers as to contents and associated hazards.
Equipment to be Used	Inspection Requirements	Training Requirements
<ul style="list-style-type: none"> •Hand tools •PPE •Sampling equipment 	<ul style="list-style-type: none"> •Pre-postmaintenance •Visual prior to use 	<ul style="list-style-type: none"> •Tailgate Safety Meeting •Site specific orientation •Hazardous waste operations •Hazard communication

ACTIVITY HAZARD ANALYSIS SOIL/DEBRIS SEPARATION

ANALYZED BY/DATE _____

REVIEWED BY/DATE _____

Activity	Potential Hazards	Recommended Controls
Job setup for soil/debris separation	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs. require assistance or mechanical equipment; size-up the lift. Recommend wearing a back support if possible.
	Slip, trip and fall hazards	Good housekeeping, keep work area picked up and as clean as feasible. Continually inspect the work area for slip, trip and fall hazards. Wet surfaces require caution.
	Cut hazards	Wear adequate hand protection.
	Lighting	Adequate lighting will be provided to ensure a safe working environment.
	Strains/sprains	When pulling or lifting, do not turn or twist your back.
		Use the proper tool for the task being performed.
	Contact with potentially contaminated materials	Appropriate PPE will be required.
		Keep airborne particulates to a minimum.
		Practice good housekeeping, avoid spreading potentially contaminated materials.
	Fueling	Only UL/FM approved safety cans shall be used to store fuel.
		Do not refuel equipment while it is operating.
		Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
Pressure washing equipment/hose washing	High pressures	IT Policy and Procedure HS303 "Pressurized Water Cleaning and Cutting Equipment" shall be adhered to at all times for pressurized water cleaning.
	Unqualified operators	Machinery and mechanized equipment shall be operated only by designated personnel.

Activity	Potential Hazards	Recommended Controls
Pressure washing equipment/hose washing	Out of control equipment	Machinery or equipment requiring an operator shall not be permitted to run unattended.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
	Noise	Sound levels above 85 dBA mandates hearing protection.
	Activation during repairs	All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.
	Pinch points	Keep feet and hands clear of moving/suspended materials and equipment.
		Stay alert at all times!
	Falling objects	Hard hats, remove unsecured tools and materials before operating equipment.
		Stay alert and clear of materials suspended overhead.
	Flying debris	Splash shield will be used.
	Contact with potentially contaminated materials	Appropriate PPE will be required.
	Hot work (hot water/steam cleaning)	IT Policy and Procedure HS314 "Hot Work in Hazardous Locations" will be adhered to at all times during any operations involving hot work.
Stage-setup equipment for pumping liquids	Pinch points	Keep hands, fingers, and feet clear of moving parts.
	Heavy lifting	Any lifting over 60 lbs requires assistance or the use of a mechanical lifting device.
	Moving equipment	Signal person will assist in positioning equipment.
	Contact with potentially contaminated materials	Real time air monitoring will take place. Appropriate PPE protection will be required.
Pumping liquids	Faulty equipment	Equipment will be inspected prior to being placed into service and at the beginning of each shift.

Activity	Potential Hazards	Recommended Controls
Pumping liquids	Pressurized systems	All discharge hoses and connections shall be routinely inspected.
	Noise	Sound levels above 85 dBA mandates hearing protection.
	Fire	A dry chemical fire extinguisher with a minimum UL rating of 5 A:B:C will be readily available.
	Refueling	Proper bonding and grounding. Only UL/FM approved safety cans will be used.
Loadout of equipment	Noise	Noise levels above 85 dBA mandates hearing protection.
	Heavy equipment operations	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.
		Equipment shall be inspected before being placed into service and at the beginning of each shift.
		Preventive maintenance procedures recommended by the manufacturer shall be followed.
		A lockout - tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.
		Machinery and mechanized equipment shall be operated only by designated personnel.
		Getting on or off any equipment while it is in motion is prohibited.
		Machinery or equipment requiring an operator shall not be permitted to run unattended.
	Heavy equipment operations	Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
		All machinery or equipment will be shutdown and positive means taken to prevent its operation while repairs or manual lubrications are being done.

