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MARE ISLAND
SSIC NO. 5090.3.A

ECC

ENVIRONMENTAL
CHEMICAL
CORPORATION

CORPORATE HEALTH & SAFETY PLAN

OE RESPONSE AT SEVERAL SITES,
MARE ISLAND NAVAL SHIPYARD
VALLEJO, CALIFORNIA

Submitted To:

Commander, Pacific Division
Naval Facilities Engineering Command
Pearl Harbor, HI

Contract No. N62742-98-D-1809
CTO 0001

August 19,1999

1240 Bayshore Highway
Burlingame, California 94010
Telephone: (650) 347-1555 Facsimile: (650) 347-4571

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Submitted By:

Environmental Chemical Corporation
1240 Bayshore Highway
Burlingame, CA 94010
(650) 347-1555

August 19, 1999

ECC
ENVIRONMENTAL
CHEMICAL
CORPORATION

August 20, 1999

Ref: 6140-COR-049

Ms. Lynn Shusterich
Contracting Officer
Pacific Division
Naval Facilities Engineering Command
Building 404
Pearl Harbor, HI 96860-7300

Contract: Contract No. N62742-98-D-1809 Contract Task Order 001, "Investigation and Response Actions for OE Related Materials, Former Mare Island Naval Shipyard".

Subject: Transmittal of Corporate Health and Safety Plan

Dear Ms. Shusterich:

Enclosed is one copy of the subject Plan. This Plan has been updated and incorporates the Navy's review comments on the November 3, 1998 Draft Corporate Health and Safety Plan. A Compliance Matrix, which indicates the response to each review comment, has been included in the front of the document. Also included in the front of the document is a matrix showing an overview of the updated material that has been incorporated into each Section of the Plan.

Copies of the subject Plan have been transmitted per the distribution below.

If you have any questions, please contact me at (650) 347-1555 x126 or Mr. Terry Grummitt, ECC Senior Manager at x324.

Sincerely,

Manjiv S. Vohra, P.E.
Program Manager

Distribution
Ms. Lynn Shusterich, PacDiv. – 1 Copy
Ms. Debbie Loo, PacDiv. COTR - 2 Copies
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Compliance Matrix for Navy Review Comments
On 11/3/98 Draft Program Corporate H&S Plan

No.	Section	Comment	Response
1	Corp. HSP (Page 38, Section 7.2.1. **(Note: Section 7.2 has been renumbered and is now Section 9.0 in the updated Corporate HSP.**	a. The text states on page 38 that a medical surveillance program is required for employees who are or may be exposed to substances above permissible levels. b. The text does not include stressors (e.g., noise) which require a medical surveillance program when personnel are overexposed. Recommendation: Include in the text the requirement for a medical surveillance program when personnel are overexposed to stressors such as noise.	Note: The ECC Corporate HSP was updated in March 1999. In the updated Corporate HSP, which has been made a part of this submittal, many of the Sections have been renumbered. ECC has included a Section by Section comparison of the 11/3/98 Draft Corporate HSP submitted and reviewed by the Navy and the Final Corporate Health and Safety Plan. This comparison also describes the updates made to each Section. The response to this recommendation is covered in two places in the updated Corp. HSP. Section 9.0 (old Section 7.2) of the Corp. HSP Plan outlines ECC's "Medical Surveillance Program", which requires an annual audiogram for personnel with a potential noise exposure above 85 decibels. Section 14 (old Section 7.2.7) of the Corp. plan describes ECC's "Hearing Conservation Program", which requires noise level monitoring and engineering controls for persons exposed to noise over 85 decibels.
2	Corp. HSP (Page 41, Section 7.2.7. **Note: Section 7.2.7 has been renumbered and is now Section 14.0 in the updated Corporate HSP**	a. The text states on page 41 "Ear protection shall be worn when noise levels prevent conversation in a normal tone of voice at a distance of three feet". b. The text does not include the requirement that personnel wear hearing protection when the equipment is labeled noise hazardous. Recommendation: The text should include the requirement that personnel wear	Section 14.0 (old Section 7.2.7)"Hearing Conservation Program." of the updated Corp. HSP outlines in detail ECC's requirement for hearing protection and noise monitoring program. The program addresses the following subsections: Policy, Purpose, Hearing Conservation Program Requirements, Monitoring, Employee Notification, Audiometric Testing Program,

		hearing protection when equipment labeling requires it.	Hearing Protectors, Hearing Protector Attenuation, Training Program, Access to Information/Training Materials, and Record Keeping.
3	Corp. HSP Page. 43, Section 7.2.8. **Note: Section 7.2.8 has been renumbered and is now Section 16.0 in the updated Corporate HSP**	Guidance for proper field management and treatment of heat stroke is unclear. Heat stroke is a true medical emergency and the casualty must be treated immediately while awaiting emergency medical transportation to the nearest medical facility. Recommendation: Clearly state how heat stroke will be managed and treated. Additional guidance can be found in the NIOSH/OSHA/EPA/USCG Occupational Safety and Health Manual for Hazardous Waste site Activities, DHHS(NIOSII) Publication No. 85-115, dated October 1985.	Section 16.0 (old Section 7.2.8) "Heat Stress Monitoring Program" incorporates the following safeguards against heat stroke: Control Measures with the implementation of the ACGIH's "Heat Threshold Limit Values for Different Work Schedules" and the use of Employee Monitoring by incorporating the "Heat Stress Monitoring Frequency Table."
4	Corp. HSP Page 65, Section 7.9.2. "Notification Procedures" and Page. 67, Section 7.10.3. "Excavation and Exposure of the UST". **Note: Sections 7.9 and 7.10 have been renumbered and are now Sections 18.0 &19.0 in the updated HSP.**	The text on page 65 states that "At no time will ECC (Environmental Chemical Corporation) allow employees or subcontractors in excavations greater than 5 feet in depth without the proper shoring or sloping/benching". However, the text states on page 67 that "no person shall be allowed to enter any excavation greater than four feet deep without the proper shoring requirements". Recommendation: The text on pages 65 and 67 contradict themselves and should be clarified.	This has been corrected in the updated Corp. HSP. Sections 18.0 (old Section 7.9) "Excavation and Trenching Safety" and 19.0 (old section 7.10) "UST Removal Program" have been updated sot that they both state that no person shall be allowed to enter any excavation greater than 5 feet deep without proper shoring requirements.

Matrix Showing Updated Material
Incorporated into the Final Corporate H&S Plan

Draft Corp. HSP Sect.	Final Corp. HSP Sect.	Section Title	Updated Material Incorporated Into Draft Corporate HSP
1.0	1.0	Safety Policy Statement	NONE
2.0	2.0	Acknowledgement/Employee Sign-off	NONE
3.0	3.0	Safety Communication Policy	NONE
4.0	4.0	General Information and Responsibility	Incorporated the following new sections: Policy, Purpose, Corporate Safety and Health Organization (C.S.P., C.I.H., C.H.P., OEW Specialist, Chemical Hygiene Officer); Job description of Site Safety and Health Officers (SSHO)."
5.0	5.0	Hazard Evaluation and Analysis	NONE
-----	6.0	Air Monitoring Program	Incorporated ECC's Air Monitoring Program to be in accordance with 29 CFR 1910.1000 and 8 CCR 5155 – Air Contaminants. The following new subsections were added: Policy, Purpose, Methods, Requirements, Principles of Data Collection and Measurement, Characteristics of Air Monitoring Instruments, Field Instruments, Instrumentation Program, and Monitoring and Interpretation.

Draft Corp. HSP Sect.	Final Corp. HSP Sect.	Section Title	Updated Material Incorporated Into Draft Corporate HSP
6.0	7.0	Hazard Communication Program	Updated ECC's HAZCOM Program "Right to Know" to include the following: Policy, Purpose, and Definitions.
7.0	8.0	Health & Safety Training Program	Updated and expanded ECC's training programs to be in accordance with 29 CFR 1910 & 1926, state regulations and ECC's health & safety policies and procedures. Subsections include: Policy, Purpose, Health & Safety Training Programs (i.e., Hazwoper, HAZCOM, Radiation, CPR/First Aid, Bloodborne Pathogen, Carcinogen and Chemical-Specific, Confined Space, Site Specific, and Visitor Orientation), and the description of "Safety Trainers."
7.2	9.0	Medical Surveillance Program	Updated ECC's Medical Surveillance Program to be in accordance with 29 CFR 1910 and 1926.
7.5	10.0	Site Control Program	NONE
7.4	11.0	Respiratory Protection Program	Updated and expanded ECC's Respiratory Protection (RSP) Program to be in accordance with the "NEW" requirements under 29 CFR 1910.134 and 8 CCR 5144. ECC's RPP includes the following new subsections: Policy, Purpose, Definitions, Respiratory Protection Program Requirements, Selection and Use of Respiratory Protective Equipment, Medical Evaluation, Respirator Fit-Testing, Use of Respirators, Maintenance and Care of Respirators, Breathing Air Quality and Use, Identification of Filters, Cartridges, and Canisters, Training/Information, Program Evaluation, and Record Keeping.
7.3	12.0	Personal Protective Program	Updated ECC's Personal Protective Equipment (PPE) Program to be in accordance with 29 CFR 1910 Subpart I – PPE (1910.132 to 1910.139). The following new subsections have

Draft Corp. HSP Sect.	Final Corp. HSP Sect.	Section Title	Updated Material Incorporated Into Draft Corporate HSP
			been updated/added: Policy, Purpose, Hazard Assessment and PPE Selection, PPE (Levels of Protection), PPE Inspection Program, Care of Equipment, and Training.
7.6	13.0	Decontamination Program	NONE
7.2.7	14.0	Hearing Conservation Program	Updated and expanded ECC's Hearing Conservation Program (HCP) to be in accordance with 29 CFR 1910.95. The following new sections are included in the HCP: Policy, Purpose, Hearing Conservation Program Requirements, Monitoring, Employee Notification, Audiometric Testing Program, Hearing Protectors, Hearing Protector Attenuation, Training Program, Access to Information/Training Materials, and Record Keeping.
-----	15.0	Cold Stress Monitoring Program	Incorporated ECC's Cold Stress Monitoring Program for ECC employees working in cold environments. The following new subsections have been implemented: Purpose, Cold Disorders (i.e., Hypothermia, Frostbite, Trench Foot, and Frostnip), and Evaluating Cold Environments.
7.2.8	16.0	Heat Stress Monitoring Program	Updated and expanded ECC's Heat Stress Monitoring Program to include the following new subsections: Purpose, Control Measures (i.e., Heat Threshold Limit Values for Different Work Schedules), and Monitoring (i.e., Heat Stress Monitoring Frequency).
7.8	17.0	Confined Space Entry Program	NONE
7.9	18.0	Excavation and Trenching Safety Program	Updated ECC's Excavation/Trenching Safety Program. All excavation work shall be performed in accordance with 29 CFR 1926 Subpart P – Excavations (1926.650-1926.652). The following new subsections are implemented: Policy, Purpose, Notification Procedures, and Excavation Safe Work Practices.

Draft Corp. HSP Sect.	Final Corp. HSP Sect.	Section Title	Updated Material Incorporated Into Draft Corporate HSP
7.10	19.0	UST Removal Program	NONE
7.11	20.0	Electrical Safety Program	NONE
7.16	21.0	Lockout/Tagout Program	NONE
7.12	22.0	Vehicle and Heavy Equipment Safety Program	Updated ECC's Vehicle and Heavy Equipment Safety Program in order to be in accordance with 29 CFR 1926 and company policies/procedures. The following new subsections are addressed: Policy, Purpose, and Vehicle Traffic Hazards.
--------	23.0	Hoisting/Rigging and Crane Operations Program	Incorporated ECC's Hoisting/Rigging and Crane Operations Program to comply with 29 CFR 1926. The following new subsections have been incorporated: Policy and Purpose.
-------	24.0	Fall Protection Program	Incorporated Fall Protection Program due to exposure to employees. The program is in accordance with 29 CFR 1926 – Fall Protection (1926.500 to 1926.503). The following new subsections have been addressed: Policy, Purpose, Hoist Areas, Work Areas/Activities, and Training Requirements.
7.19	25.0	Emergency Response and Contingency Program	NONE
7.17	26.0	Spill and Discharge Control Program	NONE
7.18	27.0	Fire Protection Program	Updated ECC's FPP in accordance with 1910 & 1926. New subsections include the

Draft Corp. HSP Sect.	Final Corp. HSP Sect.	Section Title	Updated Material Incorporated Into Draft Corporate HSP
			following: Policy, Purpose, Flammable and Combustible Liquids, Hot Work, and Fire Extinguishers.
7.15	28.0	UXO Safety Program	Updated and expanded ECC's UXO Safety Program. The following new subsections have been added/updated: Purpose, UXO Training, UXO/Explosive Hazard Recognition, Basic Safety Precautions, General Safety Precautions by Ordnance Type, UXO Safety Precautions for Site Characterization, Ordnance Avoidance for HTRW Activities, Restricted/Exclusion Area of Operations, Excavation Operations, Disposal Operations, UXO Sweep Operations, and Transportation.
7.20	29.0	Asbestos Abatement Program	Updated ECC's Asbestos to be in accordance with 29 CFR 1910 & 1926; 40 CFR; EPA 340/1-90-018 and 019; and NIOSH-01. The following new subsections are addressed: Purpose, Scope, Program Administrator, Establishing a Regulated Work Area, Remediation Procedures inside a Regulated Work Area, Security Guard Interface, Asbestos Containing Material Repair and Encapsulation Procedures, Disposal and Transportation of Asbestos Containing Waste, Interface with Trades Involved with Construction, Safety Precautions, Emergency Response and Contingency, Air Monitoring Strategies, and Medical Monitoring Plan.
7.21	30.0	Radiation Protection Program	Updated ECC's Radiation Protection Program (RPP) in accordance with 10 CFR 20 The following new subsections have been added / updated: Introduction, Organization & Responsibilities, Project Related Activities, Records/Reports, and Standard Operating Procedures.
8.0	31.0	Chemical Hygiene Plan (Program)	NONE
------	32.0	Diving Management Program	Incorporated ECC's Diving Management Program (DMP). The DMP has been prepared in accordance with OSHA (29 CFR 1910 Subpart T), NAVSHIPS 0994-001-9010 (U.S. Diving Manual); NAVSHIPS 0994-009-6010 (U.S. Navy Diving Operations Manual);

Draft Corp. HSP Sect.	Final Corp. HSP Sect.	Section Title	Updated Material Incorporated Into Draft Corporate HSP
			OPNAVINST 9940.1 (series) (U.S. Diving Program); and OPNAVINST 3150.28 (series) (Combined Diving Log-Accident/Injury Report). The following new subsections have been incorporated: Policy, Purpose, Definitions of Terms, Personnel Qualifications, Personnel Requirements and Qualification of Dive Team, Pre-Dive Procedures, Procedures During Diving Operations, Diving Emergencies, Post Dive Procedures, Scuba Diving, Search Methods, and Record Keeping Requirements.
7.12.1	33.0	Driver Fleet Safety Program	NONE
-------	34.0	Biological Hazard Program	Incorporated Biological Hazard Program (BHP) due to the nature of ECC's work activities and the potential biological hazards, which may exist. The following new subsections have been submitted: Purpose, Rodents, Snakes, Warm Blooded Animals, Tick-Borne Diseases, and Minor Bites/Stings.
7.13	35.0	Blood Borne Pathogen Program	NONE
7.14	36.0	Drug and Alcohol Program	NONE
-------	37.0	OSHA Record Keeping Program	Incorporated ECC's OSHA Record Keeping Program to be in accordance with 29 CFR 1904 "Record and Reporting Occupational Injuries and Illnesses." This section is implemented in all ECC site specific safety plans. The following subsections are addressed: Policy, Purpose, Description of the Forms, Type of Accidents Covered, OSHA Reporting, Postings, Definitions/Applications, Medical Treatment, First Aid Treatment, and Maintenance of Records.
-------	38.0	Safety Incentive Program	Incorporated ECC's Safety Incentive Program, which complies, with the state of

Draft Corp. HSP Sect.	Final Corp. HSP Sect.	Section Title	Updated Material Incorporated Into Draft Corporate HSP
			California's requirements for 8 CCR 3203 "Injury and Illness Prevention Program." ECC's Safety Incentive Program includes the following subsections: Subject, Target Participants, Background, Objective, Implementation, and Example Project.
------	39.0	Hand and Power Tools Safety Program	Incorporated ECC's "Hand and Power Tool Safety Program" to reduce the likelihood of injuries and accidents caused by improper handling. Complies with the following standards: 29 CFR 1910 Subpart P; and 29 CFR 1926 Subpart I. The following new subsections are addressed: Policy, Purpose, Safe Operating Requirements, Hand Arm Vibration (HAVs) – Reynaud's Syndrome, and Safe Inspection Checklist.
-------	40.0	Back Injury Prevention Program	Incorporated ECC's BIIP to identify existing or potential back exposure hazards in the work environment; identify and evaluate risk factors causing the problems; design and implement control measures; and to monitor/evaluate the effectiveness of the control measures being implemented. The following new subsections have been incorporated: Purpose, Back Injuries, Correct Lifting and Reaching Procedures, and Employee Protective Equipment (Back Support Belts).
7.20	41.0	Lead Remediation Operating Procedures	Incorporated ECC's Lead Remediation Standard Operating Procedures to ensure a safe and healthy work environment for ECC's employees and to be in accordance with the Federal Lead Standard. The following new subsections have been incorporated: Policy, Purpose, Program Administrator, Methods of Compliance, Employee Training, Medical Monitoring, Characterization, Storage, Transportation, and Disposal of Lead Waste.

