

ENVIRONMENTAL DEPARTMENT (ESC 40)
FIELD SAFETY PROCEDURES

A protocol to encourage safety consciousness in field work.

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Policy Statement: It is our policy to provide a safe and healthful work environment for all personnel whether in the office or on official travel.

1. Introduction

1.1 Purpose: This document is a guide to safety practices by Pollution Prevention Department personnel while on official travel. It calls attention to typical hazards encountered in the field and provides guidance and references for safety methods appropriate to those areas.

1.2. Goal: This guide will help us, as a group of professionals, to maintain an exemplary safety record. This guide is designed to make you aware of a personal responsibility for maintaining a safety awareness attitude. This includes preparing adequately prior to travel, practicing safe working methods, remaining aware of potentially unsafe actions and conditions, and reporting hazardous or unsafe conditions to the appropriate command or code.

In Appendix A, worksheets for various industrial shops will help you prepare for safety protection needed and problems you may encounter. They are tied to text sections providing greater detail. These worksheets are designed to be reproduced and carried on travel. The worksheet setup allows you to copy the page for any shop (such as a Plating shop), enter the activity specific name, building number, contact, and phone numbers, then sketch or make notes on the rest of the page.

Other appendices provide a reproducible checklist of safety equipment you may need on official travel. Guidelines prepared by NFESC092 for entering a confined space, forms for reporting and hotel guidelines on surviving a fire.

1.3. Regulations and Rules: Regulations and rules are drawn from the Occupational Safety and Health (OSHA) regulations, from consensus standards such as American Congress of Government Industrial Hygienists (ACGIH), National Fire Protection Association (NFPA), Uniform Building Code, and from Navy Occupational and Safety and Health (NAVOSH) instructions. For reading further detail on topics in these guidelines, see the list in Appendix F.

1.4. Approval: All SOPS, PPE use and project plans must be reviewed by CBC Code 21, Systems Safety prior to implementation. Any official CBC guidance change for Systems Safety initiates a review of relevant NFESC documents.

1.5. Training: Training is provided by CBC Code 21, Safety Office for all areas required by OSHA regulations and by the Navy Safety and Health Manual. These include the

- Hazard Communication (HAZCOM)
- Lockout/tagout
- Respirator (PPE)
- Confined Space

Asbestos worker/manager training is off the shelf.

2. Personal protection: Take action to protect yourself from physical hazards encountered in the workplace. Consider the potential hazards of the workplace and outfit yourself accordingly.

2.1. Protective Clothing: When working in industrial areas not requiring special clothing, avoid wearing anything which can be caught in a machine. Avoid neckties, scarves, necklaces, firmly attached wristwatches, rings, loose bracelets, dangling earrings, loose cuffs, loose shirttails, and full skirts. Wear hair close to the head.

Wherever you may encounter grease, dust, mist, or simply non-toxic dirt, wear protective clothing. Where the conditions are non-toxic, wear NFESC issue coveralls. Clean them separately from street clothing. In working with asbestos, wear disposable coated Tyvec coveralls with booties and hood or other protective clothing provided for asbestos work.

When working with PCBs and similar hazardous materials wear selected disposable clothing. American Conference of Governmental Industrial Hygienists (ACGIH) guidelines to selecting protective clothing are **in** our library.

2.2. Hand Protection: Reduce hazards to hands by wearing the proper gloves at appropriate times. Electrical work of any kind may require electricians insulated gloves. Working with chemicals requires selecting gloves for special protective properties depending on the chemical. Liquids have differing breakthrough times with the various glove materials. Select from such materials as butyl alcohol, Viton, and rubber for the best barrier. Two pairs with differing properties are often layered. Factor in exposure time. For example, Viton elastomer gloves hold up well under PCB exposure, however, for short-term exposure other materials may be used as long as skin is thoroughly washed within one-half hour after contact. Certain industrial operations become more hazardous where gloves may be caught in machinery.

2.3. Head Protection (Hard hats): Hard-hat design is effective for impact to the top, not to the side of the head. Therefore, use the hats where there is a possibility of anything falling onto your head. These hazards include falling objects, flying particles, electric shock, overhead chemical, acid or hot liquid spills. Many areas are designated and posted to require hard hats. You may elect to generally wear yours while in the field to always have your hard hat ready when needed.

2.4. Eye Protection: Abrasive dusts, heat, chemical splashes and mists, projectiles from grinders and saws, and light generated by arc welding may damage eyes. Select from colored welding shields, goggles, and prescription ground safety glasses depending on the hazard.

Protect eyes from dusts, mists, splashes, and flying particles with full coverage goggles or, if a prescription is needed, ground glasses with side shields. Adapters allow prescription fitting to some respirators. Dirty glasses/goggles provide their own hazard. Carry cleaning materials.

When working in the vicinity of welding operations, wear the proper shield. Requirements for welding shields vary with the exposure. For example, acetylene and arc welding generate different amounts and ranges of light radiation.

2.5. Hearing Protection: The Navy standard (permissible exposure limit (PEL)) for hearing protection is set by OPNAVINST 5100.23C at 84 dB(A) for an 8 hour work day. That level may

be exceeded for a short time if the average of 84 dBA is not exceeded. When you must stand very close to another person to talk with raised voices, the sound level probably exceeds 84 dBA. Then wear ear plugs. The type issued at the naval medical clinic has large cells, fits most people well, and provides adequate protection for most noise conditions. Tests show that when the noise level is higher than 84 dB(A), speech is more easily understood with earplugs in place than without them.

Per the OPNAVINST, Add earmuff type hearing protection for sound levels above 104 dB(A). Consult your activity contact or the safety office for assistance when entering these areas.

2.6. Foot Protection Wear steel toed safety shoes or boots in signed areas, where there is moving equipment, where there may be sharp objects, or where there may be falling objects. Steel toed tennis or running shoes do not provide adequate protection to other parts of the foot. Avoid slip-on boots (cowboy or Wellington styles) which occasionally slip off if you are working in mud or hot fly-ash.

2.7. Respiratory Protection: Control exposure to harmful asbestos, lead, and wood dusts; fogs; mists; gasses; sprays; metal fumes; and toxic vapors by using respirators.

Navy policy requires a physical examination including spirometric testing and medical approval followed by specialized training and fit testing before wearing a respirator. The CBC guidelines and respirator program, which we use, are in CBCINST 5100.8G.

Those potentially exposed to asbestos dusts must comply with the special asbestos regulations for respirator use. See Appendix B for guidelines to respirator selection.

3. Control of Hazardous Energy (lockout/tagout): Use lockout/tagout procedures to prevent exposure to energized equipment, either not disconnected or inadvertently started up, during servicing or testing. These procedures ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury. CBC Code 21 provides required annual training.

3.1. You must use standard procedures when preparing to work on equipment and must obey the procedures upon encountering a lockout/tagout.

3.2. Consult with your activity contact to become familiar with the activities lockout/tagout methods and use them whenever possible. If the activity doesn't have standard methods use these.

3.2.1 Use only standard approved lockout/tagout devices. Lockout is preferred to tagout. See CBC Code 21 for tags.

3.2.2. Notify those working in the area of pending lockout.

3.2.3. Shut off the equipment, Remove the power source and securely attach lockout/tagout devices. De-energize the equipment. Test for effectiveness. Return controls to OFF position. Attach a tag identifying every person working in the lockout/tagout area.

3.2.4. Do not remove anyone else's tag.

3.2.5. Never bypass, ignore, or defeat a tag.

3.2.6. Reverse the process when the job is complete.

4. Areas of NAVOSH Concern: Certain areas we encounter on travel require special care or combine several awareness areas. These are addressed below.