Activity	Potential Hazards	Recommended Controls
Loadout of equipment		All repairs on machinery or equipment will be made at a location which provides protection from traffic for repair persons.
		All self-propelled construction equipment shall be equipped with a back-up alarm.
	Fire	Each bulldozer, backhoe, or other similar equipment will be equipped with at least one dry chemical fire extinguisher having a minimum UL rating of 5 A:B:C.
	Truck and Equipment Traffic	Site personnel will wear orange safety vests to identify themselves to traffic.
		Load out area will be properly demarcated.
	Slip, trip and fall hazards	Good housekeeping, keep work area picked up and as clean as feasible. Continually inspect the work area for slip, trip, and fall hazards. Look where you step, ensure safe footing when climbing on/off equipment etc.
	Pinch points	Keep feet and hands clear of moving/suspended materials and equipment.
		Beware of contact points. Stay alert at all times!
	Strains/sprains	Use proper lifting techniques. Lifts greater than 60 lbs require assistance or mechanical equipment. Size-up the lift. Recommend wearing a back support if possible. When pulling on materials, pull in a straight line. Do not twist and pull simultaneously.
	Ropes, slings, chains, and hooks	The use of ropes, slings, and chains shall be in accordance with the safe recommendations of their manufacturer.
		Rigging equipment shall not be loaded in excess of its recommended safe working load.
	Ropes, slings, chains, and hooks	The use of open hooks is prohibited in rigging to lift any load where there is danger of relieving the tension on the hook due to the load or hook catching or fouling.
		Hooks, shackles, rings, pad eyes, and other fittings that show excessive wear or that have been bent, twisted, or otherwise damaged shall be removed from service.

Activity	Potential Hazards	Recommended Controls
Loadout of equipment		Rigging equipment for material handling shall be inspected prior to use on each shift and as necessary during its use to insure that it is safe. Defective rigging equipment shall be removed from service.
		Rigging equipment, when not in use, shall be removed from the immediate work area and properly stored so as not to present a hazard.
		Taglines shall be used to control the loads being handled by hoisting equipment.
	Hoisting Equipment	All hoisting equipment shall be capable of passing a performance (operating) test prior to being placed into service.
		At no time shall the hoisting equipment be loaded in excess of the manufacturer's rating except during performance tests.
		While hoisting equipment is in operation, the operator shall not perform any other work and he/she shall not leave his/her position at the controls until the load has been safely landed or returned to the ground.
		A standard signal system shall be used on all hoisting equipment.
	Heat	Be aware of warning signs of these conditions
	Bees, spiders, and snakes	Inspect work area carefully and avoid placing hands and feet into concealed areas.
	Cut hazards	Wear adequate hand protection.
	Falling objects	Hard hat, stay alert and clear of materials suspended overhead, steel-toed boots.

Equipment to be Used	Inspection Requirements	Training Requirements
<ul style="list-style-type: none"> • Hand tools • PPE • Heavy equipment • Soil separator 	<ul style="list-style-type: none"> • Pre-postmaintenance • Visual prior to use 	<ul style="list-style-type: none"> • Tailgate Safety Meeting • Site specific orientation • Hazardous waste operations • Hazard communication • Pressure Washing Training

ACTIVITY HAZARD ANALYSIS SETUP AND OPERATION OF SOIL FILTER PRESS EQUIPMENT

ANALYZED BY/DATE _____ REVIEWED BY/DATE _____

Activity	Potential Hazards	Recommended Controls
Equipment setup	Equipment operations	All lockout - tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.
		Machinery and mechanized equipment shall be operated only by designated and trained personnel.
		Machinery or equipment requiring an operator shall not be permitted to run unattended.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
		All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.
		All repairs on machinery or equipment will be made at a location which provides protection from traffic for repair persons.
	Confined space entry/tank cleaning	Policy and procedures for confined spaces, will be adhered to at all times (all tank entries will be considered confined space entries).
	Contact with process chemicals	Proper protective clothing and equipment will be used.
	Contact with potentially contaminated materials	Real time air monitoring will take place. If necessary proper personal protective clothing and equipment will be utilized.
		Good Housekeeping will be stressed to safe guard against cross contamination of surrounding areas and eliminate safety hazards.
		All site personnel will practice good personal hygiene.