Draft Corp. HSP Sect.	Final Corp. HSP Sect.	Section Title	Updated Material Incorporated Into Draft Corporate HSP
-------	42.0	Disciplinary Procedure	Incorporated ECC's Disciplinary Procedure Program. All employees are expected to comply with professional standards of behavior and performance. Any deviation from these standards must be corrected and will be subject to discipline.

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40.0 BACK INJURY PREVENTION PROGRAM *(Prepared - May 1999)*

41.0 LEAD REMEDIATION OPERATING PROCEDURES *(Prepared - July 1999)*

42.0 DISCIPLINARY PROCEDURES *(Prepared - August 1999)*

ATTACHMENTS: Accident Investigation Form, Visitors Information Form, Compliance Agreement, Tailgate Safety Meeting, Respirator Medical Evaluation, USACE Equipment Checklist

LIST OF ACRONYMS

AC	Alternating Current
ACBM	Asbestos-Containing Building Material
AHERA	Asbestos Hazard Emergency Response Act
AIDS	Acquired Immune Deficiency Syndrome
AIHA	American Industrial Hygiene Association
ALARA	As Low As Reasonably Achievable
ANSI	American National Standards Institute
APR	Air Purifying Respirator
bpm	beats per minute
CCR	California Code of Regulations
CFR	Code of Federal Regulations
CHSS	Corporate Health and Safety Specialist
CHST	Construction Health and Safety Technician
CHO	Chemical Hygiene Officer
CHP	Chemical Hygiene Plan
CIH	Certified Industrial Hygienist
CPR	Cardio-pulmonary Resuscitation
CRZ	Contaminant Reduction Zone
CSP	Certified Safety Professional
CTS	Carpal Tunnel Syndrome
CWM	Chemical Warfare Material
DOT	Department of Transportation
DSHO	Dosimetry Safety and Health Officer
ECC	Environmental Chemical Corporation
EKG	Electrocardiogram
EMR	Electromagnetic Radiation
EOD	Explosive Ordnance Division
EZ	Exclusion Zone
GFCI	Ground Fault Circuit Interrupter
GISO	General Industry Safety Orders (California)
HAVS	Hand Arm Vibration Syndrome
HAZCOM	Hazard Communication
HAZWOPER	Hazardous Waste Operations and Emergency Response
HBV	Hepatitis B Virus
HEPA	High Efficiency Particulate Air
HIV	Human Immunodeficiency Virus
H&S	Health and Safety
HVAC	Heating, Ventilation and Air Conditioning
IARC	International Agency for Research on Cancer
IAW	in accordance with
IDLH	Immediately Dangerous to Life and Health
IIPP	Injury and Illness Prevention Program
IMED	Airport Industrial Medical Clinic

kV	Kilovolts
LCM	Lead Containing Material
LEL	Lower Explosive Limit
LBP	Lead Based Paint
mR/hr	milliRoentgens/hour
MSDS	Material Safety Data Sheet
NCRP	National Council on Radiation Protection and Measurement
NEC	National Electric Code
NIOSH	National Institute for Occupational Safety and Health
NPE	Negative Pressure Enclosure
NRC	Nuclear Regulatory Commission
NTP	National Toxicology Program
OE	Ordnance Explosive
OEW	Ordnance and Explosive Waste
OSHA	Occupational Safety and Health Administration
PDU	Pressure Decontamination Unit
PEL	Permissible Exposure Limit
PID	Photo Ionization Detector
PM	Project Manager
PPE	Personal Protective Equipment
PVC	Poly Vinyl Chloride
QA/QC	Quality Assurance/Quality Control
QCM	Quality Control Manager
SCBA	Self Contained Breathing Apparatus
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
SZ	Support Zone
TLV	Threshold Limit Value
TSP	Tri Sodium Phosphate
UL	Underwriter's Lab
UST	Underground Storage Tank
UXO	Unexploded Ordnance
VDT	Video Display Terminal

1.0 SAFETY POLICY STATEMENT

It is the policy of Environmental Chemical Corporation (ECC) that accident prevention shall be considered of primary importance in all phases of operations and administration. ECC is committed to assuring the health & safety of its most important asset: its employees.

It is the goal of the company's top management to provide a safe and healthy working environment to its employees, and to establish and insist upon safe work practices at all times. The ECC safety culture begins with zero incident performance as an expectation, and promotes continuous improvement in safety performance. Zero incident performance means error-free project execution, no injuries, property damage, adverse community or environmental impacts. The culture is only achievable through dedicated management and individual commitment and dedication. ECC believes all accidents are preventable.

The prevention of accidents is an objective affecting all levels of the organization and its activities. It is therefore a basic requirement that each supervisor make the safety of employees an integral part of his or her regular management function. It is equally the duty of each employee to accept and follow established safety regulations and procedures.

It is ECC's goal to provide proper training to its employees. In the event that an employee is ever in doubt in how to do a job safely, it is their duty to ask a competent person for assistance. Employees are expected to assist and support management in accident prevention activities. Unsafe activities and accidents must be reported to management at all times.

Dean K. Osaki — 4/2/99
Dean K. Osaki, C.S.P., C.H.S.T. — Date
Corporate Health & Safety Manager

Manjiv S. Vohra — 4/6/99
Manjiv S. Vohra, P.E., R.E.P. — Date
Executive Vice President

Paul S. Sabharwal — 4/6/99
Paul S. Sabharwal — Date
President/Owner

2.0 ACKNOWLEDGMENTS/EMPLOYEE SIGN-OFF

The Corporate Health & Safety Program (Injury and Illness Prevention Program (IIPP) and General Health & Safety Requirements) has been prepared, reviewed and approved by Environmental Chemical Corporation (ECC) personnel in accordance with California Code of Regulations and the Code of Federal Regulations.

Prepared By: Dean K Osaki Date: 4/2/99
Dean K. Osaki, C.S.P., C.H.S.T.
Corporate Health & Safety Manager

Approved By: August Ochabauer Date: 4/6/99
August Ochabauer
Director of Environmental Division

CORPORATE HEALTH & SAFETY PROGRAM (IIPP AND GENERAL HEALTH & SAFETY REQUIREMENTS) SIGN-OFF

I understand that I am responsible for understanding and complying with the requirements that are covered in ECC's Corporate Health & Safety Program (Injury & Illness Prevention Program (IIPP) and General Health and Safety Requirements). I also had the opportunity to discuss the information presented and to ask any questions about the information that I wanted clarified or repeated.

I understand that this record will become a permanent part of my safety employee file.

_____ _____
Employee Signature Date

(Please submit a signed copy of "2.0 Acknowledgements/Employee Sign-Off" to ECC's Corporate Health & Safety Manager).

3.0 SAFETY COMMUNICATION POLICY

It is ECC's policy to maintain open communication between management and staff on matters pertaining to safety. ECC encourages all workers to report all hazards, and incidents/accidents to their supervisor without the fear of reprisal. Employee thoughts regarding safety are considered important, and we encourage active employee participation in company safety meetings, individually to the supervisor, or in writing. Be assured that all safety suggestions will be given serious consideration, and that each will receive a response.

Manjiv S. Vohra, P.E., R.E.P.
Executive Vice President

4/6/99
Date

4.0 GENERAL INFORMATION AND RESPONSIBILITY

1.0 Policy

The procedures and programs provided in the Environmental Chemical Corporation (ECC) Corporate Health & Safety Program (Injury & Illness Prevention Program (IIPP) and General Health & Safety Requirements) shall be implemented at all ECC project sites and offices as required by Section 3203 of Title 8 California Code of Regulation, and in accordance with 29 CFR 1910 and 29 CFR 1926. In addition to the Corporate Health & Safety Program, a Site-Specific Safety & Health Plan (SSHP) will be required on all ECC project sites. A Chemical Hygiene Plan (CHP) in accordance with OSHA's Laboratory Standard 29 CFR 1910.1450 is currently being implemented for our laboratory employees (ECC - Cincinnati).

2.0 Purpose

ECC is actively involved in hazardous waste site remediation activities which comply with 29 CFR 1910.120, 29 CFR 1926.65, and 8 CCR 5192. All ECC employees and subcontractors working for ECC are expected to work responsibly and comply with both the SSHP and the Corporate Health & Safety Program. A copy of both plans shall be available to all employees at each project work site.

3.0 Corporate Safety and Health Organization

ECC's Safety and Health Organization is managed by two safety professionals: **Mr. Dean Osaki, C.S.P.**, (loss prevention/environmental safety), and **Mr. Bruce Lazarus, C.I.H.**, (industrial hygiene/environmental safety). Mr. Osaki and Mr. Lazarus are responsible for the planning, implementation and monitoring of ECC's Corporate Health and Safety Program.

ECC's organization also employs the following safety professionals:

- OEW/CWM Specialist Mr. Chuck Welk provides all OEW training for ECC personnel. Mr. Welk, a Master Rated Explosive Ordnance Supervisor, has over 15 years of operational experience, and has worked with ECC for the past 5 years. Mr Welk has extensive experience in the areas of supervision, explosive safety training, and range clearance operations.

- Corporate Health Physicists Mr. Mark Mizrahi, Mr. Scott Zoeller, and Mr. Keith Anderson C.H.P., CHP, oversees ECC's Radiation Protection Program, and provides radioactive safety training for ECC personnel.

- Chemical Hygiene Officer Mr. Bhupender Sabharwal provides implementation of ECC's

Chemical Hygiene Plan (CHP)prepared in accordance with 29 CFR 1910.1450 (Laboratory Standard). Mr. Sabharwal has over 20 years experience in conducting employee safety training, lab safety audits, evaluation of chemicals and their potential hazards, and record keeping of MSDSs. Mr. Sabharwal has been employed with ECC for the past 5 years.

4.0 Site Safety & Health Officers (SSHOs)

ECC provides competent Site Safety & Health Officers (SSHOs) at all ECC project sites. The SSHOs are responsible for the review and implementation of the Site Safety & Health Plan (SSHP) and oversight of initial site-specific training. The SSHO is responsible for inspecting work sites and equipment for accordance with safety and health regulations, identification and documentation of violations, upgrading and downgrading of personal protection levels, OSHA record keeping, and conducting daily safety meetings.

ECC evaluates each site specific work plan and ensures that the SSHO has the necessary experience and training to qualify them to act as a competent person for activities performed on that site in accordance with applicable sections of 29 CFR 1926. As defined in OSHA regulation 29 CFR 1926.32(f), a competent person means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them. If the SSHO is not qualified for a particular specialized task which requires regulatory competent person oversight, ECC will provide for a safety professional with specialized expertise to be on-site before commencing work on the particular task.

The SSHO coordinates with, but does not report to the Project Manager, and has the responsibility and authority to shut a job down if conditions or work performed are unsafe or an endangerment to the health of any person.

ECC's SSHOs have successfully completed and are knowledgeable in the Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard, along with all applicable OSHA regulations. ECC's SSHOs have extensive experience working at a variety of government project sites.

5.0 HAZARD EVALUATION AND ANALYSIS
(Prevention of Injuries and Illnesses)

1.0 Policy

Is prepared in accordance with CCR 3203 - "Injury and Illness Prevention Program".

2.0 Purpose

It is ECC's belief that injuries and illnesses can be prevented. The following are "General Safe Work Practices" which shall apply to ECC personnel while conducting work activities at ECC project sites. The full cooperation of each employee is required to achieve an injury and illness free site.

- Eating, drinking, use of gum or tobacco products or the applying of cosmetics shall only be allowed in designated areas in the Support Zone (SZ);
- Smoking and any other sources of ignition shall be prohibited within 50 feet of any work area and sources of flammable/combustible chemicals. "No Smoking" signs will be posted at the entrances to the Exclusion Zones (EZ) and Contaminant Reduction Zones (CRZ). Areas will be marked where smoking is permitted;
- Personnel shall wash their hands, face and any exposed skin when completing decontamination, before eating, drinking or using tobacco product, and at the end of each shift;
- Personnel shall participate in Tailgate Safety Meetings (daily, or whenever new activity is started;
- Personnel shall continually observe their work location and be alert to changes in the environment that may affect safety;
- Personnel shall plan and prioritize their tasks prior to donning protective clothing and entering a designated Exclusion Zone;
- Personnel shall only enter regulated work areas when instructed by the Field Supervisor, and shall only enter through designated control points;
- Personnel shall exit regulated work areas through the decontamination station, and shall follow the decontamination procedures;
- Personnel shall act to avoid direct contact with contamination by not purposefully walking, touching, or contacting any obviously contaminated surfaces. Instruments and tools shall not be placed directly on the ground;
- Personnel shall report any accident, near miss or unusual situations to the Site Safety and Health Officer and/or Field Supervisor immediately;
- Personnel shall use the personal protective equipment provided and as instructed by the Field Supervisor;

- Personnel shall not wear or carry personal items (i.e., jewelry, watches, gum, tobacco products, etc.) into regulated work areas;
- Personnel shall avoid hand-to-mouth or hand-to-face activities;
- All instruments and safety equipment shall be inspected prior to use;
- All vehicles and construction equipment shall be inspected prior to use;
- The number of personnel in a work area shall be minimized in order to reduce potential exposures;
- The buddy system should be used for all personnel entering an Exclusion Zone;
- Personnel working together (i.e., buddy system) shall continually be aware of their partner, and shall make integrity checks of their partner;
- Personnel shall work purposefully and as a team;
- Personnel shall work within their own physical and mental limits;
- Personnel shall take adequate rest breaks and replace body fluids (water and electrolytes) continuously;
- Personnel shall at all times follow the instructions of the Field Supervisor;
- Personnel shall not deviate from the project SSHP or the instructions of the Field Supervisor;
- Personnel shall avoid rushing and/or taking short cuts;
- All waste generated from decontamination procedures shall be handled and disposed of as per the contract requirements. No waste shall be disposed of without the direction of the Field Supervisor; and
- Personnel will do visual checks on machinery and equipment prior to its use.

3.0 Site Safety Inspections/Audits

The Site Safety & Health Officer (SSHO) shall perform periodic safety inspection of the work site. The safety inspections shall be documented using ECC's Safety Inspection form or an equivalent form obtained from the client. The SSHO shall ensure that all immediate hazards are corrected before work proceeds and that all other hazards and potential safety situations are corrected in a timely manner in relation to this project (i.e., one to three days).

In addition, the SSHO shall perform a specific safety inspection of each piece of construction equipment to be used on the project (i.e., backhoe, loader, etc.). The equipment inspection shall be documented using a Safety Inspection Check List For Construction Equipment. Any defective items or conditions shall be corrected by the Project Manager before the commencement of work.

Copies of all safety inspections (i.e., work site and construction equipment) shall be available for field personnel review, shall be maintained on-site during the project, and shall be provided to the client representative upon request.

Environmental Chemical Corporation's (ECC's) Environmental Health & Safety Department conducts monthly safety audits at ECC project sites and offices. The purpose of the safety audit is to evaluate the effectiveness of ECC's Health & Safety Program and to record any safety deficiencies at the facility. This can be accomplished by the following: Review of OSHA training programs and filing requirements; physical survey of the facility/office; review of loss experience; interview with the Project QC/Safety Officer. Health & safety recommendations are then provided to the project staff for consideration. The recommendations are designed to assist in implementing a more effective health and safety program for the project site and offices.