4.1. Asbestos exposure: If you suspect friable (crumbling) asbestos in a work area, have the Industrial Hygienist or activity safety office sample for asbestos and analyze the samples. Respirable asbestos in air is not visible. For protection wear a HEPA (High Efficiency Particulate Air) filtering respirator, and disposable coveralls, hood, gloves, and booties. Dispose of contaminated clothing and shower after exposure. The OSHA Regulations lay out protection guidelines for asbestos exposure.

4.2. Electrical Exposure: Check all equipment for frayed cords, damaged fittings, damaged connections, and continuity before packing it to travel and daily before use. Handle electrical cords and fittings in a way to minimize wear. Plug portable equipment into GFCIs (Ground Fault Circuit Interrupters).

Carry and use electrical lockouts suitable to equipment you will be working on.

See NFESC 20 guidelines for electrostatic precipitator entry. See Appendix C.

4.3. Machinery, portable electric tools, and hand tools

4.3.1. Machinery:

Be aware of the need for machine guards to prevent approach to saw blades, grinders, in-running nip points; punching, shearing, and bending actions; reciprocating and transverse motions on moving machinery and equipment. Any part of a machine that moves presents a hazard. Obey marks indicating moving part extensions,

Watch for tripping hazards around machinery. Remember, you are not as familiar as the operator with the immediate hazards.

Be particularly concerned with loose clothing. Sleeves, ties, long hair and jewelry may catch on moving parts.

4.3.2. Portable Electrical Tools: Read the operator's manual for any tools you are using.

Ground any electrical tool not double insulated.

Keep guards in place.

Avoid working in wet and dark places.

Avoid causing a tripping hazard.

Use proper protective equipment.

Avoid accidental starting by not carrying tools with your finger on the switch.

Don't drop portable electrical tools.

Inspect cords for fraying or other damage.

Use only straight, sharp blades and bits.

Repair immediately.

4.3.3. Hand tools: Select the right tool for the job.

Keep tools in good condition. (i.e. Sharpen as needed and throw out nicked hammers.)

Use tools properly. (i.e. Don't hold a small item in the hand while loosening a tight screw on it.)

4.4. Hoists/fork-lifts: Fork-lift operators are formally trained to comply with Navy requirements. We won't be operating them, but one third to one half of the industrial truck (read fork-lift) accidents involve pedestrians. The pedestrian or onlooker is at hazard during several situations.

Failing to chock wheels of trucks being unloaded.

Using the wrong size fork-lift.

Overloading

Operator failing to look in the direction of movement.

Stacking too high.

Excessive tilt.

Speeding.

Accepting hitchhikers.

Driving the fork-lift like a car.

Abandoning the fork-lift without turning it off.

4.5. Hoists/Cranes: Hoist and crane safety awareness is similar, although their movement is more restricted. Be equally aware of moving hazards. Certain procedures are in use to promote safety.

Inspect lifting ropes or chains daily for wear.

Inspect for kinks, and avoid twisting the ropes or chains.

Lift with slings cradling the load.

Lifting parts are load-rated to handle limited weights.

Lift straight up, never at a sideways angle.

Ensure the load is at rest (not suspended) when the operator leaves the controls.

4.6. Elevated areas

4.6.1. Ladders:

Use unpainted wooden ladders. Paint can hide structural defects.

Use metal ladders marked to warn against using near electrical equipment.

Place a ladder on firm footing with a 4:1 ratio in placing: four feet up to 1 foot out.

Extend a ladder at least three feet above the top landing.

Anchor or tie a ladder top and bottom if it must be left in place.

Avoid stepping onto the top three rungs of a straight ladder or the top two treads of a stepladder.

Never "jerryrig" a ladder or use a defective ladder.

Lock or bar a door if a ladder must be placed in front of it.

4.6.2 Elevated platforms:

Use a harness or other tie-off method if elevated areas (over four feet) lack railings.

Protect tools and equipment from falling onto people below.

Be aware of tripping hazards.

4.7. Confined spaces: A confined space is an area not intended for human use, with limited access and reduced air circulation. Hazards include lack of oxygen, build-up of toxic gasses, and presence of flammable gasses, depending upon the location.

The references provide guidelines for entering confined spaces, including using test equipment to determine safety and using respirators appropriate to the situation. The use of these methods is called "gas free engineering".

A qualified CSPM must evaluate the situation if you encounter a confined space. Entry is restricted to Approved and Signed entry permitted areas and only to the personnel specified with the permit. Never enter a confined space to rescue a person who has collapsed without help standing by and in the proper protective equipment.

The NFESC Guideline for entering electrostatic precipitators is provided in Appendix C. THESE ARE CONFINED SPACES.

5. Hazardous and Toxic Materials. Without going into the details of toxicity, means of entry, toxic dose, permissible exposure limits, and such, this section briefly introduces various types of hazards and ways to recognize them. Everyone should have initial Hazard Communication training which has been customized to include expected encounters on the job.

5.1. Chemical Hazards: Chemical hazards covered include toxicity, flammability, and corrosivity. Toxicity may be through inhalation, ingestion, or skin contact. Hazards range from irritation to carcinogenicity. Become familiar with NFESC's Hazardous Materials Control and Management program and instruction.\

Make use of that knowledge in approaching hazardous materials at other activities. Use their MSDSs if materials are new to you.

Avoid inhaling toxics by wearing a respirator when it is needed (see paragraphs 2.2. and 2.3.)

Wash your hands before eating to avoid ingesting chemicals.

Avoid flammable gas build-up. A flammable material has a flash point of 100 degrees F.

Avoid contact with corrosives (see paragraph 5.5.) and toxics.

Avoid spills and don't try to clean them up. The activity has a trained spill clean-up team.

5.2. Confined Space Definition: A confined space is an area not intended for human use, with limited access, and reduced air circulation. Hazards include lack of oxygen, build-up of toxic gasses, and the presence of flammable gases, depending upon the location. A confined space can be a tank, transformer, boiler, or other storage space undergoing inspection, repair, or preparation for use.

5.3. Asphyxiating Atmospheres: An asphyxiating atmosphere contains less than 19 1/2% Oxygen, not enough to support life. This may be caused by poor ventilation, replacement by other gases, or by oxygen consumption (i.e. rusting inside a new tank). Instruments must be used prior to entry to detect this condition.

5.4. Flammable Atmospheres: Flammable atmospheres result when a gas concentration exceeds 10% of the lower explosive limit (LEL). Field testing equipment detects the percent of LEL and alarms audibly at a preset level to allow escape.

5.5. Irritant and Corrosive Atmospheres: Irritant and corrosive atmospheres develop when acids and bases vaporize or are sprayed into the air in low concentrations. Plating shop ventilation ducts commonly develop such atmospheres. Air purifying or supplied air respirators may become necessary, depending upon the concentration of pollutant. This is addressed in annual PPE training.

5.6. Other Physical Hazards: Other hazards are typical of specific areas. These hazards include the mechanical hazards around shops and heavy moving equipment.

There may be entry and exit hazards in maze-like buildings with inadequate markings or physical barriers to free access.

Communication problems occur when wearing full level A (space suit) protective equipment.

Heat becomes a hazard when working under difficult conditions. A high ambient temperature or working in bulky protective clothing may cause heat stress.

Other hazards include falling objects, flying particles, electric shock, overhead chemical, acid or hot liquid spills. Ultra-violet, infrared, and LASER light can damage eyes and skin.