Activity	Potential Hazards	Recommended Controls
Equipment setup		The work area will be demarcated. All unnecessary personnel will be kept out of the work area.
	Slip, trip and fall hazards	Good housekeeping, keep work area picked up and as clean as feasible. Continually inspect the work area for slip, trip and fall hazards. Wet surfaces require caution.
	Pinch points	Keep feet and hands clear of moving/suspended materials and equipment.
		Beware of contact points.
		Stay alert at all times!
	Fire	Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
	Strains and sprains	Use proper lifting techniques, lifts greater than 60 lbs. requires assistance or mechanical equipment. Size up the lift. Recommend wearing a back support if possible
	Noise	Noise levels above 85 dBA mandates hearing protection.
	Burns	Keep all exposed body parts away from hot machine parts.
	Electrical hand tools/electrocution	Ground fault circuit interrupters inspect extension cords, hand tool inspection, lockout-tagout procedure.
	Contact with contaminated materials	Be familiar with the materials you are working with. Appropriate PPE must be used.
	Falls	Lanyards, lifelines, and ladder/scaffolding safety.
	Falling objects	Overhead protection/hardhats
Filter press operation	Equipment operations	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.

Activity	Potential Hazards	Recommended Controls
Filter press operation		Equipment shall be inspected before being placed into service and at the beginning of each shift.
	Equipment operations	Preventative maintenance procedures recommended by the manufacturer shall be followed.
Material storage	Flammable and combustible liquids	Store in NO SMOKING AREA and 50 ft from combustible construction materials.
		Fire extinguisher readily available.
		Properly grounded and bonded.
Material storage	Slip, trip, and fall hazards	Good housekeeping
	Sprains and strains	Safe lifting procedures
	Pinch points/cuts	Adequate hand protection and observation of contact points.
	Hazard communication	Proper labeling/MSDSs
Equipment to be Used	Inspection Requirements	Training Requirements
Soil Washing Unit Heavy Equipment Hand Tools PPE	<ul style="list-style-type: none"> • Pre-post maintenance • Visual prior to use 	<ul style="list-style-type: none"> • Tailgate safety meeting • Site specific orientation • Hazardous waste operations • Hazard communication • Filter press operator training

**ACTIVITY HAZARD ANALYSIS
EQUIPMENT DECONTAMINATION
(Filter Press and Associated Equipment)**

ANALYZED BY/DATE _____ REVIEWED BY/DATE _____

Activity	Potential Hazards	Recommended Controls
Job setup for decontamination (primary filter press and associated equipment)	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs. require assistance or mechanical equipment; size-up the lift. Recommend wearing a back support if possible.
	Slip, trip and fall hazards	Good housekeeping, keep work area picked up and as clean as feasible. Continually inspect the work area for slip, trip and fall hazards. Wet surfaces require caution.
	Cut hazards	Wear adequate hand protection.
	Lighting	Adequate lighting will be provided to ensure a safe working environment.
	Strains/sprains	When pulling or lifting, do not turn or twist your back.
		Use the proper tool for the task being performed.
	Contact with potentially contaminated materials	Appropriate PPE protection will be required.
		Real time air monitoring will take place during decontamination activities.
		Keep airborne particulates to a minimum.
		Practice good housekeeping, avoid spreading potentially contaminated materials.
	Fueling	Only UL/FM approved safety cans shall be used to store fuel.
		Do not refuel equipment while it is operating.
		Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
	Faulty or damaged equipment	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.

Activity	Potential Hazards	Recommended Controls
Job setup for decontamination (primary filter press and associated equipment)		Equipment shall be inspected before being placed into service and at the beginning of each shift.
		Preventive maintenance procedures recommended by the manufacturer shall be followed.
		A lockout - tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.
Pressure washing equipment/hose washing	High pressures	IT Policy and Procedure HS303 "Pressurized Water Cleaning and Cutting Equipment" shall be adhered to at all times for pressurized water cleaning.
	Unqualified operators	Machinery and mechanized equipment shall be operated only by designated personnel.
	Out of control equipment	Machinery or equipment requiring an operator shall not be permitted to run unattended.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
	Noise	Sound levels above 85 dBA mandates hearing protection.
	Activation during repairs	All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.
	Pinch points	Keep feet and hands clear of moving/suspended materials and equipment.
		Stay alert at all times!
	Falling objects	Hardhats, remove unsecured tools and materials before operating equipment.
	Falling objects	Stay alert and clear of materials suspended overhead.
	Flying debris	Splash shield will be used.
	Contact with potentially contaminated materials	Appropriate PPE will be required.