4.0 Accident Investigations

In the event of an injury, illness or near miss, the incident shall be immediately reported to the Project Manager, SSHO, or Corporate Health & Safety Manager. If required, emergency medical care or first aid shall be rendered. At NO time during the initial incident/accident shall an injured employee seek medical attention on their own. In the event that the injured employee needs medical attention, it is important that a management staff employee (Project Manager, QC/Safety Officer) escort the injured employee to the nearest occupational health clinic in order to maintain control of the incident. The SSHO or Corporate H&S Manager shall initiate the following filing requirements within the first 24 hours:

- Accident Investigation Report;
- Employers Report of Injury to Liberty Mutual Group **(800-362-0000)**; for monopolistic states (North Dakota, Ohio, West Virginia, Washington, Alaska, and Nevada) please contact the applicable State Workers Compensation Department.
- State Employee Claim Form (if applicable). In California: DWC Form 1.

As soon as possible after the occurrence of an occupational accident, the SSHO shall initiate an Accident Investigation. The accident investigation shall be documented on an Accident Investigation form. The purpose of the accident investigation is to identify the causes of the incident in order to take corrective action to prevent future occurrences.

Finally, the SSHO shall maintain a project log of all recordable injuries and illnesses and report them to the Corporate Health & Safety Manager.

5.0 Tailgate Safety Meetings

ECC's SSHO shall conduct daily tailgate safety with all field personnel, including subcontractor personnel, at the beginning of every shift and activity. Tailgate Safety Meeting forms shall be maintained at the immediate work site and shall be available for field personnel and site visitor

review. All site visitors are to be briefed on the operations and daily Tailgate Safety Meeting information prior to entering a designated Exclusion Zone. Copies of all Tailgate Safety Meetings shall be maintained on-site during the project, and shall be provided to the client representative upon request.

6.0 Employee Hazard Analysis

The Employee Hazard Analysis is written in accordance with U.S. Department of Labor, Occupational Safety and Health Administration - 29 CFR 1910 and 8 CCR (California Code of Regulations) 3203 - "Injury and Illness Prevention Program".

The Employee Hazard Analysis is a tool to inform employees on the following: job description/principle steps; potential occupational health and safety hazards in their work environment; and preventive safe working conditions, safe work practices and implementation of personal protective equipment (PPE).

Hazard evaluations have been conducted for the following general and specific job safety classes:

- Office Administrators;
- Program/Project Managers;
- Health & Safety Officers;
- Environmental Engineers;
- QA/QC Officers;
- Environmental Field Chemists;
- Lab Chemists;
- UXO Technicians;
- Heavy Equipment Operators;
- Maintenance Support; and
- Hazardous Waste Workers.

EMPLOYEE HAZARD ANALYSIS

Job Safety Class: Office Administrator

Description of Job

1. General office work.
2. Occasional lifting and carrying.
3. Video display terminal (VDT) operation.

Potential Occupational Safety/Health Hazard

1. Tripping and falls associated with office furniture.
   Bumping edges of desks, drawers.
   Pinching fingers and body parts in file cabinets.
   File cabinets tipping over onto employees.

2. Back and extremity strains and sprains.

3. Visual stress due to improper lighting and work station design.

   Carpal tunnel syndrome (CTS) resulting from the use of a computer terminal keyboard. The carpal tunnel is a narrow passage in the wrist, where both tendons that operate the fingers and nerves pass through, to connect with muscles and ganglia in the arm. Repetitive use of the fingers (an unnatural action - hands are designed for grasping) can cause their associated tendons to swell. CTS occurs when these tendons swell, pinching the adjacent nerves. This can result in severe pain the wrist and forearm, numbness, and loss of mobility in the hands and fingers.

Preventive Safe Work Conditions and Safe Work Practices

1. Keep work areas clear of debris, floor storage and electrical cords.
   Assure adequate aisle space.
   Use care in closing drawers, assuring that all hands are clear.

2. Use proper lifting/reaching technique. Procure assistance as necessary or use hand carts for heavy loads.

3. Adjust background lighting and screen lighting so that contrast between the two is minimized. As necessary, take breaks to rest eyes.

Department managers can help prevent CTS by establishing new work patterns and procedures, then following up to ensure that these patterns and procedures become routine. Basic prevention should include: ensure even distribution of the work load; where practical, distribute typing/data entry duties as evenly as possible, to avoid overloading a minority of users.

EMPLOYEE HAZARD ANALYSIS

Job Safety Class: Program Managers/Project Managers

Description of Job

1. General office work-report writing and review, project administration.
2. Video display terminal (VDT) operation.
3. Consulting oversight of hazardous waste site activities.
4. Driving to sites for inspections, bid walks, and schedule verification.

Potential Occupational Safety/Health Hazard

1. Tripping and falls associated with office furniture.
   Bumping edges of desks, drawers.
   Pinching fingers and body parts in file cabinets.
   File cabinets tipping over onto employees.

2. Visual stress due to improper lighting and work station design.
   Carpal tunnel syndrome (CTS) resulting from use of a computer terminal keyboard.

3. Exposure to contaminated soil, groundwater, and air.
   Physical contact accidents associated with working near heavy equipment.
   Hearing loss due to noise at construction sites.
   Fall hazards associated with excavations.
   Slipping and tripping in cluttered area of the work site.

4. Vehicle accidents resulting in injury.

Preventive Safe Work Conditions, Safe Work Practices and Personal Protective Equipment.

1. Keep work areas clear of debris, floor storage and electrical cords.
   Assure adequate aisle space.
   Use care in closing drawers, assuring that all hands are clear.
   Open only one drawer of a file cabinet at a time. Evenly distribute files from top to bottom.

2. Adjust background lighting and screen lighting so that contrast between the two is minimized. As necessary, take breaks to rest eyes.

   Audit workstation environment - Wrists should be held above the level of the keyboard, with

back of hand in-line with forearm. Keyboards that are too high cause the user's writs to bend, and the shoulders to hunch. Make recommendations for changes, which may include lower or adjustable keyboard supports, change in chair height, etc. Allow regular, brief rest periods.

3. Understand the hazards of the contaminants so that proper personal protective equipment may be selected before going out to the site.

   Familiarize yourself with the site specific safety plan which describes hazards anticipated at the site, personal protective equipment to be used, safe work practices, and what to do in case of an emergency.

   Strive to keep a safe distance from heavy machinery such that you would not be in the path of a moving part if it were to swing suddenly. Strive always to be award of the movement of heavy machinery around you. Approach vehicles on the drivers side. Make sure you are seen by the vehicle operator, make eye contact!

   Follow "Hearing Conservation" program.

   Follow "Safe Work Around Excavations".

   There will be no running, eating, smoking, or horseplay allowed in the working zones or riding on parts of equipment not intended for riders anywhere, anytime. At a minimum, level "D" safety equipment will be worn at all times when in the working zones. Stay away from traffic. Be aware of tripping hazards. Watch for overhead obstructions. Every assertive movement should be thought about ahead of time, leaving yourself an out. Anticipate your actions as well as others' actions.

4. Wear seatbelt/shoulder harness at all times.
   Do not exceed speed limits for conditions.
   Practice defensive driving.
   Park in legal spaces/not obstructing traffic.
   Consumption of alcoholic beverages or use of other intoxicants, including all medications which may affect the individual's ability to safely operate equipment, prior to or during work is prohibited.

EMPLOYEE HAZARD ANALYSIS

Job Safety Class: Health and Safety Officer

Description of Job

1. Inspections and audits.
2. Video display terminal (VDT) operations.
3. Industrial hygiene monitoring.
4. Training.

Potential Occupational Safety/Health Hazard

1. Slips, trips and falls associated with physical hazards on-site (i.e., trenches, excavation equipment).
2. Visual stress due to improper lighting and work station design.
3. Chemical exposure.
4. Stress and back pain.

Preventive Safe Work Conditions and Safe Work Practices

1. Site security around all excavation sites.
2. Adjust background lighting and screen lighting so that contrast between the two is minimized.
3. Wear the appropriate level of personal protective equipment.
4. Take necessary breaks; implement stretching exercises to relieve stress and back pain.

EMPLOYEE HAZARD ANALYSIS

Job Safety Class: Environmental Engineers

Description of Job

4. Designing remediation system and performing remediation technology tests; reviewing contract specifications and interfacing with regulators, contractors, and suppliers; conducting technical design evaluation and data analysis; performing cost analysis; preparing technical and cost proposals, permits, and health and safety plans.

2. Managing hazardous waste site activities; conducting site investigation and site assessment; implementing QA/QC process.

3. Driving to sites.

4. Video display terminal (VDT) operations.

Potential Occupational Health/Safety Hazard

1. Tripping and falling associated with office furniture.
   Bumping edges of desks, drawers, and other objects.
   Pinching fingers and body parts in file cabinets.
   File cabinets tipping over onto employees.

2. Exposure to hazardous chemicals, contaminated soil, and/or groundwater.
   Physical contact accidents associated with working near heavy equipment.
   Hearing deterioration due to noise at construction sites.
   Falling hazards associated with excavations.
   Slipping and tripping in cluttered area of the work site.
   Hazards associated with cave-ins in excavations and trenches.

3. Injury resulting from vehicle accidents.

4. Visual stress due to improper lighting and work station design.
   Carpal tunnel syndrome (CTS) resulting from the use of a computer terminal keyboard.

Preventive Safe Work Conditions, Safe Work Practices, and Personal Protective Equipment

1. Keep work areas clear of debris, floor storage, and electrical cords.
   Assure adequate aisle space.
   Close drawers with caution, assuring that all hands are clear.
   Open only one drawer of a file cabinet at a time. Evenly distribute files from top to bottom.

2. Understand the hazards of the dangerous constituents so that proper personal protective equipment may be selected before going out to the site.

   Familiarize yourself with the site specific safety & health plan which describes hazards anticipated at the site, personal protective equipment to be used, safe work practices, and what to do in case of an emergency.

   Strive to keep a safe distance from heavy machinery such that you would not be in the path of a moving part if it were swing suddenly. Strive always to be aware of the movement of heavy machinery around you. Approach vehicles on the drivers side. Make sure you are seen by the vehicle operator, make eye contact!

   Follow "Safe Work Around Excavations." There will be no running, eating, smoking, or horseplay allowed in the working zones or riding on parts of equipment not intended for riders anywhere, anytime. At a minimum, level "D" safety equipment will be worn at all times when in the working zones.

   Stay away from traffic. Be aware of tripping hazards. Watch for overhead obstructions. Every assertive movement should be thought about ahead of time, leaving yourself an out. Anticipate your actions as well as others' actions.

3. Wear seatbelt/shoulder harness at all times.
   Do not exceed speed limits for conditions.
   Practice defensive driving.
   Park in legal spaces/not obstructing traffic.
   Consumption of alcoholic beverages or use of other intoxicants, including all medications which may affect the individual's ability to safely operate equipment, prior to or during work is prohibited.

4. Adjust background lighting and screen lighting so that contrast between two is minimized. As necessary, take breaks to rest eyes.

   Audit workstation environment--Wrists should be held above the level of the keyboard, with

back of hand in-line with forearm. Keyboards that are too high cause the user's wrists to bend, and the shoulders to hunch. Make recommendations for changes, which may include lower or adjustable keyboard supports, change in chair height, etc. Allow regular brief rest periods.

EMPLOYEE HAZARD ANALYSIS

Job Safety Class: Quality Assurance/Quality Control Officer

Description of Job

1. Report writing, performing document review, interacting with regulators.
2. Video display terminal (VDT) operation.
3. Visually inspecting sites where hazardous materials may be used or hazardous waste may be present.
4. Climbing ladders during site assessments and compliance audits.
5. Lifting and carrying as part of site assessments, compliance audits, and training.
6. Collecting soil, water, and air samples for site investigations at sites potentially contaminated with hazardous waste.
7. Driving to sites.

Potential Occupational Safety/Health Hazard

1. Tripping and falls associated with office furniture.
   Bumping edges of desks, drawers.
   Pinching fingers and body parts in file cabinets.
   File cabinets tipping over onto employees.
2. Visual stress due to improper lighting and work station design.
   Carpal tunnel syndrome (CTS) resulting from use of a computer terminal keyboard.
3. Hazardous material exposures.
4. Falls causing injuries.
5. Strains and sprains, back injuries due to improper lifting.
6. Inhalation of air contaminants resulting in contaminant specific ailments. Inhalation, absorption, and/or contact with soil contaminants resulting in contaminant specific ailments.
7. Vehicle accidents resulting in personal injuries.

Preventive Safe Work Conditions, Safe Work Practices and Personal Protective Equipment

1. Keep work areas clear of debris, floor storage and electrical cords.
   Assure adequate aisle space.
   Use care in closing drawers, assuring that all hands are clear.
   Open only one drawer of a file cabinet at a time. Evenly distribute files from top to bottom.

2. Adjust background lighting and screen lighting so that contrast between the two is

minimized.

As necessary, take breaks to rest eyes.

Audit workstation environment. Wrists should be held above the level of the keyboard, with back of hand in-line with forearm. Keyboards that are too high cause the user's wrists to bend, and the shoulders to hunch. Make recommendations for changes, which may include lower or adjustable keyboard supports, change in chair height, etc. Allow regular, brief rest periods.

3. Use proper personal protective equipment for potential exposures, or physical hazards.

4. Follow "General Safe Work Practices for Ladders"

5. Follow "General Safe Work Practices for Lifting and Carrying."

6. Understand the hazards of the contaminants so that proper personal protective equipment may be selected before going out to the site. Familiarize yourself with the site specific safety plan which describes hazards anticipated at the site, personal protective equipment to be used, safe work practices, and what to do in case of an emergency.

7. Wear seatbelt/shoulder harness at all times.
   Do not exceed speed limits for conditions.
   Practice defensive driving.
   Park in legal spaces/not obstructing traffic.
   Consumption of alcoholic beverages or use of other intoxicants, including all medications which may affect the individual's ability to safely operate equipment, prior to or during work is prohibited.

EMPLOYEE HAZARD ANALYSIS

Job Safety Class: Environmental Field Chemist

Description of Job

1. Handling and moving containers by hand, by drum dolly, by pallet jack, or by forklift during segregation and packaging of hazardous materials and hazardous wastes and during loading of trucks in preparation for transportation of the hazardous material/waste containers.

2. Sampling of hazardous materials and wastes from drums, tanks, vats, and soil. On-site hazard categorization and fingerprinting of various unknown chemicals. Pouring compatible chemicals together to consolidate waste streams.

3. Working in Level C or higher personal protective equipment.

4. Driving to sites and transportation of hazardous material/waste.

Potential Occupational Safety/Health Hazard

1. Slips and falls due to tripping or slippery floors.
   Foot injuries from falling inventory.
   Physical injuries resulting from working on or near equipment.
   Back strain from moving containers.
   Rollover of forklift.
   Movement of unmanned forklift.
   Hearing loss due to noise of forklift.
   Physical contact accidents associated with use of the forklift.
   Inventory falling off forklift resulting in spilled materials.

2. Exposure to hazardous chemicals during sampling, Hazcating, handling or because of accidental spillage resulting from dropping chemical containers, improper loading of truck or overloading of or improper distribution on lift-gate.

3. Heat stress due to working in personal protective gear.
   Physiological stress due to respirator use.

4. Vehicle accidents resulting in injuries.

Preventive Safe Work Conditions, Safe Work Practices and Personal Protective Equipment

1. There will be no running, eating, smoking, or horseplay allowed in the working zones or riding on parts of equipment not intended for riders anywhere, anytime. At a minimum level "D" safety equipment which includes steel-toed safety boots, eye protection, and hard hat will be worn at all times when in the working zones.

   Stay away from traffic. Be aware of tripping hazards. Watch for overhead obstructions. Every assertive movement should be thought about ahead of time, leaving yourself an out. Anticipate your actions as well as others' actions. Follow "General Safe Work Practices for Lifting and Carrying".

   When working on equipment be aware of all personnel, structures and obstructions and anticipate where you will be to make sure that someone or something won't also be there. Conversely, when not working on equipment be aware of the equipment and anticipate its movements and give it a wide berth. Never sneak around equipment, make sure you are seen by the operator, whenever you have to be near it. Make eye contact!

   Follow safety procedures for "Operating Forklifts.

2. Level C personal protective equipment with appropriate cartridges or a higher level of personal protective equipment if warranted, is prescribed during packaging operations as a precaution in case of chemical spillage. Level "C" PPE will be worn whenever wastes or materials are handled directly, during the sampling of wastes, during the identification of the wastes and materials, during packaging of wastes or materials, and in general, whenever the seal of a container is broken. Level "C" consists of full or half face respirator with appropriate filter cartridges, eye protection, chemical resistant gloves with latex under gloves, chemical resistant steel-toed rubber boots, and Tyvek suit with the poly coating. All glove and boot interfaces with the tyvek will be taped with duct tape. An apron will also be worn when handling liquids.

   Level "D" PPE will be worn at all other times when on the job-site or moving packed containers. Level "D" for lab pack projects will consist of steel-toed boots, safety glasses or goggles, ECC uniform, paper tyvek and chemical resistant gloves.