Microwaves may affect organs when strong and uncontrolled. Be aware of these and protect yourself

5.7. Training: The OSHA regulation section relating to hazardous waste operations includes a requirement for 40 hours safety training before entering a hazardous waste site.

Requirements are spelled out to include such aspects as understanding the chemistry of hazardous wastes, monitoring equipment use, safe work practice, using reference materials to determine accessibility, and selecting and fitting respiratory protection. ESC40 has hazardous waste operations training provided under contract to Naval activities. The course is available to ESC40 personnel.

Learn when to back out of a situation. Avoid life threatening situations.

6. Testing or Awareness: Testing at the right time and understanding the results saves lives. You can learn to use most field equipment in half a day. The safety office or industrial hygienist can provide other tests.

6.1. Oxygen: Upon entering, an oxygen deficient atmosphere, no warning of deficiency is detected -- the brain stops functioning without warning sufficient to escape. Oxygen concentration between 19.5 % and 22 % in the atmosphere is essential to life. Oxygen concentration exceeding 22% is toxic. Ensure the proper amount of oxygen is present in questionable areas by testing with field equipment.

This equipment should be calibrated daily before and after use. It has both a dial and an audible alarm to signal low oxygen levels.

6.2. Chemicals: Anyone with a basic chemistry background is aware of the standard safety precaution such as eye protection and splash protection. However, if the chemicals have volatilized, testing is in order.

Field equipment is available for testing various materials in air, including volatile organic materials, in order to avoid hazardous concentrations. Testing service can be arranged with the local Industrial Hygienist, either through the safety office or through the nearest medical command hospital or clinic.

6.3. Immediately Dangerous to Life and Health

(IDLH): The National Institute for Occupational Safety and Health defines the IDLH as the maximum concentration from which, in the event of respirator failure, one could escape within 30 minutes without experiencing any escape-impairing or irreversible health effects. Details and concentrations are available in NIOSH "Pocket Guide to Chemical Hazards.

6.4. Noise: Noise damage to hearing is not recognizable until 25% permanent hearing loss has occurred. To protect your hearing a noise level test is needed whenever hearing voices becomes difficult without shouting. Use portable test equipment, an audiometer, to determine if noise levels are within acceptable limits.

7. Mishap management and reporting

7.1. First Aid: Know the phone number of the local clinic or hospital so you can call them for assistance. **THE LOCAL CLINIC OR HOSPITAL IS RESPONSIBLE FOR GIVING FIRST AID TREATMENT.**

Obtain first aid training and keep your card current through NFESC's training program. Procedures must be according to accepted methods, however, don't let an expired card keep you from saving a life.

7.2. Cardiopulmonary resuscitation (CPR) Cardiopulmonary resuscitation (CPR) knowledge is mandatory for anyone working around electrical hazards such as electrostatic precipitators. NFESC provides the training and expects all engineers and scientists to stay current.

7.3. Hypersensitivity: If you are one of those few people with a hypersensitivity to bee stings or chemicals such as isocyanates, you should be aware of areas where you may encounter your nemesis and prepared to react to the problem. Know the symptoms and care needed. Anyone with hypersensitivity to bee stings should carry a kit with the antidote. If you are hypersensitive to isocyanates know the activity areas where they may be in use, paint shops, model shops, airplane rehab areas. Know the medical care you may need. **ADVISE YOUR TEAM LEADER.**

7.4. Local Medical Assistance. If you require medical treatment, present the letter in Appendix D to the local naval medical clinic or hospital. It was written to clarify NAVMEDCOM policy on treating official travelers.

Use the Department of Labor identification card at any medical care location. Avoid using your personal medical insurance; using it causes complications in gaining workers compensation.

If you have a body injury accident notify your supervisor as soon as possible with the information requested on the example CA-1 form in Appendix D. With that information, and at your supervisors request, CBC at 982-4133 can notify any medical provider that you are eligible for workman's compensation to cover emergency room or other medical treatment.

7.5. Incident reporting. Report all accidents on base to the local safety office.

If you are involved in an auto accident, in addition to filing a local police report, report all information from the SF-91 in Appendix (D) to the activity you are visiting. They will investigate.

All accidents and illnesses while on official travel are considered to be job related. Use the Department of Labor identification card at any medical care location. Avoid using your personal medical insurance; using it causes complications in gaining workman's compensation.

If you have a body injury accident or illness, notify your supervisor as soon as possible with the information requested on the example CA-1 form in Appendix D. Your supervisor will notify CBC's local Workman's Compensation Representative at 982-2434.

8. Off-the-job

8.1. Auto accidents, other injuries, or illness: If you are involved in an auto accident, in addition to filing a local police report, report all information from the Operator's Report of Motor Vehicle Accident, SF-91, to the activity you are visiting. They will investigate.

8.1.1. If you require medical treatment, present the letter in Appendix D to the local naval medical clinic or hospital. It was written to clarify NAVMEDCOM policy on treating official travelers.

8.1.2. All accidents and illnesses while on official travel are considered to be job related. Use the Department of Labor identification card at any medical care location. Avoid using your personal medical insurance; using it causes complications in gaining workmans' compensation.

8.1.3. If you have a body injury accident notify your supervisor as soon as possible with the information requested for the CA-1 form in Appendix D. With that information and at your supervisors request, CBC can notify any medical provider that you are eligible for workman's compensation to cover emergency room or other medical treatment.

8.2. Hotels: The possibility of involvement in hotel fires concerns all travelers. For your information, Appendix E provides guidance on how to survive a hotel fire.

8.3. Alcohol and Drugs: To over simplify:

DON'T DO DRUGS.

DON'T DRINK AND DRIVE

8.3.1. Using drugs results in unsafe practices and can cost your life or your job.

8.3.2. In an auto accident, driving under the influence may result in your losing damage coverage normally coming from the government. In addition these practices reflect poorly on the command.

8.3.3. Show how proud you are of your command and conduct yourself in a manner to reflect this.

APPENDIX A

Activity:

Shop Name:

Building Number

Point of Contact:

Code:

Phone:

POC HAZMIN:

Phone:

MISSION OF SHOP:

AIR CONDITION/REFRIGERATION SHOP

Personal Protection:

Safety shoes, possibly coat and gloves.

Areas of NAVOSH Concern:

Refrigerant and water spills.

Electrical hazards.

Thermal hazards.

Hazardous/Toxic Materials (Review MSDS):

Rosins, freons.

CHEMICAL NAME/STOCK
NUMBER/QUANTY:

Activity:

Shop Name:

Building Number

Point of Contact:

Code:

Phone:

POCHAZMIN:

Phone:

MISSION OF SHOP:

AUTOMOTIVE GARAGE

Personal Protection:

Areas of NAVOSH Concern:

Hazardous/Toxic Materials (Review
MSDS):

CHEMICAL NAME/STOCK
NUMBER/QUANTY:

Activity:

Shop Name:

Building Number

Point of Contact:

Code:

Phone:

POCHAZMIN:

Phone:

MISSION OF SHOP:

BATTERY SHOP

Personal Protection:
Safety glasses and shoes.

Areas of NAVOSH Concern:
Water and acid spills on floor.
Explosion hazard without adequate
ventilation.
Electrical hazard.

Hazardous/Toxic Materials (Review MSDS):
Sulfuric acid and hydrogen gas.

CHEMICAL NAME/STOCK
NUMBER/QUANTITY:

Activity:

Shop Name:

Building Number

Point of Contact:

Code:

Phone:

POCHAZMIN:

Phone:

MISSION OF SHOP:

BRAKE SHOP

Personal Protection:

Safety glasses and shoes, HEPA particulate respirator to enter areas with uncontrolled dust.