Activity	Potential Hazards	Recommended Controls
Pressure washing equipment/hose washing	Hot work (hot water/steam cleaning)	IT Policy and Procedure HS314 "Hot Work in Hazardous Locations" will be adhered to at all times during any operations involving hot work.
Stage-setup equipment for pumping liquids	Pinch points	Keep hands, fingers, and feet clear of moving parts.
	Heavy lifting	Any lifting over 60 lbs requires assistance or the use of a mechanical lifting device.
	Moving equipment	Signal person will assist in positioning equipment.
	Contact with potentially contaminated materials	Real time air monitoring will take place. Appropriate PPE protection will be required.
Pumping liquids	Faulty equipment	Equipment will be inspected prior to being placed into service and at the beginning of each shift.
	Pressurized systems	All discharge hoses and connections shall be routinely inspected.
	Noise	Sound levels above 85 dBA mandates hearing protection.
	Fire	A dry chemical fire extinguisher with a minimum UL rating of 5 A:B:C will be readily available.
	Refueling	Proper bonding and grounding. Only UL/FM approved safety cans will be used.
Loadout of equipment	Noise	Noise levels above 85 dBA mandates hearing protection.
	Heavy equipment operations	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.
	Heavy equipment operations	Equipment shall be inspected before being placed into service and at the beginning of each shift.
		Preventive maintenance procedures recommended by the manufacturer shall be followed.
		A lockout - tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.

Activity	Potential Hazards	Recommended Controls
Loadout of equipment		Machinery and mechanized equipment shall be operated only by designated personnel.
		Getting on or off any equipment while it is in motion is prohibited.
		Machinery or equipment requiring an operator shall not be permitted to run unattended.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
		All machinery or equipment will be shutdown and positive means taken to prevent its operation while repairs or manual lubrications are being done.
		All repairs on machinery or equipment will be made at a location which provides protection from traffic for repair persons.
		All self-propelled construction equipment shall be equipped with a back-up alarm.
	Fire	Each bulldozer, backhoe, or other similar equipment will be equipped with at least one dry chemical fire extinguisher having a minimum UL rating of 5 A:B:C.
	Truck and Equipment Traffic	Site personnel will wear orange safety vests to identify themselves to traffic.
		Load out area will be properly demarcated. Ground personnel to make eye contact with equipment/vehicle operators prior to traffic zone entry. Ground personnel will avoid blind spots directly in front of and directly behind equipment/vehicles.
	Slip, trip and fall hazards	Good housekeeping, keep work area picked up and as clean as feasible. Continually inspect the work area for slip, trip, and fall hazards. Look where you step, ensure safe footing when climbing on/off equipment etc.
	Pinch points	Keep feet and hands clear of moving/suspended materials and equipment.
		Beware of contact points. Stay alert at all times!

Activity	Potential Hazards	Recommended Controls
Loadout of equipment	Strains/sprains	Use proper lifting techniques. Lifts greater than 60 lbs require assistance or mechanical equipment. Size-up the lift. Recommend wearing a back support if possible. When pulling on materials, pull in a straight line. Do not twist and pull simultaneously.
	Ropes, slings, chains, and hooks	The use of ropes, slings, and chains shall be in accordance with the safe recommendations of their manufacturer.
		Rigging equipment shall not be loaded in excess of its recommended safe working load.
		The use of open hooks is prohibited in rigging to lift any load where there is danger of relieving the tension on the hook due to the load or hook catching or fouling.
		Hooks, shackles, rings, pad eyes, and other fittings that show excessive wear or that have been bent, twisted, or otherwise damaged shall be removed from service.
		Rigging equipment for material handling shall be inspected prior to use on each shift and as necessary during its use to insure that it is safe. Defective rigging equipment shall be removed from service.
	Ropes, slings, chains and hooks	Rigging equipment, when not in use, shall be removed from the immediate work area and properly stored so as not to present a hazard.
		Taglines shall be used to control the loads being handled by hoisting equipment.
	Hoisting Equipment	All hoisting equipment shall be capable of passing a performance (operating) test prior to being placed into service.
		At no time shall the hoisting equipment be loaded in excess of the manufacturers rating except during performance tests.
		While hoisting equipment is in operation, the operator shall not perform any other work and he/she shall not leave his/her position at the controls until the load has been safely landed or returned to the ground.
		A standard signal system shall be used on all hoisting equipment.