   Don't work around chemical hazards without at least one other individual aware of your intentions and on-site to offer assistance in order to handle the job safely. Safety is a primary concern. The individual's ability is not to be superseded at anytime in order to do the job.

   A spill response kit, fire extinguisher, and first aid kit must remain on-site or in the company

vehicle during packaging operations.

All personnel doing lab-packing should have 29 CFR 1910.120 training and be respirator fitted.

3. Follow "Heat Stress" policy.

   Physician approval is necessary to wear a respirator. Users experiencing difficulty breathing or substantially increased pulse or breathing rates should take a work break, and change the respirator cartridge (if applicable).

4. Wear seatbelt/shoulder harness at all times.
   Do not exceed speed limits for conditions.
   Practice defensive driving.
   Park in legal spaces/not obstructing traffic.
   Consumption of alcoholic beverages or use of other intoxicants, including all medications which may affect the individual's ability to safely operate equipment, prior to or during work is prohibited.

EMPLOYEE HAZARD ANALYSIS

Job Safety Class: Lab Chemist

Description of Job

Sample analysis.

Potential Occupational Safety/Health Hazard

Chemical exposure due to chemical spills, fire and explosions.

Preventive Safe Work Conditions and Safe Work Practices

Remember chemical compatibility when storing chemicals.
Recognize the potential hazards which exists when working around chemicals.
Wear the appropriate personal protective equipment in the lab: Eye goggles, lab coat and leather shoes.

EMPLOYEE HAZARD ANALYSIS

Job Safety Class: UXO Technician

Description of Job

1. Locate, access, diagnose, and dispose of UXO and explosive waste.
2. Perform field testing of suspected explosive, and/or contaminated soils.
3. Perform exploratory boreholing and trenching in OEW environments.
4. Provide UXO avoidance escort to non-UXO personnel.

Potential Occupational Safety/Health Hazard

1. Explosions, fire or burns; repetitive motion injuries.
2. Chemical contamination.
3. Slips, trips, falls.
4. Insect, snakes, rodent bites, and other biological hazards.

Preventive Safe Work Conditions, Safe Work Practices and Personal Protective Equipment

1. Use of buddy system (2 rule) during field operations.
   Follow CEHNC's basic considerations and safety concepts for UXO operations.
   Ensure adequate training of UXO personnel.
2. Provide thorough decontamination procedures.
3. Practice good housekeeping.
4. Implement snake leggings, insect repellant along with Level D protection.

EMPLOYEE HAZARD ANALYSIS

Job Safety Class: Heavy Equipment Operator

Description of Job

1. Operate various pieces of equipment ranging from skid-steer loaders to excavators and loaders.

2. Verification of serviceability of equipment (checking fluids, operation of safety equipment; backup lights, flashers, etc.).

Potential Occupational Safety/Health Hazard

1. Hearing loss, eye damage, exposure to contents of buried/overhead utilities (electricity, natural gas, water, sewer, etc.), and crushed limbs/extremities.

2. Damaging of equipment from maintenance neglect.

Preventive Safe Work Conditions, Safe Work Practices and Personal Protective Equipment

1. Survey site prior to work.
   Use ear plugs/eye protection when operating heavy machinery.
   Use hand signals, spotters, and mirrors.
   Always operate at safe speed limits.
   Always have clean windows.

2. Have daily inspections.

EMPLOYEE HAZARD ANALYSIS

Job Safety Class: Maintenance (Building Support)

Description of Job

1. Driving.
2. Lifting/moving office supplies and furniture.
3. General construction work (support).

Potential Occupational Safety/Health Hazard

1. Vehicle accidents resulting in personal injuries.
2. Back strain due to improper lifting techniques.
3. Tripping and slipping hazards.

Preventive Safe Work Conditions, Safe Work Practices and Personal Protective Equipment

1. Wear seatbelt/shoulder harness at all times.
   Do not exceed speed limits for conditions.
   Practice defensive driving.
   Park in legal spaces. Do not obstruct traffic.
   Consumption of alcoholic beverages or use of other intoxicants, including all medications which may affect the individual's ability to safely operate equipment, prior to or during work is prohibited.

2. Follow "Proper Lifting Technique Guidelines" implemented by Corporate Health and Safety Specialist. Procure assistance as necessary or use hand carts for heavy loads.

3. Be aware of tripping hazards. Every assertive movement should be thought about ahead of time. Anticipate your actions as well as others' actions.

EMPLOYEE HAZARD ANALYSIS

Job Safety Class: Hazardous Waste Workers

Description of Job

1. Use of saw-cutters, jack hammers, and other power tools.
2. Lifting heavy equipment.
3. Trenching and excavation work.
4. Coming in contact with contaminated materials.
5. General construction work.
6. Working in Level C and higher personal protective equipment.
7. Driving to sites.
8. Working near and/or operating heavy machinery.

Potential Occupational Safety/Health Hazard

1. Cuts, puncture wounds, eye and foot injuries.
2. Back strain due to improper lifting techniques.
3. Cave-ins, equipment or spoils collapsing into trench onto workers.
4. Exposure to hazardous chemicals resulting in health impairment.
   Fire or explosion during operations involving ignitable materials.
5. Tripping and slipping hazards.
6. Heat stress.
   Decreased mobility, visibility, and hearing which increases the likelihood of physical injury.
   Physiological stress due to respirator use.
7. Vehicle accidents resulting in personal injuries.
8. Hearing loss.
   Physical contact accidents associated with working near heavy equipment.
   Rollover of equipment.
   Movement of unmanned vehicle.
   Getting caught in gears and chains.
   Hearing loss due to noise.
   Electrocution/shock.
   Fire and explosion during refueling.

Preventive Safe Work Conditions, Safe Work Practices and Personal Protective Equipment

1. Follow "Equipment Safety Procedures Power Tools."
2. Follow "General Safety Work Practices for Lifting and Carrying."

3. Follow "Safety Procedures for trenching and excavation work."
4. Understand the hazards of the contaminants so that proper personal protective equipment may be selected before going out to the site.
5. There will be no running, eating, smoking or horseplay allowed in the working zones or riding on parts of equipment not intended for riders anywhere anytime.
6. Follow "Heat Stress" policy.
7. Wear seat/shoulder harness at all times.
   Do not exceed speed limits for conditions.
   Practice defensive driving.
   Park in legal spaces. Do not obstruct traffic.
   Consumption of alcoholic beverages or use of other intoxicants, including all medications which may affect the individual's ability to safely operate equipment, prior to or during work is prohibited.
8. Wear the appropriate hearing protection (ear muffs, ear plugs).

6.0 AIR MONITORING PROGRAM

1.0 Policy

Environmental Chemical Corporation's (ECC's) Air Monitoring Program is prepared in accordance with 29 CFR 1910.1000 and 8 CCR 5155 - *Air Contaminants.*

2.0 Purpose

Airborne contamination at work sites can present a risk to the health and safety of field personnel. Air monitoring data helps identify and measure various airborne chemical hazards and can provide critical information necessary for:

- Selecting personal protective clothing and equipment
- Specifying safe work practices
- Assessing the potential health effects of exposure
- Determining actions to mitigate the hazards

3.0 Methods

Air monitoring data can be obtained using two different methods.

1. ***Field Monitoring*** - This method involves sampling the air and obtaining instantaneous results (real time) using portable field instruments. These instruments are referred to as "direct reading".

2. ***Air Sampling*** - This method involves collecting air samples for laboratory analysis, usually by sampling a known volume of air through a sample collection device media. Laboratory analysis delays results from hours to weeks.

4.0 Requirements

To obtain and interpret useful information, care must be taken to:

- Select the appropriate instrument.
- Consider the limitations of the instrument selected.
- Use the instrument as specified by the manufacturer.
- Use only properly calibrated instruments.
- Consider any interferences which may influence the results.
- Take representative samples.

- Consider uncertainty and error when making conclusions or interpretations.

5.0 Principles of Data Collection and Measurement

5.1 Types of Data

Field monitoring instruments do not all collect the same type of data. Knowledge of the type of data obtained is important to interpreting the data.

1. *Qualitative Data* - This data identifies whether a hazard (i.e., contaminant) is present.

2. *Quantitative Data* - This data specifies the quantity of concentration of an identified hazard (contaminant) measured.

5.2 Characteristics

1. *Accuracy* - Describes how close measured results are to actual conditions.

2. *Precision* - Describes how close repeated measurements are of the same condition.

3. *Representative* - Describes samples for which the results describe conditions adjacent to where the samples were taken.

4. *Error* - Describes conditions which can affect the accurately and/or precision of data. There are numerous sources of errors that exist whenever a field monitoring instrument is used. Some sources of error are inherent in the instrument and cannot be altered. Other sources of error are dependant on the use and condition of the instrument.

6.0 Characteristics of Air Monitoring Instruments

The following characteristics should be considered when selecting/evaluating an instrument:

6.1 Portability - A portable instrument should be:

1. Able to withstand shock from transportation, moving and handling.
2. Able to withstand damage or interference from environmental conditions (temperature, humidity, heat, weather and dust).
3. Light weight, self-powered (no AC requirement), easy to carry, set up and operate.

6.2 Useful Results

1. Response Time - The interval between sensing and indicating. The shorter the response time, the faster data can be obtained.

2. Direct Reading - The instrument response should be readable with little or no manipulation.

6.3 Selectivity

The ability to identify specific contaminants.

6.4 Sensitivity

The lowest concentration of a contaminant/hazard an instrument can accurately and repeatedly analyze.

6.5 Inherent Safety

1. Instruments which are inherently safe can be used in hazardous environments such as flammable and explosive atmosphere, without adversely interacting with the environment.

   Almost all field monitoring instruments are electrical devices and therefore can provide a source of ignition to a flammable explosive environment. Inherently safe instruments are designed to prevent a potential ignition source from igniting a flammable or explosive atmosphere.

2. The National Fire Protection Association (NFPA) established definitions of hazardous atmospheres and minimum standards for equipment safety, as published in the National Electrical Code (NEC).

3. Controls

   a. Explosion-proof designed to internally contain an explosion.
   b. Intrinsically safe - designed to reduce the potential for arcing among components.
   c. Purged - designed to isolate the ignition source from the atmosphere with an inert gas.

4. Certifications - By agreement, several national groups have developed test protocols for attesting equipment as inherently safe (i.e. meeting minimum standards of acceptance). A certified device carries a permanently affixed plate with laboratory type and Classes,

Divisions and Groups tested against.

a. Certification Organizations
   - Factory Mutual (FM)
   - Underwriters Laboratories (UL)

7.0 Field Instruments

Portable field instruments can be grouped into four categories based on the type of atmosphere of hazard of interest. Instruments are available to sample and analyze for:

1. Explosive atmospheres - percentage of the lower explosive limit (LEL) or a vapor or gas in air.

2. Oxygen deficient atmosphere - percentage (concentration) of oxygen in air.

3. Toxic atmosphere - Concentration (ppm or mg/m^3) of toxic vapors or gas in air.

4. Radioactive hazards - (see section 30.0).

7.1 Types of Instruments

1. Combustible Gas Indicators (CGI)

CGIs measure the concentration of flammable vapor or gas in air and indicate the results as a percentage of the LEL. Many chemical materials, including solvents and hydrocarbon liquids, produce combustible or flammable vapors or gases. When sufficient gas or vapor has mixed with air, a flammable atmosphere occurs. The lowest concentration of a gas or vapor by volume in air which will burn or ignite is called the Lower Flammable Limit (LFL). The highest concentration of as gas or vapor, by volume which will burn or ignite, is called the Upper Flammable Limit (UFL). Often a distinction can be made between unconfined environments defining explosive atmospheres (LEL, UEL). The range from lower to upper limit is called the flammable or explosive range.

Most CGIs operate on the "hot wire" principle. Gases and vapors sampled by the instruments are burned after passing over a heated platinum filament in the instrument combustion chamber. As the gas or vapor burns, the temperature of the filament increases, changing its resistance. The change in resistance results in an instrument indication.

CGI meters usually indicate in percent (%) LEL. Thus, the meter indicates a potential

flammable or explosive environment before exposure in the flammable or explosive range. When an instrument meter indicates past 100% LEL, the ambient atmosphere is readily flammable. For many instruments operated in the flammable range, the meter will rise to 100% LEL and then rapidly return to 0% LEL, indicating saturation of the sensor (atmosphere too rich to burn).

Advantages

- Portable, rugged, simple to operate and fast response.
- Some instruments can switch to read in ppm.
- Extension hoses and probes are available which allow for "remote" sampling.
- Can be continuously operated.

Disadvantages/Limitations

- The reaction is temperature dependent.
- Most CGIs are calibrated to pentane or methane, but not all combustible or flammable gases or vapors give the same response.
- A charcoal pre-filter is required to differentiate between petroleum vapors and combustible gases.
- Oxygen enriched and deficient atmospheres will give false readings.
- Chemical materials, including leaded gasoline, halogens and sulfur compounds, will contaminate the filament and decrease its sensitivity.

Field Application

- Identify flammable or explosive environments
- Identify flammable liquids
- Identify potential hazards associated with confined spaces and poorly ventilated areas.

2. Oxygen Meters

Oxygen meters measure the percent concentration of oxygen (O2) in air. At sea level, ambient air contains approximately 21,0% (20.8%) oxygen. Both oxygen deficient and enriched atmospheres can be hazardous to human physiological functioning. In addition, changes in oxygen concentration can affect the flammablility range of materials.

- Oxygen meters usually indicate % oxygen in a range from 0-25%.
- Ambient air is sampled (pump or diffusion) across an electrochemical sensor. Oxygen diffusing into the sensor establishes an electric current resulting in a needle deflection.

Advantages

Same as for CGIs

Disadvantages/Limitations

- The meter operation is dependent on the partial pressure of oxygen. A meter calibrated at sea level and used at high elevations will falsely indicate an oxygen deficient atmosphere.
- Oxygen sensors (cells) have a short shelf life (6 months) which can be shortened further by exposure to high concentrations of carbon dioxide (CO_2).

Field Application

- Identify oxygen deficient or enriched atmospheres.
- Identify poorly ventilated areas.

3. Combination Instruments

Many units combine a CGI and an Oxygen Meter into one instrument. Some newer models also incorporate a toxic gas sensor (carbon monoxide or hydrogen sulfide). Combination meters use the same technology for gas and vapor detection as do individual sensing instruments.

Advantages

- Single meters allow fast measurement of two interdependent hazards (oxygen deficiency and flammable atmosphere).

Disadvantages/Limitations

- Same as for individual instruments.

Field Operations

- Combination meters consider "work horse" for many field situations.
- Combines application for oxygen meters and CGIs.

4. Direct Reading Colorimetric Indicator Tubes

Colorimetric indicator tubes are used to measure the presence and concentration of specific chemical hazards. Individual types of tubes are manufactured for testing for individual chemicals or groups of chemicals. Tubes are calibrated in ppm, % concentration or mg/m^3.

Color indicator tubes consists of a glass tube filled with one or more sections of indicator chemicals. Chemical contaminants in the air react with the indicator chemicals resulting in a color change called a stain.

The length of stain is proportional to the concentration of the contaminant.

Advantages

- Portable, light weight and simple to use following training.
- Allows qualitative and semi-quantitative field/measurements for a variety of chemical contaminants or groups of materials. Over 100 types of tubes available.
- Relatively rapid response, convenient to use.
- Durable and rugged.

Disadvantages/Limitations

- Colorimetric indicator tubes should be used with caution because there may be as much as 25% error associated with the results. Indicator tubes are useful as an initial screening device. The sources of error include:

  - Chemical interferences from other material
  - Limited shelf life
  - Temperature (high temperature above 85F will limit shelf life)
  - Variations in volume and flow rate of air sampled
  - Operator's ability to correctly "read" the length of stain

- Colorimetric indicator tubes should be refrigerated during storage.

- The pump should be leak tested before use.

- The tube should be "read" in good lighting. Avoid fluorescent and mercury vapor lighting.

- The leading edge of a stain should be "read".

Field Applications

- Determination of presence of a contaminant (present or not present).

- Determination of concentration (semi-quantitative) of identified contaminants.

- Rapid screening for various suspected field chemical hazards.

- Limited confirmation test for materials preliminarily identified by other means.

5. Photo Ionization Detector (PID)

The Photo ionization instrument measures the electric current created by electrons removed from chemical contaminants exposed to a UV source. Air samples are pumped past a UV lamp having a specified energy output.

Advantages

- Portable, rugged, easy to use instruments.

- Instant warm up time and direct read (ppm)
- Use no flame or fuel source
- Useful operating range (0-2000 ppm).
- Interchangeable probe.
- Can be calibrated to direct read for individual species.