Areas of NAVOSH Concern:

Respirable particles – asbestos dust, beryllium dust.

Hazardous/Toxic Materials (Review MSDS):

Solvents, asbestos dust, beryllium dust.

CHEMICAL NAME/STOCK
NUMBER/QUANTITY:

Activity:

Shop Name:

Building Number

Point of Contact:

Code:

Phone:

POCHAZMIN:

Phone:

MISSION OF SHOP:

CHEMICAL/INDUSTRIAL LABORATORY

Personal Protection:

Safety glasses and possibly lab coat or apron.

Areas of NAVOSH Concern:

Chemical spills.

Broken glassware.

Chemical hazards specific to the lab.

Hazardous/Toxic Materials (Review MSDS):

Corrosives, flammables, carcinogens and other biohazards.

CHEMICAL NAME/STOCK
NUMBER/QUANTY:

Activity:

Shop Name:

Building Number

Point of Contact:

Code:

Phone:

POCHAZMIN:

Phone:

MISSION OF SHOP:

CHEMICAL STRIPPING SHOP

Personal Protection:

Safety glasses and shoes, hard hat, and possible coveralls or apron, gloves, and air purifying respirator.

Areas of NAVOSH Concern:

Confined spaces include (1) spaces below tanks. (2) ventilation ducts, and (3) scrubbers.

Elevated areas – ladders or scaffolding, platforms. Mechanical lifts.

Water, acid, grease spills on floor.

Electric hazards with power tools.

Hazardous/Toxic Materials (Review MSDS):

Solvents and greases, corrosives, metal compounds in solvents and sludges.

CHEMICAL NAME/STOCK
NUMBER/QUANTITY:

Activity:

Shop Name:

Building Number

Point of Contact:

Code:

Phone:

POCHAZMIN:

Phone:

MISSION OF SHOP:

ELECTRICAL SHOP

Personal Protection:

Safety glasses and shoes, gloves, hearing protection

Areas of NAVOSH Concern:

Electrical current exposure.

Confined spaces include large transformers undergoing repair.

Hazardous/Toxic Materials (Review MSDS):

Transformer oils, lead and zinc fumes.

PCBs. Asbestos.

CHEMICAL NAME/STOCK
NUMBER/QUANTITY:

Activity:

Shop Name:

Building Number:

Point of Contact:

Code:

Phone:

POCHAZMIN:

Phone:

MISSION OF SHOP:

FOUNDRY

Personal Protection:

Safety shoes, possibly special eye and hearing protection, and coveralls.

Areas of NAVOSH Concern:

Eye exposure to UV light.

Noise.

Thermal stress.

Hazardous/Toxic Materials (Review MSDS):

Lead, zinc, and other metal fumes.

CHEMICAL NAME/STOCK
NUMBER/QUANTITY:

Activity:

Shop Name:

Building Number

Point of Contact:

Code:

Phone:

POCHAZMIN:

Phone:

MISSION OF SHOP:

FUEL FARM

Personal Protection:
Safety shoes.

Areas of NAVOSH Concern:
Oil and fuel spills.
Flammable materials.

Hazardous/Toxic Materials (Review MSDS):
Oils, fuels (diesel, gasoline, AVGAS)
Carcinogens in gasoline, AVGAS.

CHEMICAL NAME/STOCK
NUMBER/QUANTITY:

Activity:

Shop Name:

Building Number

Point of Contact:

Code:

Phone:

POCHAZMIN:

Phone:

MISSION OF SHOP:

GROUND SUPPORT EQUIPMENT

Personal Protection:

Safety glasses and shoes, hard hat, coveralls, possible air purifying respirator.

Areas of NAVOSH Concern:

Overhead cranes and hoists, forklifts.

Flammable and toxic materials.

Spills.

Hazardous/Toxic Materials (Review MSDS):

Oils, fuels, solvents, paints, degreasers, compressed gasses, asbestos.

Carcinogens in fuels.

CHEMICAL NAME/STOCK
NUMBER/QUANTITY:

Activity:

Shop Name:

Building Number

Point of Contact:

Code:

Phone:

POCHAZMIN:

Phone:

MISSION OF SHOP:

**HAZARDOUS MATERIAL STORAGE
FACILITY**

Personal Protection:

Safety glasses and shoes, coveralls or apron depending on materials.

Areas of NAVOSH Concern:

Corrosive, oil, and chemical spills.
Flammable materials.
Forklift proximity.

Hazardous/Toxic Materials (Review MSDS):

Hazardous and toxic materials are listed in DOD 4145.19R.

CHEMICAL NAME/STOCK
NUMBER/QUANTITY:

Activity:

Shop name:

Building Number

Point of Contact:

Code:

Phone:

POCHAZMIN:

Phone:

MISSION OF SHOP:

**HAZARDOUS WASTE TRANSFER
FACILITY**

Personal Protection:

Safety glasses and shoes, hearing protection, hard hat, coveralls or apron depending upon wastes.

Areas of NAVOSH Concern:

Noise moving equipment, falling or flying objects, spills, leaking containers.

Hazardous/Toxic Materials (Review MSDS):

Waste oils, flammable liquids, carcinogens, corrosives, chemicals.

CHEMICAL NAME/STOCK
NUMBER/QUANTITY:

Activity:

Shop Name:

Building Number

Point of Contact:

Code:

Phone:

POCHAZMIN:

Phone:

MISSION OF SHOP:

HYDRAULIC SHOP

Personal Protection:
Safety glasses and shoes, coveralls.

Areas of NAVOSH Concern:
Oily spills.
Flammable materials.

Hazardous/Toxic Materials (Review MSDS):
Hydraulic fluids containing PCBs or
carcinogens.

CHEMICAL NAME/STOCK
NUMBER/QUANTITY:

Activity:

Shop Name:

Building Number

Point of Contact:

Code:

Phone:

POCHAZMIN:

Phone:

MISSION OF SHOP:

INDUSTRIAL WASTE TREATMENT
PLANT

Personal Protection:

Safety glasses with side shields, shoes,
hearing protection.

Areas of NAVOSH Concern:

Water spills on floor.
Possible noise.

Hazardous/Toxic Materials (Review MSDS):

Corrosives, phosphates, potash, chlorine gas.

CHEMICAL NAME/STOCK
NUMBER/QUANTITY:

Activity:

Shop Name:

Building Number

Point of Contact:

Code:

Phone:

POCHAZMIN:

Phone:

MISSION OF SHOP:

MACHINE SHOP

Personal Protection:

Safety glasses and shoes, hard hat, and hearing protection

Areas of NAVOSH Concern:

Moving machinery, nip points during use.

Cranes, fork lift proximity.

Spills.

Possible trip hazards.

Electrical hazard.

Hazardous/Toxic Materials (Review MSDS):

Cutting oils may contain carcinogens or PCBs.

CHEMICAL NAME/STOCK
NUMBER/QUANTITY:

Activity:

Shop Name:

Building Number

Point of Contact:

Code:

Phone:

POCHAZMIN:

Phone:

MISSION OF SHOP:

PEST CONTROL SHOP

Personal Protection:

Safety glasses and shoes, possibly gloves, coveralls or apron, adding particulate/acid gas, organic vapor/ammonia respirator to enter areas with uncontrolled dust or vapor.

Areas of NAVOSH Concern:

Respirable dusts and mists.

Possible confined spaces include (1) pesticide tanks and (2) spill control sumps.