Activity	Potential Hazards	Recommended Controls
Loadout of equipment	Heat	Be aware of warning signs of these conditions
	Bees, spiders, and snakes	Inspect work area carefully and avoid placing hands and feet into concealed areas.
	Cut hazards	Wear adequate hand protection.
	Falling objects	Hardhat, stay alert and clear of materials suspended overhead, steel-toed boots.
Equipment to be Used	Inspection Requirements	Training Requirements
<ul style="list-style-type: none"> • Hand tools • PPE • Heavy equipment • Pressure Washer 	<ul style="list-style-type: none"> • Pre-postmaintenance • Visual prior to use 	<ul style="list-style-type: none"> • Tailgate Safety Meeting • Site specific orientation • Hazardous waste operations • Hazard communication • Pressure washer training

ACTIVITY HAZARD ANALYSIS EQUIPMENT DECONTAMINATION

ANALYZED BY/DATE _____ REVIEWED BY/DATE _____

Activity	Potential Hazards	Recommended Controls
Job setup for decontamination of equipment	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs. require assistance or mechanical equipment; size-up the lift. Recommend wearing a back support if possible.
	Slip, trip and fall hazards	Good housekeeping, keep work area picked up and as clean as feasible. Continually inspect the work area for slip, trip and fall hazards.
	Cut hazards	Wear adequate hand protection.
	Lighting	Adequate lighting will be provided to ensure a safe working environment.
	Strains/sprains	When pulling or lifting, do not turn or twist your back.
		Use the proper tool for the task being performed.
	Contact with potentially contaminated materials	Appropriate PPE protection will be required.
		Real time air monitoring will take place during decontamination activities.
		Keep airborne particulates to a minimum.
		Practice good housekeeping, avoid spreading potentially contaminated materials.
	Fueling	Only UL/FM approved safety cans shall be used to store fuel.
		Do not refuel equipment while it is operating.
		Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
	Faulty or damaged equipment	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.

Activity	Potential Hazards	Recommended Controls
Job setup for decontamination of equipment		Equipment shall be inspected before being placed into service and at the beginning of each shift.
		Preventive maintenance procedures recommended by the manufacturer shall be followed.
		A lockout - tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.
Pressure washing equipment	High pressures	IT Policy and Procedure HS303 "Pressured water cleaning and cutting equipment" shall be adhered to at all times.
	Unqualified operators	Machinery and mechanized equipment shall be operated only by designated personnel.
	Out of control equipment	Machinery or equipment requiring an operator shall not be permitted to run unattended.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
	Noise	Sound levels above 85 dBA mandates hearing protection.
	Activation during repairs	All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.
	Pinch points	Keep feet and hands clear of moving/suspended materials and equipment.
		Stay alert at all times!
	Falling objects	Hardhats, remove unsecured tools and materials before operating equipment.
	Falling objects	Stay alert and clear of materials suspended overhead.
	Flying debris	Splash shield will be used.
	Contact with potentially contaminated materials	Appropriate PPE will be required.

Activity	Potential Hazards	Recommended Controls
Pressure washing equipment	Hot work (hot water/steam cleaning)	IT Policy and Procedure HS314 "Hot Work in Hazardous Locations" will be adhered to at all times during any operations involving hot work.
Stage-setup equipment for pumping liquids	Pinch points	Keep hands, fingers, and feet clear of moving parts.
	Heavy lifting	Any lifting over 60 lbs requires assistance or the use of a mechanical lifting device.
	Moving equipment	Signal person will assist in positioning equipment.
	Contact with potentially contaminated materials	Real time air monitoring will take place. Appropriate PPE protection will be required.
Pumping liquids	Faulty equipment	Equipment will be inspected prior to being placed into service and at the beginning of each shift.
	Pressurized systems	All discharge hoses and connections shall be routinely inspected.
	Noise	Sound levels above 85 dBA mandates hearing protection.
	Fire	A dry chemical fire extinguisher with a minimum UL rating of 5 A:B:C will be readily available.
	Refueling	Proper bonding and grounding. Only UL/FM approved safety cans will be used.
	Noise	Noise levels above 85 dBA mandates hearing protection.
	Heavy equipment operations	Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.
	Heavy equipment operations	Equipment shall be inspected before being placed into service and at the beginning of each shift.
		Preventive maintenance procedures recommended by the manufacturer shall be followed.
		A lockout - tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.