Disadvantages/Limitations

- Significant differences in relative response for many materials.
- Differentiation of chemical species not practical for most field work.
- Sensitive to high humidity conditions.
- Subject interference by nearby power sources.
- UV lamp sources are easily damaged or contaminated.
- Field use and interpretation of results requires training and experience.

Field Applications

- Provides quantitative measurements for total ionizing materials, several orders of magnitude less than that indicated by a CGI.
- Useful for field surveys after identifying no flammable atmosphere hazard.
- Can detect materials not responsive to a CGI detection.

6. Flame Ionization Detector (FID)

The FID works similar to a Photo ionization instrument except a hydrogen flame provides the source of energy to ionize sample contaminants.

Advantages

- Portable and rugged.
- Wide operating range.
- Fast response.
- Audible alarms available.
- Responds to most organics.

Field Application

- Similar to a Photo ionization instrument.

8.0 Instrumentation Program

Air monitoring instruments used for direct-read field sampling application should be selected based on data need and use.

8.1 Types of Monitoring

1. Continuous - In some situations, it may be desirable to monitor for potentially changing hazards throughout the duration of an activity. Instruments used for continuous monitoring may be set up in a specific or carried by field personnel during work. In most applications, an audible alarm is highly desirable when using an instrument for continuous monitoring.

2. Periodic - In most field applications, instruments are operated for short periods of time to collect data. The battery life of instruments can be extended when conducting periodic monitoring.

8.2 Field Applications

Instruments used for field applications should be light weight, rugged, weather resistant, operable without external power, easy to read and capable of being protected by contamination before use.

1. Site Survey - Site surveying is the process of evaluating the general ambient air condition at a location. For simple situations, the operator may walk the perimeter of the site and then tour the site while taking air samples, continuously evaluating the instrument's response as

compared.

2. Hazard Identification and Evaluation

   This type of instrument use includes: Hazard categorization of samples; evaluation of suspected leading containers; hazard assessment of spilled materials.

3. Operations Monitoring - Direct-read instruments can also be used to assess changes in various hazards caused by on-site activities (sampling, drum handling, on-site treatment, spill clean-up, etc).

8.3 Maintenance

Proper maintenance and storage of instruments cannot be over emphasized. After properly selecting an appropriate instrument for field use, proper maintenance and calibration ultimately affects field usability.

1. Instrument maintenance usually includes:

   - Case, exterior and accessories cleaning after each use.
   - Alarm and meter checks after each use.
   - Battery checks under load after each use. Replacement/recharge as needed.
   - Check general instrument operation (turn on and test) after each use.
   - Periodic replacement of hoses, filters and sensors as needed.
   - Periodic manufacturer check-up (cleaning, inspection, calibration, etc.)
   - Documentation of all repair and maintenance work.

8.4 Calibration

All instruments must be calibrated periodically to verify and ensure accuracy within manufacturer's specifications. Some instruments are calibrated by the factory and "calibration check" by the used, while others are calibrated by the user.

Calibration refers to sampling a known concentration of a chemical and comparing the instrument response to the expected response. An instrument's response must be within a specified range to be considered calibrated.

In general, calibration is recommended annually and calibration-checks are recommended monthly. All calibrations' work should be documented and properly checked or calibrated instruments tagged.

8.5 Field Use

The following general instructions on proper instrument use apply to all field instruments:

- All operators must be trained in instrument use.
- All instruments must be protected from damage, weather and contamination.
- Instruments should be allowed to warm up and be checked before use.
- Instruments should be initially cleaned in the field after each use.
- Instrument sensors must never be saturated.

9.0 Monitoring and Interpretation

9.1 Field Application

Because air monitoring data is useful in identifying and assessing hazards, selecting personal protective equipment and specifying safe work practices, air monitoring is routinely conducted during hazardous waste management operations.

Examples of operations requiring monitoring:

- Confined Space Work - Sample before entry and periodically during work for oxygen deficiency, flammable and toxic atmospheres. Use of CGI and specific color indicator tubes.

- Tank Cutting/Hot Work - Sample prior to cutting for flammable atmospheres. Use a CGI

- Emergency Response - Sample during hazard assessment phase (i.e. initial scene evaluation, hazard categorization testing, etc.). Use a CGI, specific color indicator tubes and/or a PID.

- Handling Unknown Materials - Sample during hazard assessment (container handling, opening and sample testing).

- Use a CGI, specific color indicator tubes and/or a PID.

- Soil Excavation - Sample to determine the need for further excavation and to assess hazards. Use a CGI, specific color indicator tubes and/or a PID.

- Hazard Categorization - Sample during HAZCAT testing. Use a CGI.

9.2 Responsibility

Monitoring is normally performed by the SSHO, Lead Supervisor or the Project Manager.

9.3 Timing/Duration

Monitoring is performed at a variety of different times:

- Prior to beginning work to assess a hazard (i.e. flammable or toxic atmosphere). Example - confined space entry, tank cutting, hot work, waste site entry, sampling unknowns, etc.
- During the operation to identify any changes in the environment. Example - during tank cleaning, after ventilating an area, while cleaning up a spill, etc.
- After an operation is complete to determine satisfactory results. Example - after ventilating and dry icing a tank, after excavating visible contaminated soils, etc.

ENVIRONMENTAL CHEMICAL CORPORATION
Exposure Monitoring Log

Type of Monitoring_____ **Project**_____ **Date**_____

Instrument_____ **Manufacturer**_____ **Serial No.**_____

TIME	PERSON/LOCATION	RESULT	COMMENTS	SAMPLED BY

ENVIRONMENTAL CHEMICAL CORPORATION
Calibration Log

Project_____ **Safety Officer**_____ **Date**_____

Instrument_____ **Manufacturer**_____ **Serial No.**_____

DATE	BATTERY CHECK	LEAK TEST	ZERO ADJUSTMENT	ALARMS	CALIBRATION GAS	INSTRUMENT READING	COMMENT

7.0 HAZARD COMMUNICATION PROGRAM

1.0 Policy

This program is prepared in accordance with Title 29 of the Code of Federal Regulations (CFR) Part 1910.1200 titled Hazard Communication *"Right to Know"*. This written program will be readily available at all ECC offices and project sites.

2.0 Purpose

The purpose of the Hazard Communication Program is to inform and train Environmental Chemical Corporation (ECC) employees about the potential hazards of the materials that they may be exposed to while performing their work duties. ECC will provide information about chemical hazards and their control through labeling, chemical inventory, Material Safety Data Sheets (MSDS), and training programs as detailed in this written hazard communication program. This program applies to all known hazardous substances in the workplace that employees may be exposed to under normal conditions of use or in a foreseeable emergency resulting from workplace operations. Emergencies include equipment failure, rupture of containers.

This program does not apply to:

- Hazardous Waste (as defined by the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976);
- Tobacco and tobacco products;
- Wood and wood products;
- Foods, drugs, or cosmetics intended for personal consumption by employees while in the work place;
- Consumer products packaged for distribution to and use by, the general public, provided that employee exposure to the product is not significantly greater than the consumer exposure occurring during the principle consumer use of the product.

3.0 Definitions

Chemical - Means any element, chemical compaound or mixture of elements and/or compounds.

Chemical manaufacturer - Means an employer with a workplace where chemical(s) are produced for use or distribution.

Container - Means any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank, or

the like that contains a hazardous chemical. For the purposes of this section, pipes or piping systems, and engines, fuel tanks, or other operating systems in a vehicle, are not considered to be containers.

Distributor - Means a business, other than a chemical manufacturer or importer, which supplies hazardous chemicals to other distributors or to employers.

Employee - Means a worker who may be exposed to hazardous chemicals under normal operating conditions or in foreseeable emergencies. Workers such as office workers and bank tellers who encounter hazardous chemicals only in non-routine, isolated instances are not covered.

Exposure or exposed - Means that an employee is subjected in the course of employment to a chemical that is a physical or health hazard, and includes potential exposure.

Flammable - Means a chemical that falls into one of trhe following categories: aerosal flammable, gas flammable, liquid flammable,or solid flammable.

Hazardous chemical - Means any chemical which is a physical hazard or a health hazard.

Label - Means any written, printed, or graphic material displayed on or affixed to containers of hazardous chemicals.

Material Safety Data Sheet (MSDS) - Means written or printed material concerning a hazardous chemical which is prepared in accordance with paragraph (g) of 1910.1200.

Mixture - Means any combination of two or more chemicals if the combination is not, in whole or in part, the result of a chemical reaction.

Physical hazard - Means a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive.

Water-reactive - Means a chemical that reacts with water to release a gas that is either flammable or presents a health hazard.

Work Area - Means a chemical that reacts with water to release a gas that is either flammable or presents a health hazard.

Workplace - Means an establishment, job site, or project, at one geogrgaphical location containing one or more work areas.

4.0 Hazard Determination

Manufacturers, distributors and importers of chemicals are required to assess the physical and health hazards associated with each chemical they manufacture or import. This information must be conveyed to the employer by means of Material Safety Data Sheets (MSDS) and container labels. Hazardous substances are any material listed in any one or more of the following lists:

- 29 CFR Part 1910, Subpart Z, Toxic & Hazardous Substances (OSHA);
- Threshold Limit Values (American Conference of Gov. Industrial Hygienists);
- National Toxicology Program (NTP);
- International Agency for Research on Cancer (IARC);
- Any scientific study providing evidence that a material has physical or health hazards;
- Mixture containing 1% or more of a hazardous substance; or
- Mixtures containing 0.1% or more of a carcinogen.

Consumer products used under normal conditions are exempt from federal hazard communication regulation.

No chemicals shall be used in the work place without reading the MSDS for safety measures regarding ventilation and/or use of respirators, and proper exposure monitoring. Chemicals are not to be stored except in secured ventilated rooms designed for such purposes. Unused portions of chemical bottles are to be placed in the storage room after use.

5.0 Material Safety Data Sheets (MSDS)

Manufacturers and importers of chemicals are required to develop an MSDS for each chemical based upon the information they obtained during the hazard determination process. A copy of the MSDS supplied by the manufacturer or distributor of the chemical shall be kept at each ECC project site and office. The Corporate Health & Safety Manager, Chemical Hygiene Officer (Cincinnati Lab) or Project SSHO will be responsible for obtaining an MSDS for all chemicals present at each site or office. These individuals shall review incoming MSDSs for new and important health and safety information. All supervisors and employees will be informed of the new MSDSs within 30 days of the Health & Safety Officer receiving the new MSDS from the manufacturer.

All MSDSs will be reviewed for completeness by the ECC SSHO. If an MSDS is missing, a new MSDS shall be requested in writing from the manufacturer within 7 days.

The MSDS must contain the following information: *chemical identity; chemical ingredients; physical and chemical characteristics; fire and explosion hazard data; reactivity hazard data; health*

hazard data; control and protective measures; precautions for safe handling and special hazards. Upon receiving the MSDS from the first shipment of a chemical, the original will be sent to the SSHO. The MSDS will be reviewed by the SSHO and will be placed in the MSDS binder. ECC will not accept chemicals from the manufacturer or distributor unless a copy of the MSDS has already been obtained from a previous shipment or the shipment is accompanied by an MSDS. MSDS are available to all employees and contractors in the work area for review during each work shift. MSDSs shall be kept in a conspicuous location (ECC job trailer) at all times.

6.0 Labeling

ECC will not accept or release hazardous chemicals for use unless the original container is clearly labeled with at least the following information: identity of the hazardous chemical(s); appropriate hazard warning statement; and name and address of the manufacturer. If the hazardous substance is transferred to a secondary container, the secondary container must be clearly labeled with at least the following information: identity of the hazardous chemical and the appropriate hazard warning statement.

All labels must be legible, in English, and prominently displayed on the container. Labels shall not be defaced or removed unless the container is immediately marked with the required information. Unlabeled chemical containers should be immediately reported to the area supervisor or the Health and Safety Officer. The name of the material that appears on the manufacturer's label shall be the same as the name that appears in the area chemical inventory as well as the MSDS. Neither this program nor 29 CFR 1910.1200 require labeling of the following substances: pesticides; distilled spirits (beverage alcohols) for non-industrial use; and any consumer product.

7.0 Employee Training

Employees shall be trained on the hazardous substances in their work area: at the time of their initial assignment; whenever a new hazard is introduced into their area; and within 30 days of the employer receiving an updated MSDS containing new information indicating significant increased risk or changes in the use of personal protective equipment.

ECC employees will be trained in the following:

- Overview of the Hazard Communication regulation (29 CFR 1910.1200);
- Operations involving hazardous chemicals in their work area;
- Location and availability of the MSDS and written hazard communication program;
- How to read an MSDS and container labels;
- Physical and health effects of hazardous chemicals and measures to be taken by the employee to protect themselves;

- Use of engineering controls, personal protective equipment and work practices to prevent or lessen exposure to hazardous chemicals;
- Emergency and first aid procedures to follow in case of exposure to hazardous chemicals.

The employees shall be informed of their rights to:

- Personally receive information on the hazardous substances to which they may be exposed;
- Have their physician receive information regarding hazardous substances to which they may be exposed; and
- Incur no disciplinary action, including discharge or discrimination, against the employee due to the employee's exercise of the rights given to them under 29 CFR 1910.1200 and this written hazard communication program.

8.0 Chemical Inventory

Each ECC office and project site containing hazardous chemicals must have a Chemical Inventory list. The inventory shall be placed with the MSDS binder in a conspicuous location at all times. An MSDS shall be available for each chemical listed in the inventory. The SSHO is responsible for updating the chemical inventory list whenever a new chemical is introduced into the area or a chemical is deleted from the area.

9.0 Trade Secrets

ECC recognizes trade secrets may be witheld from disclosure under 29 CFR 1910.1200 (i). At this time, however, ECC is not aware of any chemicals in our inventory for which there is not full and open disclosure of hazard communication.

8.0 HEALTH AND SAFETY TRAINING PROGRAM

1.0 Policy

All personnel engaging in work activities involving hazardous waste site operations and remedial activities have satisfied the following safety training requirements in accordance with 29 CFR 1910.120 (e), 29 CFR 1926, state regulations, and ECC's health & safety policies and procedures. ECC will not permit employees or subcontractors to participate in field activities until they have been adequately trained.

It is ECC policy that persons involved in hazardous waste site operations or remediation activities will have successfully completed the following, at a minimum:

- OSHA 40-Hour Hazardous Waste Operations Training with a minimum of three days of supervised hazardous waste work;
- OSHA 8-Hour Refresher Training, for personnel who completed OSHA 40-Hour training more than 12 months previously;
- OSHA 8-Hour Supervisor Training, for the Field Supervisor and any other field personnel assigned supervisory duties;

In addition, the following ECC site health and safety training requirements shall be conducted:

- Site and/or task-specific training guidelines (i.e., confined space entry)
- Hazard Communication Program, as required by 29 CFR 1910.1200, 29 CFR 1926.59, and state regulations.
- All field personnel assigned to an ECC project shall be informed of, and trained on the content and application of the project Site Safety & Health Plan (SSHP). Employees shall review the SSHP and sign an SSHP Compliance Agreement upon completion of the training.

2.0 Purpose

ECC believes that injuries, illnesses, and near misses can be prevented when effective training is implemented. It is ECC's goal to provide proper and ongoing safety training to our employees.

3.0 Health & Safety Training Programs

3.1 40-Hour Hazardous Waste Training

ECC's HAZWOPER training program was developed in accordance with 29 CFR 1910.120 and state regulations. ECC requires all employees who may be exposed to hazardous substances/waste during the course of their employment with ECC to complete a 40-hour HAZWOPER training course prior to assignment on a hazardous substance/waste site.

Training topics include:

- Applicable regulations and employee/employer rights;
- Elements of the Emergency Response Plan;
- Standard operating procedures for the job and site;
- Hazard recognition and control;
- Physical and chemical characteristics of chemicals;
- Toxicology and exposure limits;
- Hazard communication and sources of information;
- Site characterization;
- Field monitoring equipment;
- Drums, containers, and spill control;
- Labeling;
- Personal protective equipment, including respiratory protection and decontamination;
- First aid and safety equipment;
- Emergency procedures;
- Methods used to minimize risks from hazards;
- Safe use of control equipment;
- Recognizing health effects; and
- Hands-on training.

In accordance with 29 CFR 1910.120, all ECC employees who have completed the 40-hour training course have received three days of supervised field experience instruction prior to working independently at or on hazardous waste site operations.

3.2 Annual Refresher Training

In order to stay in accordance with state and federal regulations, ECC employees must attend an annual 8-hour refresher training session within a year of receiving the 40-hour training. Topics include those described above as well as an evaluation of any incidents or regulatory, operational, or procedural changes that occurred over the previous year.