Hazardous/Toxic Materials (Review MSDS):

Oils, insecticides, fungicides, rodenticides.

CHEMICAL NAME/STOCK
NUMBER/QUANTITY:

Activity:

Shop Name:

Building Number

Point of Contact:

Code:

Phone:

POCHAZMIN:

Phone:

MISSION OF SHOP:

PAINT SHOP

Personal Protection:

Safety glasses, shoes: coveralls and supplied air respirator to enter areas during operations.

Areas of NAVOSH Concern:

Overhead cranes and hoists.

Flammable paint vapors.

Hazardous/Toxic Materials (Review MSDS):

Solvents, paints.

CHEMICAL NAME/STOCK
NUMBER/QUANTITY:

Activity:

Shop Name:

Building Number

Point of Contact:

Code:

Phone:

POCHAZMIN:

Phone:

MISSION OF SHOP:

PLATING SHOP

Personal Protection:

Hard hat, safety glasses and shoes. For ventilation surveys; gloves and acid/organic vapor/particulate filtered respirator.

Areas of NAVOSH Concern:

Confined spaces include (1) spaces below tanks, (2) ventilation ducts, (3) scrubbers.

Elevated areas – ladders or scaffolding, platforms, mechanical lifts.

Water, acid, grease spills o floor.' Electric hazards with power tools.

Hazardous/Toxic Materials (Review MSDS):

Solvents and greases, acids, metal compounds.

CHEMICAL NAME/STOCK
NUMBER/QUANTY:

Activity:

Shop Name:

Building Number

Point of Contact:

Code:

Phone:

POCHAZMIN:

Phone:

MISSION OF SHOP:

SANDBLASTING AREA

Personal Protection:

Safety glasses and shoes, hearing protection, and hard hat.

Use supplied air entering blast area.

Areas of NAVOSH Concern:

Noise.

Particulates.

Overhead cranes.

Hazardous/Toxic Materials (Review MSDS):

Silica dust, paint waste dusts.

CHEMICAL NAME/STOCK
NUMBER/QUANTITY:

Activity:

Shop Name:

Building Number

Point of Contact:

Code:

Phone:

POCHAZMIN:

Phone:

MISSION OF SHOP:

SEWAGE TREATMENT PLANT

Personal Protection:

Safety glasses and shoes, hearing protection.

Areas of NAVOSH Concern:

Water and corrosive spills on floor.

Possibly noise.

Hazardous/Toxic Materials (Review MSDS):

Chlorine or fluorine gas, hydrogen sulfide.

CHEMICAL NAME/STOCK
NUMBER/QUANTITY:

Activity:

Shop Name:

Building Number

Point of Contact:

Code:

Phone:

POCHAZMIN:

Phone:

MISSION OF SHOP:

STEAM PLANT

Personal Protection:

Safety glasses and shoes. hearing protection
hard hat, coveralls. Add gloves and respirator
if going into air pollution equipment.

Areas of NAVOSH Concern:

Noise.
Heat stress.
Wet floors.

Hazardous/Toxic Materials (Review MSDS):

Corrosives, water softeners, phosphates,
morpholine, cyclohexamine, sodium, sulfates,
chelates.

CHEMICAL NAME/STOCK
NUMBER/QUANTITY:

Activity:

Shop Name:

Building Number

Point of Contact:

Code:

Phone:

POCHAZMIN:

Phone:

MISSION OF SHOP:

TORPEDO SHOP

Personal Protection:

Safety glasses and shoes, coveralls, hard hat.

Areas of NAVOSH Concern:

Use only non-sparking equipment.

Do not carry ignitables such as matches and lighters.

Use smoke generators only with CO and fire dept approval.

Slippery floors. Particulates

Overhead cranes.

Hazardous/Toxic Materials (Review MSDS):

PGDN (otto fuel), oils, greases, solvents. Oily dusts.

CHEMICAL NAME/STOCK
NUMBER/QUANTITY:

Activity:

Shop Name:

Building Number

Point of Contact:

Code:

Phone:

POCHAZMIN:

Phone:

MISSION OF SHOP:

WATER TREATMENT PLANT

Personal Protection:

Hard hat, safety glasses, shoes, and ear protection.

Areas of NAVOSH Concern:

Elevated areas – ladders, platforms, lifts.
Water, caustic, and acid spills.

Hazardous/Toxic Materials (Review MSDS):

Sodium chloride, chlorine or fluorine gas, acids.

CHEMICAL NAME/STOCK
NUMBER/QUANTITY:

APPENDIX B

CHECKLIST OF SAFETY EQUIPMENT Consider whether you need this equipment while you are on official travel.

Protective Clothing:

- Cloth coveralls
- Tyvec coveralls
- Booties
- Hood
- Gloves:
 - Rubber insulating (electricians) glove
 - Chemical resistant gloves
 - Viton elastomer gloves (PCBS)

Head Protection

- Hard hat

Eye Protection:

- Goggles
- Safety glasses

Hearing Protection:

- Ear plugs

Foot Protection:

- Steel toed shoes
- Steel toed boots

Respiratory Protection:

- Half-mask respirator
- Full-face respirator
- Cartridges selected for potential exposure
- SCBA

Other:

- Ground Fault Circuit Interrupter
- Harness and rope for confined space or elevated space tie-off
- Lockout or tagout materials.

Tools:

- Safety check completed

REGULAR SAFETY CHECKS FOR PROTECTIVE EQUIPMENT

Hard-hat: Ensure liner is properly attached and chin strap is in place. Adjust straps and liner to fit.

Gloves: Check for holes, proper fit, flexibility and possible contamination from previous use.

Goggles, safety glasses and side shields: inspect for defects or damage. If you find cracks or your vision is impaired, replace the item.

Respirator: Never use dirty or contaminated respirators.

Before using a respirator, do the positive and negative check for air leaks.

If you have difficulty breathing, change the filters.

If you detect a chemical odor or taste, change the chemical cartridges.

When finished with the respirator, remove the prefilters and cartridges and clean and store the respirator in a ziplock bag.

Safety Shoes and Boots: Test the flexibility of the shoes and boots. Check for worn soles and cracks in the leather. Check for a comfortable fit.

RESPIRATOR CARTRIDGE SELECTION

Atmospheric contaminant. Color assigned to be protected against

Acid gases	White
Organic vapors	Black
Ammonia gas	Green
Carbon monoxide gas	Blue
Acid gases and organic vapors	Yellow
Acid gases, ammonia, and organic vapors	Brown
Acid gases, ammonia, carbon monoxide, and organic vapors	Red
Other vapors and gases not listed above	Olive
Radioactive materials (exc. tritium and noble gases)	Magenta
Dusts, fumes, and mists (other than radioactive materials)	Orange

A purple stripe identifies radioactive materials in combination with any vapor or gas.
An orange stripe identifies dusts, fumes, and mists in combination with any vapor or gas.

Consult your safety specialist for specifics on acceptable exposures for any cartridge.

APPENDIX C

NFESC Safety Standards for Inspection of Electrostatic Precipitators

SAFETY. An electrostatic precipitator meets the definition of a confined space. Therefore entry is restricted to those people who are trained and certified to enter upon issuance of a permit to enter. See CBC Code 21 for training.

The operation of any electrostatic precipitator (ESP) is not so critical that time cannot be made to do it in a safe manner. Failure to follow strict safety procedures, developed for working with high voltage sources and for working in potentially hazardous atmospheres, can result in death, serious injury, or chronic illness. All personnel involved in the operation of the unit must train thoroughly in the safety aspects of the job. Base occupational safety and fire department personnel should also be familiar with the unit, associated hazards, and special requirements of fire or rescue operations resulting from operation of the ESP.