Activity	Potential Hazards	Recommended Controls
Loadout of equipment		Machinery and mechanized equipment shall be operated only by designated personnel.
		Getting on or off any equipment while it is in motion is prohibited.
		Machinery or equipment requiring an operator shall not be permitted to run unattended.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
		All machinery or equipment will be shutdown and positive means taken to prevent its operation while repairs or manual lubrications are being done.
		All repairs on machinery or equipment will be made at a location which provides protection from traffic for repair persons.
		All self-propelled construction equipment shall be equipped with a back-up alarm.
	Fire	Each bulldozer, backhoe, or other similar equipment will be equipped with at least one dry chemical fire extinguisher having a minimum UL rating of 5 A:B:C.
	Truck and Equipment Traffic	Site personnel will wear orange safety vests to identify themselves to traffic.
		Load out area will be properly demarcated. Ground personnel to make eye contact with equipment/vehicle operators prior to traffic zone entry. Ground personnel will avoid blind spots directly in front of and directly behind equipment/vehicles.
	Slip, trip and fall hazards	Good housekeeping, keep work area picked up and as clean as feasible. Continually inspect the work area for slip, trip, and fall hazards. Look where you step, ensure safe footing when climbing on/off equipment etc.
	Pinch points	Keep feet and hands clear of moving/suspended materials and equipment.
		Beware of contact points. Stay alert at all times!

Activity	Potential Hazards	Recommended Controls
Loadout of equipment	Strains/sprains	Use proper lifting techniques. Lifts greater than 60 lbs require assistance or mechanical equipment. Size-up the lift. Recommend wearing a back support if possible. When pulling on materials, pull in a straight line. Do not twist and pull simultaneously.
	Ropes, slings, chains, and hooks	The use of ropes, slings, and chains shall be in accordance with the safe recommendations of their manufacturer.
		Rigging equipment shall not be loaded in excess of its recommended safe working load.
		The use of open hooks is prohibited in rigging to lift any load where there is danger of relieving the tension on the hook due to the load or hook catching or fouling.
		Hooks, shackles, rings, pad eyes, and other fittings that show excessive wear or that have been bent, twisted, or otherwise damaged shall be removed from service.
		Rigging equipment for material handling shall be inspected prior to use on each shift and as necessary during its use to insure that it is safe. Defective rigging equipment shall be removed from service.
	Ropes, slings, chains and hooks	Rigging equipment, when not in use, shall be removed from the immediate work area and properly stored so as not to present a hazard.
		Taglines shall be used to control the loads being handled by hoisting equipment.
	Hoisting Equipment	All hoisting equipment shall be capable of passing a performance (operating) test prior to being placed into service.
		At no time shall the hoisting equipment be loaded in excess of the manufacturer's rating except during performance tests.
		While hoisting equipment is in operation, the operator shall not perform any other work and he/she shall not leave his/her position at the controls until the load has been safely landed or returned to the ground.
		A standard signal system shall be used on all hoisting equipment.

Activity	Potential Hazards	Recommended Controls
Loadout of equipment	Heat	Be aware of warning signs of these conditions
	Bees, spiders, and snakes	Inspect work area carefully and avoid placing hands and feet into concealed areas.
	Cut hazards	Wear adequate hand protection.
	Falling objects	Hardhat, stay alert and clear of materials suspended overhead, steel-toed boots.
Equipment to be Used	Inspection Requirements	Training Requirements
<ul style="list-style-type: none"> •Hand tools •PPE •Heavy equipment •Pressure Washer 	<ul style="list-style-type: none"> •Pre-postmaintenance •Visual prior to use 	<ul style="list-style-type: none"> •Tailgate Safety Meeting •Site specific orientation •Hazardous waste operations •Hazard communication •Lead Control Plan