3.3 OSHA Supervisory Training

As required by state and federal regulations (29 CFR 1910.120 and 1926.65) and ECC policy, all employees who are responsible for supervising personnel in hazardous waste site operations have received an additional eight hours of specialized supervisor training.

3.4 Corporate Health and Safety Program Training

ECC's Corporate Health & Safety Program was developed in accordance with Federal OSHA (29 CFR 1910, 1926), and 8 CCR 3203 of the General Industry Safety Orders for the State of California.

ECC's Corporate Health & Safety Program will be provided to:

- All full-time employees;
- Full-time employees given a new work, job, or task assignment for which training has not been received;
- Full-time employees affected by the introduction of new substances, procedures, or equipment in the workplace;
- When a new or previously unrecognized hazard has been identified; and
- All supervisors, to familiarize them with safety and health hazards to which employees under their immediate direction and control may be exposed.

Topics include:

- Corporate Health & Safety Program structure, programs. and requirements;
- Safe and healthy work practices; and
- Accident prevention.

3.5 Hazard Communication Program Training

ECC's HAZCOM Program was developed in accordance with state and federal regulations. As required, training will be provided:

- To all new employees;
- To employees given a new work, job, or task assignment for which training has not been received; and
- Whenever a new hazard is identified or a new substance is introduced.

Training topics include:

- Applicable regulations;
- Hazard determination;
- Material Safety Data Sheets notification;
- The Hazard Communication Program: availability, components, and employee rights; and
- Safe and appropriate work practices (i.e., PPE, labeling).

3.6 Site and Task-Specific Training

Certain sites or job tasks require the additional training of on-site personnel (managers, project employees, subcontractors). Examples of training include working with radiation, confined space entry, blood borne pathogens, carcinogens, and other specific chemicals such as asbestos, lead, arsenic, vinyl chloride, and benzene. Field personnel will attend these supplemental training programs as required by their job responsibilities.

In addition, visitors to the site will receive an orientation and safety overview. Safety and tailgate meetings, held periodically to review the SSHP and any changes to the document, will stress the importance of safe work practices and procedures.

3.7 Radiation Training

All applicable site personnel will receive radiation training in accordance within ECC's program for controlling radiation hazards associated with sources of ionizing radiation. ECC does not possess radiation sources that could cause any individual to receive a dose in excess of two millirems in any one hour, or 100 millirem in any one year.

The purpose of ECC's radiation protection program is to establish a procedure for identifying, evaluating, and controlling exposure to sources of ionizing radiation. ECC's Health Physicists oversees ECC's Radiation Protection Program, and conducts the necessary training requirements for all employees and Subcontractors.

It is the philosophy of this program to establish and preserve policies that maintain potential radiation exposures at levels that are as low as reasonably achievable (ALARA). Therefore, only those personnel with specific assigned tasks shall be authorized to enter and work in areas where radioactive anomalies have been identified. All ECC personnel assigned to perform tasks in these areas shall be subject to the provisions of this radiation protection program.

The following regulations and programs shall apply in the implementation of this program. Where

a specific topic is addressed by more than one of the participating parties listed, the most stringent interpretation shall apply, unless special documented provisions have been identified and approved.

- Federal regulations - 10 CFR Parts 19, 20, and 835; and 29 CFR 1910.96;
- Applicable state and federal agency-specific regulations; and
- ECC Radiation Protection Program.

3.8 CPR/First Aid Training

For all field activities, at least two on-site personnel are required to have current First Aid and CPR certification. For field activities where only one employee is present, the employee will be First Aid and CPR-trained as above.

3.9 Blood borne Pathogen Training

OSHA requires accordance with 29 CFR 1910.1030 and state regulations (Occupational Exposure to Blood borne Pathogens Standard). A source of occupational exposure may occur when an employee gives First Aid and CPR to an individual who has infectious blood.

Additional sources of exposure are infectious waste found at hazardous waste sites, glassware, needles, or other sharp objects that have been involved in injuries to personnel resulting in contamination with blood or related bodily fluids, and infectious waste in laboratory samples. Because exposure to blood borne pathogens may occur while an employee is giving First Aid or CPR or is in contact with infectious waste, field personnel will receive training as required by 29 CFR 1910.1030 and state regulations.

3.10 Carcinogen and Chemical-Specific Training

Prior to the start of a project, ECC employees are trained in requirements regarding certain specific chemicals, especially carcinogens that have specific general industry safety orders for persons who may be exposed to those chemicals at or above action or permissible exposure levels. Examples of these chemicals include, but are not limited to, asbestos, lead, arsenic, vinyl chloride, formaldehyde, benzene, and explosives. The training requirements described in these orders generally include:

- Applicable regulations and employee rights;
- Manner or method of exposure;
- Material Safety Data Sheets;
- Safe work practices and engineering controls;
- Understanding the hazards and health effects;
- Recognizing exposures and monitoring devices;

- Use and limitations of PPE/Respiratory Protection;
- Medical surveillance programs;
- Emergency procedures for exposures, spills, and cleanups; and
- Interaction of chemical with other substances.

3.11 Confined Space Training

State and federal safety regulations require that each employer generate and implement a written confined space entry program. The components of ECC's Confined Space Entry Training Program which complies with 29 CFR 1910.146 consists of the following:

- Regulation overview;
- Hazards of a confined space;
- Confined space entry procedures;
- Responsibilities of a standby person;
- Permit required confined space procedures;
- Ventilation procedures;
- Monitoring requirements;
- Emergency planning and procedures; and
- PPE and emergency equipment checklist.

3.12 Visitor Orientation Training

All visitors to the site are required to review the SSHP and relevant sections of the work plan and sign an acknowledgment that they have read and understand these documents and will follow safe work practices while on-site. Visitors must also meet the site-specific PPE, medical surveillance, and training requirements and will receive site indoctrination training from the SSHO. Individuals not meeting these requirements will not be permitted in the Exclusion and Contamination Reduction Zones, and shall remain in the Support Zone at all times.

4.0 Safety Trainers

ECC safety trainers have satisfactorily completed all training requirements of the programs that they are teaching (i.e., HAZWOPER training). ECC trainers have also maintained the academic credentials and instruction experience necessary to provide the highest degree of training to our personnel.

Training records are kept at the following locations:

- Burlingame/Hawaii full-time employees - Dean Osaki (Corporate Office)

- Denver/Lakewood full-time employees - Lloyd McKissick (Denver Office)
- Cincinnati full-time employees - Bhupender Sabharwal
- Project SSHOs are responsible for verifying that project employees and subcontractors have maintained their annual refreshers and all other applicable training.

9.0 MEDICAL SURVEILLANCE PROGRAM

1.0 Policy

All Environmental/Operational Division employees at ECC shall receive an extensive pre-employment medical screening in accordance with OSHA standard 29 CFR 1910.120/1926.65. Personnel shall also receive periodic and follow-up examinations when appropriate. All medical monitoring information is properly documented and is maintained in each employee's personnel file.

2.0 Purpose

The medical surveillance program is established to ensure that personnel are capable of performing their assigned activities and the health of employees is not compromised by potential exposure to chemical or physical agents found at work sites. This program is designed to support and monitor the effectiveness of the primary Health and Safety goal of controlling worker exposure to hazardous materials.

This procedure describes the ECC medical surveillance program requirements.

A medical surveillance program is required for employees who are or may be:

- Exposed to substances above permissible levels;
- Required to wear a respirator; and
- Exposed above permissible levels in accidents or emergency situations.

Employees who have a potential site exposure risk, work with potentially hazardous materials, are required to wear respiratory devices, or are required to be monitored under other regulations (e.g., DOT drivers) will be monitored. All employees who enter the exclusion or contamination reduction zone must participate in the medical surveillance program. Other personnel may be monitored on a case-by-case basis. All employees designated to participate in this program are required to do so as a condition of employment. Employees who do not fall within the above categories will not be included in the program.

The medical surveillance program consists of four parts: *a pre-employment medical examination, annual medical examination, project specific monitoring and/or medical examination (periodic), and exit medical examination.*

ECC's Corporate Health and Safety Manager or Project SSHO is responsible for providing the physician with the following:

- A copy of the OSHA regulation relating to hazardous waste site workers and its appendices (29 CFR 1910.120);
- Description of employee duties as they relate to exposures;
- Description of the personal protective equipment to be used;
- Information from previous examinations which may not be readily available to the physician; and
- A copy of the ECC Medical Program.

Documentation of employee participation in the medical surveillance program and physician determination that the employees can wear PPE and respirators, will be documented for OSHA record keeping purposes.

3.0 Pre-Employment Medical Examination

The purpose of pre-employment examination is three-fold. First, the examination shall identify any pre-existing illness or medical problem which may exclude a prospective applicant from employment. Secondly, the examination should determine if a candidate possesses sufficient physical capabilities to wear respiratory and personal protective equipment, work at heights, work in climatic extremes (heat and cold), and perform strenuous physical labor. Thirdly, the medical information (physical exam, spirometry, EKG, drug screening, chest x-ray (if applicable), urinalysis, audiogram) will serve as a baseline (pre-exposure) against which the yearly or project specific monitoring can be compared, providing a mechanism for early detection of toxic substance exposure, and determine the employee's general fitness for potential exposure to chemicals and physical agents. ECC will fill out the Physical Examination Request Form while sending an employee for medical examination. It describes the nature of the tests to be performed. The Medical Clearance Form and Employee Medical Notification letter will be completed by the occupational physician and sent to ECC after the examination is completed.

During the performance of this pre-employment exam, the employee will prepare a pre-employment medical history.

In the pre-employment examination, the examining physician will determine if the prospective employee is capable of safely performing the job for which he/she is applying. At the conclusion of the pre-employment examination, the examining physician will carefully review the medical history and result of the physical examination along with laboratory reports, and then determine if the prospective employee is physically capable of safely performing the intended tasks.

4.0 Annual Medical Examination

The annual examination will include an updated medical history, including any occupational exposure from the previous year, and a detailed physical exam featuring components similar to the pre-employment examination. The physician will pay particular attention when comparing the bio-chemical parameters to help ensure that symptoms of toxic exposure which may have developed during the past year are recognized. The physician will complete and sign the medical certification/rejection section. A written report of the occupational and medical history, physical exam, and all lab work is required.

5.0 Drivers' Medical Examination

ECC personnel do not transport hazardous materials, therefore U.S. Department of Transportation (DOT) physicals are not required. DOT physicals shall be checked for all subcontractors transporting hazardous materials for ECC. Driver physicals will consist of a short history and physical examination.

6.0 Project Specific Monitoring and/or Medical Examination (periodic)

The project's treating physician will determine the contents of the project medical surveillance program. Any time an actual exposure occurs, the employee may be tested for that material and the advice of the consultant toxicologist sought. Mr. Gilbert Kucera (Industrial Medical Clinic - Burlingame) servers as ECC's Medical Advisor.

7.0 Exit Medical Examination

An exit medical examination is required at termination of employment or reassignment to an area where the employee would not be covered. The physician should pay particular attention to the condition of skin and document employee comments as to state of health. A written report of the occupational and medical history, physical exam, and all lab work is required.

In the event an individual leaves ECC without the required exit exam, ECC shall send a registered letter to the employee requesting a baseline physical at ECC's expense.

ENVIRONMENTAL CHEMICAL CORPORATION
PHYSICAL EXAM REQUISITION
AS REQUIRED BY 29 CFR 1910.120(f) & 1926.65 (f) - *Medical Surveillance*

Name_____ Date_____

As required by 29 CFR 1910.120 (f) and 1926.65 (f), Environmental Chemical Corporation's (ECC's) Medical Surveillance Program shall be instituted by ECC for the following employees:

i) All employees who may be exposed to hazardous substances or health hazards at or above the permissible exposure limits or, if there is no permissible exposure limit, above the published exposure levels for these substances, without the regard to the use of respirators, for 30 days or more a year; ii) All employees who wear a respirator as required by 29 CFR 1910.139; iii) All employees who are injured, become ill or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation; and iv) Members of HAZMAT teams.

The contents of ECC's medical examination shall consist of the following tests:

_____ Basic Physical Exam - medical history, occupational history, blood pressure, height, weight, physical examination interpretation, vision test, complete blood count (CBC), SMAC 23,
muscleskeletal examination (*required for every employee covered under this standard*).

_____ Audiogram (*required for all personnel who may have a potential exposure of >85 decibel exposure*).

_____ Spirometry *(required for every employee covered under this standard)*.

_____ Chest X-ray and "B" Reader (*required* ***only*** *if spirometry readings are abnormal*).

_____ EKG, resting, mounted, & interpreted *(required for every employee covered under this standard)*.

_____ Drug Screening Test - 8 Panel + alcohol (*pre-placement test for all ECC employees*).

_____ Additional Testing Requirements:_____

Person Requesting Exam _____
(Signature)

MEDICAL CLEARANCE FORM

Employee Name:_____ **Date of Exam:**_____

I have reviewed the results of the medical history, physical exam, and lab tests prescribed by ECC.

Type of Exam: ___ Initial ___ Annual ___ Exit
Protocol: ___ Hazardous Worker ___ Administrator
and attest that: ___ The record is complete ____ The following were not performed

Based upon my examination as per the OSHA Respirator Standard (29 CFR 1910.134), I attest that this employee:

___ Has no medical contraindications to the use of supplied air or self contained breathing apparatus (SCBA) and air-purifying respirators.
___ Has a medical restriction in the use of respiratory equipment (described below).

_____

_____

As per OSHA Hazardous Waste Operations and Emergency Response Standard (29CFR 1910.120/1926.65), I have examined the individual above for medical conditions that would place him/her at an increased risk of material impairment of health from work involving hazardous waste operations or emergency response. Based on my examination, I attest that this individual:

___ Has no medical contraindications to full participation in hazardous waste site work; when conducted under the conditions of adequate training and a health and safety plan.
___ Has medical limitations that restrict full participation in hazardous waste site work. (Describe work function limitations, i.e., lifting, temporary limitation, pending medical follow-up work, etc.).
___ Is medically restricted from any direct work with hazardous waste or hazardous waste sites. (Describe work limitations).

Hearing Classifications: ____ Normal
___ Hearing loss ___ Standard Threshold Shift - 10dB or more loss at 2000, 3000 and 4000Hz in either ear.

I have reviewed the examination results to the employees and have also informed the employee about medical conditions discovered during my examination that require further examination or treatment

Signature of Physician:_____ Date:_____

EMPLOYEE MEDICAL NOTIFICATION LETTER

Employee Name:_____ **Date of Exam**_____

Recently you had a medical examination in our office in accordance with OSHA regulations for workers exposed to hazardous waste (29 CFR 1910.120/1926.65) and for the use of respiratory protective equipment (29 CFR 1910.134). The results of this examination follow:

Medical History	___	Normal	___	Abnormal _____
Physical Exam	___	Normal	___	Abnormal _____
Chest X-rays	___	Normal	___	Abnormal_____
Spirometry:	___	Normal	___	Abnormal _____
EKG	___	Normal	___	Abnormal_____
Laboratory Tests	___	Normal	___	Abnormal _____

Comments:_____

___ Your examination was normal.

___ The abnormalities noted above have resulted in restrictions in your work duties or in your use of personal protective equipment as described in the accompanying medicalevaluation form.

If you have any question, please do not hesitate to call me.

_____ _____

Name of Physician (please print) Signature of Examining Physician Date

10.0 SITE CONTROL PROGRAM

1.0 Policy

ECC's Site Control Program is prepared in accordance with 29 CFR 1910.120 (d), 29 CFR 1926.65 (d), and 8 CCR 5192. A site control program shall be part ECC's site safety and health program.

2.0 Purpose

The purpose of site control on an ECC project site is to minimize potential contamination of workers, protect the public from the site's chemical and physical hazards, and facilitate work activities prior to clean-up activities. Site control shall be established by artificial and/or physical barriers which isolate various hazards from potential "targets".

3.0 Site Control Planning

Site control should be established in the planning stage of any job. The degree of site control is dependent on individual site characteristics, and must be flexible.

Variables Affecting Site Control

- Chemical and physical hazards
- Site characteristics
- Work activities
- Environmental factors

4.0 Site Control Implementation

Effective site control is contingent on good organization (equipment, people and tasks).

Procedures/Components

- Site map
- Site preparation
- Work zones
- Buddy system
- Site security
- Communication system
- Safe work practices
- Exposure minimization

- Nearest medical facility/route map

5.0 Work Zones

To reduce the accidental spread of hazardous substances by workers from the contaminated area to the clean area, work zones must be set up. The establishment of work zones will help to assure that personnel are properly protected against the hazards present where they are working. Uncontrolled hazardous waste substances sites are generally divided into three zones: Exclusion Zone (EZ) Contamination Reduction Zone (CRZ), and the Support Zone (SZ).