ELECTRICAL SAFETY. The voltages associated with an ESP can cause fatal shocks, burns, or secondary hazards (falling, dropping tools, etc.). Current produces a sensation of intense heating and burning along the current path with only slight muscular contraction. At about 3 to 10 milliamps the pain becomes unbearable and muscular contractions from breaking contact may bodily throw a person. Fatal falls may result from shock induced contractions. Respiratory paralysis occurs at 30 milliamps. Currents as low as 60 milliamps for only one quarter of a second may cause fibrillation--fatal without immediate cardio-pulmonary resuscitation (CPR). Higher currents can cause heart stoppage.

To prevent accidents, ESP designs include double interlocking safety controls that prevent entrance into the unit unless it has been deenergized. However, it is a common practice to bypass the interlocks when working on a troublesome unit. Periodic maintenance and inspection avoids another problem with the interlocks. At least one case has been reported where electrocution resulted when a worker entered a unit believed to be deenergized. In this instance corrosion of the interlock system prevented adequate grounding, and a fatality resulted.

NFESC recommends the following practices to prevent electrical accidents. Although they are considerably more conservative than most manufacturer's procedures, the extra time spent is well-worth the effort. Several manufacturer's service engineers now use these same procedures "after observing them."

A. Prior to initial startup or after the unit has been down for major electrical work verify that all controls are connected to the proper power supplies and that all circuit breakers are operational. Verify the electrical path for each electrical bus section by this typical sequence:

1. Power supply (main circuit breaker)
2. Transformer-rectifier (T-R) control
3. T-R set
4. Discharge electrodes.

B. Lubricate all key interlocks with graphite powder. Check to see that dust covers fit tightly and that all keys work easily. Activate all locks monthly and lubricate as required. When a lock fails, a by-passed interlock sets up a potentially fatal situation. It is management's responsibility to ensure that the interlock system is kept intact. Team leaders emphasis placed on the integrity of the interlocks helps to assure proper attitudes by operation and maintenance personnel.

C. NEVER RELY ON THE INTERLOCK SYSTEM TO ENSURE ADEQUATE GROUNDING. Always work in groups of at least two--NEVER WORK ALONE! All workers must maintain current CPR certification. We recommend the following entrance procedure:

1. Shut off unit at control panel.
2. Place personal lockout devices on main control switches. Each worker should have his own locks and have the only key--no two workers should have interchangeable keys. Make sure the rapper controls and any bushing heaters are also locked out. See Figure 12 for a lock out illustration. Note: ESPs have more than one electrical field.
3. Tag-out unit. Inform shift supervisor of your intention to enter unit. Get an entry permit (discussed below).
4. Ground out all transformer-rectifier (T-R) sets with interlock before you enter the unit. CAUTION: LISTEN FOR THE SOUND OF CORONA WHEN OPENING ANY DOORS AND BEFORE USING A HOT-STICK. CORONA SOUNDS LIKE A HIVE OF BEES. IF YOU HEAR IT, STOP. THE UNIT IS ENERGIZED.
5. Using a high quality hot-stick and wearing 40 kilovolt hot gloves, "buzz" high-voltage feed wire in doghouse. CAUTION: IF A BUZZING SOUND IS HEARD, STOP. THE UNIT IS ENERGIZED.
6. Ground cable to ESP ground. A good practice is to clean the bronze interlock strike with a file card and attach the cable to the strike. Check the resistance from the opposite end of the grounding cable to ground. The resistance must be less than 1 ohm.
7. Using the hot-stick, lay the grounding clamp onto the high-voltage wire. CAUTION: IF AN ARC OCCURS DO NOT ATTEMPT TO REMOVE THE GROUNDING WIRE. THE ARC COULD FOLLOW THE WIRE CAUSING FATAL INJURY. THE T-R OVERCURRENT LIMIT SHOULD TRIP. IF NOT, LET THE WIRE BURN OUT.
8. Using the hot-stick or 40 kilovolt hotgloves, tighten clamp to the high-voltage wire.
9. Still wearing hotgloves, measure resistance from high-voltage wire to ground. It must be less than 1 ohm.

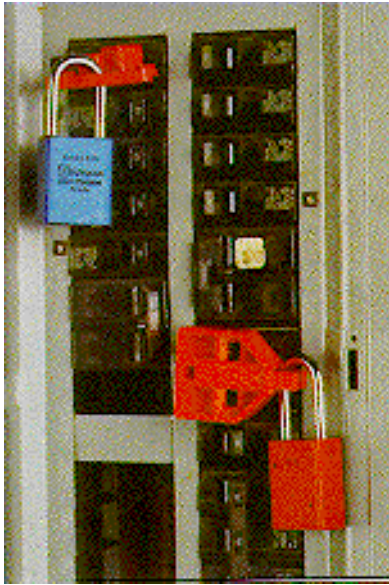
10. Open access door to desired compartment using interlock key. Listen for corona.
CAUTION: LISTEN FOR THE SOUND OF CORONA WHEN OPENING DOOR. IF YOU HEAR IT, STOP. THE UNIT IS ENERGIZED.

SAFE, SURE MEANS TO ELIMINATING INJURIES, EQUIPMENT DAMAGE OR WORK-SPOILAGE. SWITCHES OR VALVES CANNOT BE ACTIVATED UNTIL ALL LOCKS ARE REMOVED.

LOCK-OUT devices were specifically designed for use on fuse and switch boxes: steam, air or acid valves: all types of control units and levers--wherever there's danger to men or machines from the accidental operation of equipment.

LOCK-OUTS provide means of locking control devices. They serve as a warning tag which accommodates up to six individual padlocks.

Constructed of cast aluminum alloy, LOCK-OUTS can be forcibly removed in seconds, if necessary. They are a safety device, not a security lock! A heavy vinyl coating serves as insulation, prevents damage to finishes, etc.



LOCK-OUT FOR USE ON LOAD CENTER BOXES

The circuit breaker type switches in load center boxes lock into position with the new LOCK-OUTS. The hasp fits thru the wire holding device supplied by the box manufacturer, thereby preventing the switch from being locked into "ON" position. More and more new and re-designed power systems employ load center boxes.

Up to six padlocks can be used on each LOCK-OUT. Each crew or crew member at work on equipment at the same time uses one lock. Remove all locks to activate switches, valves or controls.

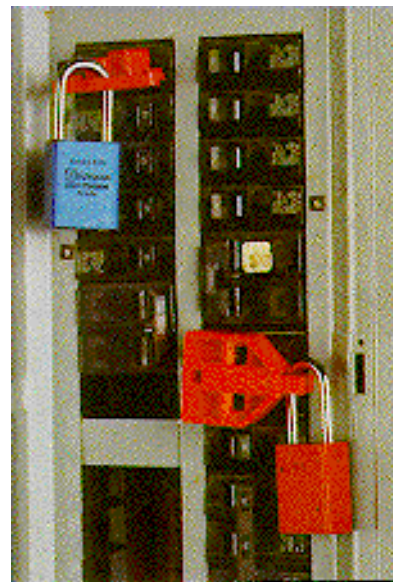


Figure 1. Personal Lock-out Devices

11. Using a hot-stick and hot-gloves as before, "buzz" discharge electrode wires. **CAUTION: IF A BUZZING SOUND IS HEARD, STOP. THE UNIT IS ENERGIZED.**

12. Attach ground cable to ESP ground as before. Again the resistance from the ground set to ground must be less than 1 ohm.