5.1 Exclusion Zone

An Exclusion Zone will be established around the immediate work area, and shall be clearly marked by a combination of traffic cones, barricades and/or high visibility barrier tape. The Exclusion Zone shall mark the area where direct handling operations are occurring and where field personnel may be exposed to chemical and physical hazards. Entry into the Exclusion Zone shall be regulated by the SSHO and the Field Supervisor. No person shall enter an Exclusion Zone if they are not wearing the required protective clothing and equipment. All personnel exiting an Exclusion Zone must pass through the Contamination Reduction Zone, following the required decontamination procedure.

The size and shape of the Exclusion Zone shall be based on known and anticipated hazards, type of operation being performed, physical and topographical features, potential for site emergencies affecting surrounding areas, etc. Prior to the beginning of each days' operations, the SSHO shall observe site conditions and determine the location and boundaries of the exclusion zone. This work zone shall be reasonably large enough to accommodate equipment operations (i.e. 25 to 50 feet in all directions, etc.). The SSHO shall re-evaluate the location and boundaries of the Exclusion Zone as frequently as necessary, each day at minimum, to ensure that the Exclusion Zone incorporates all areas as described immediately above.

5.2 Contamination Reduction Zone

The Contamination Reduction Zone (CRZ) is the transition area between the contaminated area and the clean area. This zone is designed to reduce the probability that the clean Support Zone will become contaminated or affected by other site hazards. Decontamination procedures begin at the boundary between the Exclusion Zone and the CRZ, called the hotline.

5.3 Support Zone

The Support Zone is the location of the administrative and other support functions needed to keep the operations in the Exclusion Zone and CRZ running smoothly. Individuals entering the Support

Zone shall be free of contamination.

All work zones shall be established daily before beginning operations. Site control requirements shall be reviewed during daily Tailgate Safety Meetings. A copy of the site map showing any adjustments to the work zone boundary shall be attached to the daily Tailgate Safety Meeting form whenever work zones are adjusted based on-site conditions.

6.0 Site Security

Site security shall be established by clearly marking all work zones at all possible locations of entry by unauthorized personnel in order to minimize and prevent public exposure to hazards created by site activities. In addition, the SSHO as well as ECC employees shall observe for pedestrian and vehicle traffic that may unknowingly enter designated work areas, and take action to stop their unauthorized entry. When necessary, field personnel may be assigned as security in order to warn persons or vehicles of the adjacent operation.

11.0 RESPIRATORY PROTECTION PROGRAM

1.0 Policy

ECC's Respiratory Protection Program is prepared in accordance with 29 CFR 1910.134.

2.0 Purpose

The purpose of ECC's Respiratory Protection Program is to protect the health of the employee from contaminated air. In the control of occupational diseases caused by breathing contaminated air, the primary objective shall be to prevent atmospheric contamination by engineering controls. Respirators shall be provided by ECC which are applicable for the purpose intended.

3.0 Definitions

The following definitions are important terms used in the respiratory protection standard in this section.

Air-purifying respirator means a respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.

Atmosphere-supplying respirator means a respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere, and includes supplied-air respirators (SARs) and self-contained breathing apparatus (SCBA) units.

Canister or cartridge means a container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.

Demand respirator means an atmosphere-supplying respirator that admits breathing air to the face piece only when a negative pressure is created inside the face piece by inhalation.

Emergency situation means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment that may or does result in an uncontrolled significant release of an airborne contaminant.

Employee exposure means exposure to a concentration of an airborne contaminant that would occur if the employee were not using respiratory protection.

End-of-service-life indicator (ESLI) means a system that warns the respirator user of the approach of the end of adequate respiratory protection, for example, that the sorbent is approaching saturation or is no longer effective.

Escape-only respirator means a respirator intended to be used only for emergency exit.

Filter or air purifying element means a component used in respirators to remove solid or liquid aerosols from the inspired air.

Filtering face piece (dust mask) means a negative pressure particulate respirator with a filter as an integral part of the face piece or with the entire face piece composed of the filtering medium.

Fit factor means a quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

Fit test means the use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual. (See also Qualitative fit test QLFT and Quantitative fit test QNFT.)

Helmet means a rigid respiratory inlet covering that also provides head protection against impact and penetration.

High efficiency particulate air (HEPA) filter means a filter that is at least 99.97% efficient in removing monodisperse particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N100, R100, and P100 filters.

Hood means a respiratory inlet covering that completely covers the head and neck and may also cover portions of the shoulders and torso.

Immediately dangerous to life or health (IDLH) means an atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.

Interior structural firefighting means the physical activity of fire suppression, rescue or both, inside of buildings or enclosed structures which are involved in a fire situation beyond the incipient stage.

(See 29 CFR 1910.155).

Loose-fitting face piece means a respiratory inlet covering that is designed to form a partial seal with the face.

Negative pressure respirator (tight fitting) means a respirator in which the air pressure inside the face piece is negative during inhalation with respect to the ambient air pressure outside the respirator.

Oxygen deficient atmosphere means an atmosphere with an oxygen content below 19.5% by volume.

Physician or other licensed health care professional (PLHCP) means an individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide, or be delegated the responsibility to provide, some or all of the health care services required by paragraph (e) of this section.

Positive pressure respirator means a respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

Powered air-purifying respirator (PAPR) means an air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

Pressure demand respirator means a positive pressure atmosphere-supplying respirator that admits breathing air to the face piece when the positive pressure is reduced inside the face piece by inhalation.

Qualitative fit test (QLFT) means a pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

Quantitative fit test (QNFT) means an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

Respiratory inlet covering means that portion of a respirator that forms the protective barrier between the user's respiratory tract and an air-purifying device or breathing air source, or both. It may be a face piece, helmet, hood, suit, or a mouthpiece respirator with nose clamp.

Self-contained breathing apparatus (SCBA) means an atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

Service life means the period of time that a respirator, filter or sorbent, or other respiratory equipment provides adequate protection to the wearer.

Supplied-air respirator (SAR) or airline respirator means an atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.

Tight-fitting face piece means a respiratory inlet covering that forms a complete seal with the face.

4.0 Respiratory Protection Program Requirements

Where respirators are necessary to protect employee health or are required by ECC, ECC shall establish and implement a written respiratory protection program included in the SSHP with work site specific procedures for respirator use. The program shall be administered by ECC's Certified Safety Professional (C.S.P.), Certified Industrial Hygienist (C.I.H.), or a Competent Person trained in Respiratory Protection. The program shall include the following topics:

- Procedures for selecting respirators;
- Medical evaluations of respirator users;
- Fit testing for tight-fitting respirators;
- Procedures for routine and foreseeable emergency respirator use;
- Maintenance procedures and schedules;
- Procedures for adequate quality, quantity and flow of breathing air for atmosphere-supplying respirators;
- Employee training in the respiratory hazards during routine and emergency situations;
- Employee training in the use, limitations and maintenance of respirators;
- Procedures for regular evaluation of program effectiveness.

Where respirators use is not required:

- ECC may provide respirators at the request of employees if respirator use will not create a hazard.
- ECC must establish and implement elements of a written respiratory protection program to ensure that any employee using a respirator voluntarily is medically able to use the respirator,

and the respirator is cleaned, stored, and maintained so that use does not present a health hazard. Exception: voluntary use of filtering face pieces.

5.0 Selection and Use of Respiratory Protective Equipment

5.1 General Requirements

ECC shall select and provide respirators based on hazard(s) and user factors that affect respirator performance.

ECC shall select NIOSH-certified respirators. Respirators shall be used in accordance with NIOSH certification.

ECC shall identify and evaluate hazard(s). Evaluation shall include an estimate of employee exposures and an identification of each contaminant's chemical state and physical form. If employee exposure cannot be estimated, the atmosphere shall be considered IDLH.

ECC shall select respirators from a number of models and sizes.

5.2 Respirators For IDLH Atmospheres

Due to the potential hazards existing in ECC employees shall not be permitted in IDLH atmospheres.

ECC shall provide the following respirators in IDLH atmospheres:

- Full-face pressure demand SCBA certified for a minimum of 30 minutes, or
- Combination full-face pressure demand supplied-air respirator with auxiliary self-contained air supply.

Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape. All oxygen-deficient atmospheres shall be considered IDLH. Exception: If under all foreseeable conditions the oxygen concentration can be maintained within the ranges specified in Table 1.

Table 1.

Altitude (ft.)	Oxygen-deficient Atmospheres (%O_2) for which the employer may rely on atmosphere-supplying respirators
Less than 3,001	16.0 - 19.5
3,001 - 4,000	16.4 - 19.5
4,001 - 5,000	17.1 - 19.5
5,001 - 6,000	17.8 - 19.5
6,001 - 7,000	18.5 - 19.5
7,001 - 8,000	19.3 - 19.5

5.3 Respirators For Atmospheres That Are Not IDLH

ECC shall provide a respirator adequate to protect the employee and ensure accordance with OSHA requirements under routine and reasonably foreseeable emergency situations. The respirator shall be appropriate for the chemical state and for the contaminant. For protection against gases and vapors, ECC shall provide:

- An atmosphere-supplying respirator, or
- An air-purifying respirator, provided that it is equipped with an end-of-service-life indicator (ESLI) certified by NIOSH; or implement a change schedule for canisters and cartridges based on information or data that will ensure canisters and cartridges are changed before the end of their service life. ECC shall describe in the respirator program the information and data basis for canister and cartridge change schedule.

For protection against particulates, ECC shall provide the following:

- An atmosphere-supplying respirator; or
- An air-purifying respirator with a filter certified by NIOSH
- For contaminants with mass median aerodynamic diameters (MMAD) of at least 2 micrometers, an air-purifying respirator with any filter certified for particulates by NIOSH.

6.0 Medical Evaluation

ECC shall provide an annual medical evaluation before the employee is fit tested or required to use the respirator. Medical evaluations shall be conducted by a physician or other licensed health care professionals to determine if the employee is physically fit to wear a respirator. ECC's medical testing requirements and employee medical forms can be located in Section 9.0 - *Medical Surveillance Program.*

The following information must be provided to the physician during the medical examination:

- The type and weight of the respirator to be used;
- The duration and frequency of respirator use (including rescue and escape);
- The expected physical work effort;
- Additional protective clothing and equipment to be worn;
- Temperature and humidity extremes that may be encountered.

Any supplemental information provided previously need not be provided for a subsequent evaluation if the information remains the same.

ECC shall provide the physician with a copy of the written respiratory protection program and the OSHA Standard.

6.1 Medical Determination

In determining the employee's ability to use a respirator, ECC shall:

- Obtain a written recommendation regarding the employee's ability to use the respirator from the Physician or Licenced Health Care Professional (PLHCP). The recommendation shall provide only the following information:
- Any limitations on respirator use related to the medical condition of the employee, or relating to the workplace conditions in which the respirator will be used, including whether or not the employee is medically able to use the respirator;
- The need, if any, for follow-up medical evaluations; and

- A statement that the PLHCP has provided the employee with a copy of the PLHCP's written recommendation.

If the respirator is a negative pressure respirator and the PLHCP finds a medical condition that may place the employee's health at increased risk if the respirator is used, ECC shall provide a Powered Air Purifying Respirator (PAPR) if the PLHCP's medical evaluation finds that the employee can use such a respirator; if a subsequent medical evaluation finds that the employee is medically able to use a negative pressure respirator, then ECC is no longer required to provide a PAPR.

6.2 Additional Medical Evaluations

At a minimum, ECC shall provide additional medical evaluations that comply with the requirements of this section if:

- An employee reports medical signs or symptoms that are related to ability to use a respirator;
- A PLHCP, supervisor, or the respirator program administrator informs ECC that an employee needs to be reevaluated;
- Information from the respiratory protection program, including observations made during fit testing and program evaluation, indicates a need for employee reevaluation; or
- A change occurs in workplace conditions (e.g., physical work effort, protective clothing, temperature) that may result in a substantial increase in the physiological burden placed on an employee.

7.0 Respirator Fit-Testing

- Employees using tight-fitting face piece respirators shall pass a fit test;
- Employees shall be fit tested prior to initial respirator use, whenever a different respirator face piece is used, and annually;
- Additional fit tests shall be conducted whenever changes in the employee's physical condition are observed that could affect respirator fit.
- If after fit testing the employee notifies ECC that the fit is unacceptable, the employee shall select a different respirator and be retested.
- Qualitative fit test (QLFT) may only be used to fit test negative pressure air purifying respirators that must achieve a fit factor of 100 or less.
- If the fit factor, through Quantitative fit test (QNFT) protocol, is equal to or greater than 100 for half face pieces, or equal to or greater than 500 for full face pieces, the QNFT has been passed.
- Fit testing of tight-fitting atmosphere-supplying respirators and tight-fitting powered air-purifying respirators shall be accomplished by performing quantitative or qualitative fit testing in the negative pressure mode, regardless of the mode of operation (negative or

positive pressure) that is used for respiratory protection.

- Qualitative fit testing of these respirators shall be accomplished by temporarily converting the respirator user's actual face piece into a negative pressure respirator with appropriate filters, or by using an identical negative pressure air-purifying respirator face piece with the same sealing surfaces as a surrogate for the atmosphere-supplying or powered air-purifying respirator face piece.
- Quantitative fit testing of these respirators shall be accomplished by modifying the face piece to allow sampling inside the face piece in the breathing zone of the user, midway between the nose and mouth. This requirement shall be accomplished by installing a permanent sampling probe onto a surrogate face piece, or by using a sampling adapter designed to temporarily provide a means of sampling air from inside the face piece.
- Any modifications to the respirator face piece for fit testing shall be completely removed, and the face piece restored to NIOSH-approved configuration, before that face piece can be used in the workplace.

8.0 Use of Respirators

This section requires ECC to establish and implement procedures for the proper use of respirators. These requirements include prohibiting conditions that may result in face piece seal leakage, preventing employees from removing respirators in hazardous environments, taking actions to ensure continued effective respirator operation throughout the work shift, and establishing procedures for the use of respirators in IDLH atmospheres or in interior structural firefighting situations.

8.1 Face Piece Seal Protection

ECC shall not permit respirators with tight-fitting face pieces to be worn by employees who have:

- *Facial hair that comes between the sealing surface of the face piece and the face or that interferes with valve function; or*
- *Any condition that interferes with the face-to-face piece seal or valve function.*

If an employee wears corrective glasses or goggles or other personal protective equipment, ECC shall ensure that such equipment is worn in a manner that does not interfere with the seal of the face piece to the face of the user. Employees shall perform a user seal check each time the respirator is used.

8.2 Continuing Respirator Effectiveness

Appropriate surveillance shall be maintained of work area conditions and degree of employee exposure or stress. When there is a change in work area conditions or degree of employee exposure or stress that may affect respirator effectiveness, ECC shall reevaluate the continued effectiveness of the respirator.

ECC shall ensure that employees leave the respirator use area:

- To wash their faces and respirator face pieces as necessary to prevent eye or skin irritation associated with respirator use; or
- If they detect vapor or gas breakthrough, changes in breathing resistance, or leakage of the face piece; or
- To replace the respirator or the filter, cartridge, or canister elements.

If the employee detects vapor or gas breakthrough, changes in breathing resistance, or leakage of the face piece, ECC must replace or repair the respirator before allowing the employee to return to the work area.

8.3 Procedures For IDLH Atmospheres

For all IDLH atmospheres, ECC shall ensure that:

- One employee or, when needed, more than one employee is located outside the IDLH atmosphere;
- Visual, voice, or signal line communication is maintained between the employee(s) in the IDLH atmosphere and the employee(s) located outside the IDLH atmosphere;
- The employee(s) located outside the IDLH atmosphere are trained and equipped to provide effective emergency rescue;
- ECC is notified before the employee(s) located outside the IDLH atmosphere enter the IDLH atmosphere to provide emergency rescue;
- ECC or designee provides necessary assistance appropriate to the situation;
- Employee(s) located outside the IDLH atmospheres are equipped with: Pressure demand or other positive pressure SCBAs, or a pressure demand or other positive pressure supplied-air respirator with auxiliary SCBA; and either Appropriate retrieval equipment for removing the employee(s) who enter(s) these hazardous atmospheres where retrieval equipment would contribute to the rescue of the employee(s) and would not increase the overall risk resulting

from entry; or Equivalent means for rescue.

8.4 Procedures For Interior Structural Firefighting

In addition to the requirements set forth under paragraph (g)(3), in interior structural fires, ECC shall ensure that:

- At least two employees enter the IDLH atmosphere and remain in visual or voice contact with one another at all times;
- At least two employees are located outside the IDLH atmosphere; and
- All employees engaged in interior structural firefighting use SCBAs.