13. Using the hot-stick and wearing the hot-gloves, hook the grounding wire to a discharge electrode. **CAUTION: IF AN ARC OCCURS DO NOT ATTEMPT TO REMOVE THE GROUNDING WIRE.**

14. While one worker holds the grounding hook to the wire using the hot-stick and hot-gloves, the other worker can enter the ESP wearing proper respiratory protection. Inside the unit, a convenient ground can be established on the catwalk. Clean the area with the file card or a crosscut file and a grounding clamp attached. Wearing hot-gloves, clean an adjacent discharge electrode with the file card. Do not use the file on the electrode as damage can result. Attach the other end of the grounding cable to the wire using a bronze clamp. Check the resistance between the discharge electrode and the catwalk. The resistance should be less than 3 ohms. The unit is now grounded and safe. The worker outside should remove the hook and ground cable from the access door and store out of the way.

15. **ALWAYS HAVE A GROUND CABLE IN SIGHT WHEN WORKING INSIDE THE ESP. DON'T TRUST ANYBODY.** If the unit will be down for several days or more, disconnect all T-R sets from the discharge electrode frames before entering the ESP (at the doghouse or pent house locations). This a precaution to protect the T-R sets diode boards from electrical grounding damage (i.e. welding inside the ESP). Then have a welder attach a scrap piece of metal between the ESP wall and the electrical discharge fields.

16. Reverse procedure to bring unit back on line.

To ensure adequate protection properly maintain and periodically check all hot-sticks, hot-gloves, and grounding equipment. Always clean hotsticks before use. Clean and polish them before storing. Before using them, always visually inspect hot-gloves. Inflate them and check for leaks. Store hot-gloves away from sunlight and ozone. Do not fold them when storing. Clean hot-gloves and powder with talc after use. Semi-annually check hot-gloves with a high-voltage glove tester. Remember, those gloves can save a life!

If an ESP is going to be down for more than a few days, remove the high-voltage connection wire from the bus at the support insulator and ground it to the frame. Check the integrity of the ground with an ohm-meter.

FIRE AND EXPLOSION HAZARDS. Fires and explosions in ESPs usually result from the presence of unburned carbon in the boiler exhaust. By design, boilers burn fuel and transfer the released heat to the working fluid-water, while limiting losses of heat due to incomplete combustion or excess air.

Incomplete combustion, resulting from a variety of reasons, produces carbon particles which in the presence of sufficient oxygen (air leakage) and a source of ignition (high voltage sparking) can result in fire or explosion. Fires usually occur in the ash collection hoppers; explosions occur in the ESP unit itself.

Explosions most commonly occur during upset conditions when large quantities of finely divided unburned carbon enter the ESP. On startup of a coal-fired boiler, do not energize the ESP until the stack plume has turned from black to gray and the ESP has sufficiently purged to remove most oxygen. In a similar manner, ESPs should be deenergized prior to relighting a boiler after a flame failure. The use of a good startup procedure by ESP operators minimizes explosion risk. Additionally, boiler operators must be trained in ESP operation safety to prevent accidents during upset conditions.

Fires are most likely to occur in the collection hoppers or duct work where fly ash accumulates. Again, start-ups and upsets produce high carbon content ashes that will burn when exposed to the proper temperatures and oxygen concentrations. Poor boiler combustion produces a high combustible content flyash which not only degrades ESP performance but is a fire hazard. Good boiler operation and maintenance cannot be overstressed.

Minimize fire hazards by controlling air leakage and by keeping the hoppers empty. Air leakage is usually the result of gasket failures or duct deterioration caused by weathering or flue gas corrosion. Control both sources of air leakage by proper preventive maintenance and steady boiler operation.

Hopper maintenance is crucial for proper ESP operation and to keep the quantity of combustible material low. Correct over and under temperature excursions within the hopper immediately. Relieve hopper discharge plugging at the first alarm sound. Remove from service hoppers that habitually overflow and identify and correct the cause of the problem. When ESPs are off-line, clean and inspect all hoppers. Pay special attention to the build-up of hardened ash on the walls and large chunks in the apex. When the hopper is reheated during startup, the expansion of the walls will often dislodge remaining ash and cause hopper plugging. Poor operation and/or poor maintenance practices at the plant cause the majority of fires and explosions.

RESPIRATORY PROTECTION. Workers inside an ESP require respiratory protection from toxic gases and particulates. The National Institute of Occupational Safety and Health (NIOSH) sets specific guidelines for working inside confined spaces. All personnel working inside the units must read the entire document. Personnel must rigidly adhere to the rules set forth by NIOSH. See Appendix F.

An ESP out-of-service is a class "B" space, unless shown by testing to be safer. Toxic gas hazards come primarily from the presence of sulfur dioxide (SO₂), but carbon monoxide (CO), ozone (O₃) and various unburned hydrocarbons also may be present. Never make entry into the unit without first opening it to provide adequate ventilation. Also, close the dampers between the boilers and the ESP to prevent intrusion of toxic gases. Wear a respirator with acid-gas rated cartridges unless air samples are tested for SO₂ and found to be safe. NIOSH requires permitting

prior to entry A safety watchman with rescue apparatus (rope and self-contained breathing apparatus-- SCBA) is to be within speaking distance of workers. At the first sign of dizziness, bad taste or smell, workers shall immediately leave the ESP and report the incident to their supervisors.

Sulfur dioxide has a strong pungent smell and acid taste. The taste threshold for SO₂ is about 0.3 ppm. At 1 ppm SO₂ becomes very unpleasant; at 5 ppm, respiratory irritation occurs and spasmodic reactions can result. Exposure to low levels of SO₂ can cause a pneumonia type reaction. Exposure to high levels, such as those associated with burning of fossil fuels, can cause death.

Carbon monoxide is odorless, tasteless, and colorless. Short term exposure causes headaches and impaired judgment; higher concentrations kill. Carbon monoxide also is cumulative. Ozone has the smell associated with electrical arcs. Ozone is detected by smell in concentrations as low as 0.02 ppm. Nasal and throat irritation begin at about 0.3 ppm. At 1 ppm, severe respiratory restriction occurs. Exposure results in aging of lung tissue and increased respiratory infections. Never work downstream from an energized ESP. The ozone concentrations can kill.

Normally, ozone and carbon monoxide levels in out-of-service, deenergized ESPs are very low. Acid-gas cartridge respirators provide almost no removal of ozone and carbon monoxide. Keep a standby SCBA for rescue. Note that acid-gas cartridges occasionally give a slight ammonia odor when used in areas with sulfur dioxide. This is normal and is not cause for alarm.

Fine particulate is usually a more severe problem than toxic gases in an ESP. Equip respirator cartridges with particulate prefilters. Although the cartridges are adequate, prefilters are inexpensive and will extend their usable life. Prolonged exposure to fine particulates is believed to be related to numerous respiratory diseases, including carcinoma. Minimize exposure.

RESPIRATORY SAFETY. Assign workers their own respirators or maintain them centrally. Thoroughly clean respirators after each use. Test respirators for fit each time they are worn. Full-face respirators tend to fit best and provide the best protection. Facial hair normally interferes with the respirator seal. Beards shall not be worn by workers requiring respiratory protection. Workers using respirators require training prior to use.

LIGHTING. Provide adequate lighting for safe work inside the unit. Provide approximately one 150-watt spotlight per worker. Some jobs may require more light or the use of high intensity flood lamps. NFESC uses GE 150 PAR/SP industrial spotlights for inspection work. Cord sets are made-up using McGill 7000 SG 38 grounded industrial extension lights with Carol 2035 16/3 SO Vutron 90oC cord. For high intensity lighting, NFESC uses Specialty Lighting 1500watt quartz/halogen portable floodlights. The GE, McGill, and Carol supplies are normally available from local electrical distributors. The Specialty Lighting units are available from:

Specialty Lighting, 926 Arlene Place, Anaheim, CA 92803
(714) 778-1840

FALLS. Falls inside an ESP can be fatal. Inside the unit, the best prevention is worker caution. Ladders or temporary support use require careful supervision to ensure they are adequately secure. Some situations require use of harnesses and safety lines. Hoppers need hand and foot holds inside as shown in Figure 13. Where possible use temporary scaffolding, especially in the lower parts of hoppers. Remove pipes, ladders, clips and other protrusions from inside the lower half of hopper walls to alleviate obstructions. Ash bridging starts by building from protrusions on side walls.

Prevent falls outside the ESP by using safety rails and ladder cages and by placing proper handholds above hopper and ESP entry covers. Provide adequate access to hopper doors, poke holes, and strike plates. Maintain and repair all guards and rails.

BURNS. Burns can occur from hot metal inside the ESP. Adequately cool ESPs before entry. Wear gloves to prevent direct contact with any hot spots. Fatal burns can occur from arcs initiated during ESP grounding. Always follow the recommended electrical safety procedure. Never wear flammable or synthetic clothing unless specifically designed for hot wear (Nomex or poly-aramide).

Burns can also occur when opening hoppers. When opening hopper doors, slightly open the doors and probe the area above with a 5 to 6 foot wooden stick. Even when the lower has been emptied, it is still possible that mounds of material may remain lodged in the upper portion. When doors are left open, check the hoppers for any build-up that may dislodge and fall on personnel. This is especially important if either hot or pyrophoric material is present.

Note: Fly ash buildups are a greater burn potential than hot metal. Usually units are allowed to cool for a day after manholes are opened, allowing plenty of time for cooling. But flyash can smoulder for weeks. Stepping into a pile of flyash can give a severe burn.

PERSONNEL. Adequate continued operation of an ESP requires long-term, dedicated personnel assignments. The people assigned to ESP operation and maintenance need to be present when manufacturer's technicians are on-site. These time periods present opportunities to learn specifics about the individual ESP and control system. ESP personnel can use these times to have technicians demonstrate such troubleshooting techniques as oscilloscope hook-up, checkpoint reading, and corrective actions to be used to obtain the proper readings required for optimum operation. Personnel change after the initial work on the unit is complete causes loss of much of this experience.

Experience shows that it takes a special type person to spend long hours in the dusty, uncomfortable working conditions required to assure successful ESP operation. Rarely is this willingness combined with the electronic technical skills required to troubleshoot the complex controls. However, the operator is a valuable resource when dealing with an ESP.

APPENDIX D

Federal Employee's Notice of Traumatic Injury and Claim for Continuation of Pay/Compensation

U.S. Department of Labor
Employment Standards Administration
Office of Workers' Compensation Programs
Form CA-1

These questions must be answered. If you are injured on travel, give the information to your supervisor.

1. Name of employee
2. Social Security Number
3. Date of Birth
4. Sex
5. Home Telephone
6. Grade as of date of injury
7. Employee's complete home mailing address
8. Dependents
9. Place where injury occurred (be specific with room number, floor, etc.)
10. Date injury occurred, Time of day
11. Date of this report
12. Employee's occupation
13. Cause of injury (What happened and why)
14. Nature of injury (Both injury and part of body)
15. Signature of injured or representative.

6320
Ser 33/61104013A
19 Dec 1986

From: Commander. Naval Medical Command
To: Commanding Officer. Naval Energy and Environmental Support Activity. Port Hueneme,
CA 93043-5014
Via: (1) Commander, Naval Medical Command Southwest Region
(2) Commander. Naval Facilities Engineering Command

Subj: MEDICAL TREATMENT OF EMPLOYEES DURING OFFICIAL TRAVEL

Ref: (a) Your ltr 12720 Ser 111A/2304 of 25 Sep 86
(b) NAVMEDCOKINST 6320.3A

1. I am responding to reference (a) concerning the extent of medical treatment your civilian employees may expect while on official travel away from your Command. Guidance was requested concerning two specific incidents.
2. The first incident involved an employee on Temporary Additional Duty (TAD) at the Naval Air Station, Brunswick, Maine. While on TAD, a civilian employee is considered in a duty status 24 hours a day. Accordingly, such employees are entitled to care for occupationally related injuries or diseases, at no charge to the employee, while away from their primary duty stations. The employee in question was certainly eligible for care through the Occupational Health Service at the Naval Branch Medical Clinic. If the required service was not available at time of need because the Occupational Health Service was closed, the Emergency Room or Walk-in Clinic should have readily provided care.
3. The second incident cited involved two civilian employees on TAD to Subic Bay. Entitlement to care is similar to the case cited above. Your employees should have been evaluated and provided treatment at no cost to the employees. Because they were away from their primary duty stations and are thus in a duty status 24 hours a day. their care should have been provided by Naval Hospital, Subic Bay. Republic of the Philippines under the purview of occupational health.
4. Reference (b) will be revised to clarify the issues you have raised. Under separate letters. I am informing the Naval Hospital Subic Bay. Republic of the Philippines and the Naval Branch Medical Clinic, Naval Air Station. Brunswick, Maine of this decision.
5. I appreciate your bringing this to my attention. Should you or your staff have any further questions concerning these issues please call . Head Beneficiary Services Division, at autovon 294-1102 or autovon 294-1179.

Deputy Commander for Heath Care Operations

APPENDIX E

HOW TO SURVIVE A HOTEL FIRE

WHAT TO DO IF ROOM DOOR IS HOT OR SMOKE IS DENSE IN HALL.

Stay in your room and still survive a fire. Here are some things you should do:

- § Open window to vent room if there is any smoke. If you are on first or second floor you may be able to drop to ground safely. If you are up any higher you are usually better off staying put. Although some people survive jumps from 35 feet or more, they are usually seriously injured.
- § Let someone know you are in room. If the phone works, call for help. Hang a bed sheet out the window to signal firefighters, but don't try to climb down.
- § Fill the tub with water. It might be needed for fire fighting. Turn on the bathroom fan if it helps to clear your room of smoke.
- § Wet towels and sheets. You'll need them to put around doors and cracks if smoke seeps in. Use your ice bucket to bail water.
- § Get fresh air. Make a tent over your head with a blanket at a slightly opened window to get fresh air. If the windows do not open, you may have to break one out with a chair or drawer. If heat and flames are rising outside the window from a lower floor, don't breathe smoke-laden air.
- § As a last resort. Finally, if your room becomes untenable, you may be forced to make for the best exit. But remember to keep low.
- § Remember that few people are burned to death in fires. Most people die from smoke, poisonous gases and panic. Panic is usually the result of not knowing what to do. If you have an escape plan and adapt it to the emergency, you can greatly increase your chances of survival.
- § **TIP TO TRAVELERS:** It's a good idea to always pack a flashlight in your suitcase. You may need it to guide yourself through smoke or darkness.

*****Please Note*****

The preceding recommendations are merely suggestions and not to be construed otherwise. Each person should exercise his or her own independent judgement. (From a public service flier.)

APPENDIX F

References:

29 CFR 1910.147 "The Control of Hazardous Energy (lockout/ tagout)"
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