9.0 Maintenance and Care of Respirators

This section requires ECC to provide for the cleaning and disinfecting, storage, inspection, and repair of respirators used by employees.

9.1 Cleaning and Disinfecting

ECC's Project Safety Officer shall provide each respirator user with a respirator that is clean, sanitary, and in good working order. The Project Safety Officer shall ensure that respirators are cleaned and disinfected or procedures recommended by the respirator manufacturer, provided that such procedures are of equivalent effectiveness. The respirators shall be cleaned and disinfected at the following intervals:

- Respirators issued for the exclusive use of an employee shall be cleaned by the employee and disinfected as often as necessary to be maintained in a sanitary condition;
- Respirators issued to more than one employee shall be cleaned and disinfected by the employee before being worn by different individuals;
- Respirators maintained for emergency use shall be cleaned and disinfected by the employee after each use; and
- Respirators used in fit testing and training shall be cleaned and disinfected by the employee after each use.

9.2 Storage

ECC shall ensure that respirators are stored as follows:

- All respirators shall be stored in ECC's project trailer to protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals, and they shall be packed or stored to prevent deformation of the face piece and exhalation valve.

Emergency respirators shall be:

- Kept accessible to the work area;
- Stored in compartments or in covers that are clearly marked as containing emergency respirators; and
- Stored in accordance with any applicable manufacturer instructions.

9.3 Inspection

ECC shall ensure that respirators are inspected as follows:

- All respirators used in routine situations shall be inspected before each use and during cleaning by the Project Safety Officer;
- All respirators maintained for use in emergency situations shall be inspected at least monthly and in accordance with the manufacturer's recommendations, and shall be checked for proper function before and after each use by the Project Safety Officer; and
- Emergency escape-only respirators shall be inspected before being carried into the workplace for use by the project safety officer.

ECC's Project Safety Officer shall ensure that respirator inspections include the following:

- A check of respirator function, tightness of connections, and the condition of the various parts including, but not limited to, the face piece, head straps, valves, connecting tube, and cartridges, canisters or filters; and
- A check of elastomeric parts for pliability and signs of deterioration.

Self-contained breathing apparatus shall be inspected monthly by the Project Safety Officer. Air and oxygen cylinders shall be maintained in a fully charged state and shall be recharged when the pressure falls to 90% of the manufacturer's recommended pressure level. ECC's Project Safety Officer shall determine that the regulator and warning devices function properly.

For respirators maintained for emergency use, ECC's Project Safety Officer shall:

- Attest the respirator by documenting the date the inspection was performed, the name (or signature) of the person who made the inspection, the findings, required remedial action, and a serial number or other means of identifying the inspected respirator; and provide this information on a tag or label that is attached to the storage compartment for the respirator, is kept with the respirator, or is included in inspection reports stored as paper or electronic files. This information shall be maintained until replaced following a subsequent certification.

9.4 Repairs

ECC shall ensure that respirators that fail an inspection or are otherwise found to be defective are removed from service, and are discarded or repaired or adjusted in accordance with the following procedures:

- Repairs or adjustments to respirators are to be made only by persons appropriately trained to perform such operations and shall use only the respirator manufacturer's NIOSH-approved parts designed for the respirator;
- Repairs shall be made according to the manufacturer's recommendations and specifications for the type and extent of repairs to be performed; and
- Reducing and admission valves, regulators, and alarms shall be adjusted or repaired only by the manufacturer or a technician trained by the manufacturer.

10.0 Breathing Air Quality and Use

This section requires ECC to provide employees using atmosphere-supplying respirators (supplied-air and SCBA) with breathing gases of high purity.

ECC shall ensure that compressed air, compressed oxygen, liquid air, and liquid oxygen used for respiration accords with the following specifications:

Compressed and liquid oxygen shall meet the United States Pharmacopoeia requirements for medical or breathing oxygen; and

Compressed breathing air shall meet at least the requirements for Grade D breathing air described in ANSI/Compressed Gas Association Commodity Specification for Air, G-7.1-1989, to include:

- Oxygen content (v/v) of 19.5-23.5%;
- Hydrocarbon (condensed) content of 5 milligrams per cubic meter of air or less;

- Carbon monoxide (CO) content of 10 ppm or less;
- Carbon dioxide content of 1,000 ppm or less; and
- Lack of noticeable odor.

ECC shall ensure that compressed oxygen is not used in atmosphere-supplying respirators that have previously used compressed air.

ECC shall ensure that oxygen concentrations greater than 23.5% are used only in equipment designed for oxygen service or distribution.

ECC shall ensure that cylinders used to supply breathing air to respirators meet the following requirements:

- Cylinders are tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49 CFR part 173 and part 178);
- Cylinders of purchased breathing air have a certificate of analysis from the supplier that the breathing air meets the requirements for Grade D breathing air; and
- The moisture content in the cylinder does not exceed a dew point of -50 deg.F (-45.6 deg.C) at 1 atmosphere pressure.

ECC shall ensure that compressors used to supply breathing air to respirators are constructed and situated so as to:

- Prevent entry of contaminated air into the air-supply system;
- Minimize moisture content so that the dew point at 1 atmosphere pressure is 10 degrees F (5.56 deg.C) below the ambient temperature;
- Have suitable in-line air-purifying sorbent beds and filters to further ensure breathing air quality. Sorbent beds and filters shall be maintained and replaced or refurbished periodically by the Project Safety Offer following the manufacturer's instructions.
- Have a tag containing the most recent change date and the signature of the person authorized by ECC to perform the change. The tag shall be maintained at the compressor.
- For compressors that are not oil-lubricated, ECC shall ensure that carbon monoxide levels in the breathing air do not exceed 10 ppm.
- For oil-lubricated compressors, ECC shall use a high-temperature or carbon monoxide alarm, or both, to monitor carbon monoxide levels. If only high-temperature alarms are used, the air supply shall be monitored at intervals sufficient to prevent carbon monoxide in the

breathing air from exceeding 10 ppm.

- ECC shall ensure that breathing air couplings are incompatible with outlets for nonrespirable worksite air or other gas systems. No asphyxiating substance shall be introduced into breathing air lines.
- ECC shall use breathing gas containers marked in accordance with the NIOSH respirator certification standard, 42 CFR part 84.

11.0 Identification of filters, Cartridges, and Canisters

ECC shall ensure that all filters, cartridges and canisters used in the workplace are labeled and color coded with the NIOSH approval label and that the label is not removed and remains legible.

12.0 Training and Information

This section requires ECC to provide effective training to employees who are required to use respirators. The training must be comprehensive, understandable, and recur annually, and more often if necessary.

ECC shall ensure that each employee can demonstrate knowledge of at least the following:

- Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator;
- What the limitations and capabilities of the respirator are;
- How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions;
- How to inspect, put on and remove, use, and check the seals of the respirator;
- What the procedures are for maintenance and storage of the respirator;
- How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators; and
- The general requirements of this section.
- The training shall be conducted in a manner that is understandable to the employee.
- ECC shall provide the training prior to requiring the employee to use a respirator in the workplace.

12.1 Retraining

Retraining shall be administered annually, and when the following situations occur:

- Changes in the workplace or the type of respirator render previous training obsolete;
- Inadequacies in the employee's knowledge or use of the respirator indicate that the employee has not retained the requisite understanding or skill; or
- Any other situation arises in which retraining appears necessary to ensure safe respirator use.

13.0 Program Evaluation

This section requires ECC to conduct evaluations of the workplace to ensure that the written respiratory protection program is being properly implemented, and to consult employees to ensure that they are using the respirators properly. ECC shall conduct evaluations of the workplace as necessary to ensure that the provisions of the current written program are being effectively implemented and that it continues to be effective. ECC shall regularly consult employees required to use respirators to assess the employees' views on program effectiveness and to identify any problems. Any problems that are identified during this assessment shall be corrected. Factors to be assessed include, but are not limited to:

- Respirator fit (including the ability to use the respirator without interfering with effective workplace performance);
- Appropriate respirator selection for the hazards to which the employee is exposed;
- Proper respirator use under the workplace conditions the employee encounters; and
- Proper respirator maintenance.

14.0 Record keeping

This section requires ECC to establish and retain written information regarding medical evaluations, fit testing, and the respirator program. This information will facilitate employee involvement in the respirator program, assist ECC in auditing the adequacy of the program, and provide a record for accordance determinations by OSHA.

14.1 Medical Evaluation

Records of medical evaluations required by this section must be retained and made available in accordance with 29 CFR 1910.1020.

14.2 Fit testing

ECC shall establish a record of the qualitative and quantitative fit tests administered to an employee including:

- The name or identification of the employee tested;
- Type of fit test performed;
- Specific make, model, style, and size of respirator tested;
- Date of test; and
- The pass/fail results for QLFTs or the fit factor and strip chart recording or other recording of the test results for QNFTs.

Fit test records shall be retained for respirator users until the next fit test is administered. A written copy of the current respirator program shall be retained by ECC.

RESPIRATOR FIT TEST AND TRAINING ACKNOWLEDGMENT

EMPLOYEE_____ DATE_____
EMPLOYER_____
ADDRESS_____

RESPIRATOR(S) TESTED

MAKE & MODEL_____ SIZE_____

MAKE & MODEL_____ SIZE_____

TYPE OF TEST

QUANTITATIVE_____ QUALITATIVE_____

_____ Isoamyl Acetate _____ Irritant Smoke _____ Saccharin Mist

TEST EXERCISE

_____ Positive/Negative Pressure Test
_____ Normal Breathing
_____ Deep Breathing
_____ Turn head side to side
_____ Nod head up and down
_____ Reading (Rainbow Passage)
_____ Grimace
_____ Bend over and touch toes
_____ Jogging in place

THIS CERTIFIES THAT THE ABOVE NAME TEST SUBJECT HAS BEEN INFORMED OF THE HAZARD INVOLVED IN WORKING AT A HAZARDOUS WASTE SITE, AND HAS BEEN GIVEN INSTRUCTIONS IN THE USE AND CARE OF THE RESPIRATOR SELECTED.

INSTRUCTOR SIGNATURE_____ DATE_____

I attest that I understand the exercises which have been shown to me today are for properly fitting my respirator. I have been instructed about how to properly clean and maintain the respirator, and how to field test and inspect the respirator.

EMPLOYEE SIGNATURE_____ DATE_____

12.0 PERSONAL PROTECTIVE EQUIPMENT PROGRAM

1.0 Policy

ECC's Personal Protective Equipment Program is prepared in accordance with 29 CFR 1910 Subpart I - Personal Protective Equipment (1910.132 to 1910.139).

2.0 Purpose

The purpose of personal protective equipment and clothing is to isolate individuals from chemical and physical hazards. ECC shall provide PPE to authorized site visitors and field personnel who require access to the Exclusion Zone and Contamination Reduction Zone. All visitors and employees shall be trained in the donning of PPE. Level of protection at any site will be selected on a site specific/task specific basis; however Level D will be worn as minimum for all site activities. The equipment list given below includes information on all levels of protection. ECC Personal Protective Equipment Program is in accordance with 29 CFR 1910 Subpart I PPE (1910.132 to 1910.139).

3.0 Hazard Assessment and Personal Protective Equipment Selection

ECC shall assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of personal protective equipment (PPE). If such hazards are present, or likely to be present, ECC shall:

- Select, and have each affected employee use, the types of PPE that will protect the affected employee from the hazards identified in the hazard assessment;
- Communicate selection decisions to each affected employee; and,
- Select PPE that properly fits each affected employee.

The level of protection may be upgraded or downgraded by the Project SSHO as conditions change at the site. Decisions for downgrading PPE requirements shall be approved by the client representative prior to implementation. The client representative should be notified by the SSHO of decisions for upgrading PPE requirements.

Reasons to upgrade include:

- Change in task that will increase contact or potential contact with hazardous

materials;

- Action level is detected during monitoring; and
- Request of the individual employee.

Reasons to downgrade include:

- New information indicated the situation is less hazardous than originally believed;
- Change in site conditions that decreases the hazards; and
- Monitoring or lab analysis support a decision to downgrade.

4.0 Personal Protective Equipment (Levels of Protection)

4.1 OSHA Level D

This is primarily a work uniform. Level D PPE is worn when no contaminants are reported on the site. Level D provides only minimal protection. The following PPE is required for Level D:

- Hard hat;
- Boots (steel toed);
- General work clothes;
- Safety glasses or safety goggles;
- High visibility vests; and
- Ear Protection (heavy equipment operations).

4.2 OSHA Modified Level D

Same as Level D with an increase protection level for splash hazards. No air purifying respirator.

- Insulated coveralls which shall be oversized to allow several layers of wool or pile or polypropylene clothing inside (optional);
- Disposable overalls (tyvek and saranex);

- Chemically resistant boots with steel toe and shank (ANSI Z41-1983, Safety Toe Footwear, Classification 75). Boots shall be equipped with deep traction sole and be oversized to allow two to three layers of woolen or similar socks inside; and
- Chemical gloves (PVC, Neoprene, Nitrile) which shall be oversized to allow two to three layers of wool or similar gloves inside;
- Safety glasses or goggles to guard against wind; and
- Hard hat (ANSI Z89.1-1986, Class A, B, and C) supplemented with a hard hat liner.

4.3 OSHA Level C

This is to be selected when the type of airborne substance is known, concentration measured, criteria for using air purifying respiratory met, and skin and eye exposure unlikely. Please note that all the requirements for hard hat, coveralls, and boots apply here.

- Half-face/full-face air purifying respirator;
- Tyvek/saranex coveralls - refer to Modified Level D;
- Neoprene outer gloves - refer to Modified Level D;
- Cotton inner gloves - refer to Modified Level D;
- Hard hat with face shield - refer to Modified Level D;
- Steel toed rubber boots - refer to Modified Level D;
- Rubber boot covers (where applicable);
- Taped wrist and ankle joints;
- Chemical goggles (where applicable);
- Hearing protection (where applicable); and
- Safety glasses (where applicable).

Protective clothing material must be compatible with the identified hazardous substances released. In an unknown situation the material providing the highest overall protection will be utilized. No individual will enter an area where respiratory protective equipment is required unless the person has been trained in the selection, use, care and limitations of the respirator, and the proper respirator has been selected for the task.

Whenever respirators are required, only equipment approved for that purpose will be used. This equipment must be approved by the National Institute for Occupational Safety and Health (NIOSH). Only parts approved for the specific respirator system are to be used for replacement. Only a person specifically trained should perform work with respirators.

Proper selection of respirators is to be made according to guidance provided by ANSI standard Z88.2 -1980. The correct respirator is to be specified for each job.

4.4 OSHA Level B

Should be used when the type and atmospheric concentrations of substances have been identified or are estimated to be within tolerance parameters of PPE. Level B requires a high level of respiratory protection, but less skin protection. This involves atmospheres:

- With IDLH concentrations of specific substances that do not represent a severe skin hazard;
- That do not meet the criteria for use of air-purifying respirators; and
- Which contain less than 19.5 percent oxygen.

The PPE required for Level B work is the same as Level C except a higher level of respiratory protection (supplied air) is required:

- Polytyvek or saranex suit;
- Gloves (inner and outer);
- Chemical boots (steel toed);
- Hard hat;
- Supplied air (SCBA or airline).

4.5 OSHA Level A

Should be used when the chemical substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on either:

- Measured (or potential for) high concentrations of atmospheric vapors, gases, or particulates;
- Site operations and work functions involving a high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates of materials that are harmful to skin or capable of being absorbed through the intact skin; and
- Substances with a high degree of hazard to the skin are known or suspected to be present, and skin contact is possible.

Level A offers the highest level of respiratory, skin and eye protection. The following PPE is required:

- Fully encapsulated suit;
- Level B PPE/SCBA; and
- Two-way radio communication.

5.0 PPE Inspection Program

Regular inspection of PPE, together with respiratory protective equipment, shall be performed. ECC's SSHO shall ensure the following during PPE inspection:

- All equipment shall be inspected by the wearer prior to use;
- Respirator cartridges shall be disposed of daily (i.e., not reused);
- Respirator cartridges shall be changed during a work shift if the wearer experiences breakthrough, resistance, or uncomfortably warm inhaled air, or if the respirator/cartridges become wet or grossly contaminated;
- Disposable protective items may be reused during a work shift provided they are not damaged or obviously contaminated. Disposable items shall be disposed of daily;
- Reusable protective items shall be cleaned and inspected daily.

6.0 Care of Equipment

Personal protective equipment offers a high degree of protection, yet the equipment must be

maintained and inspected on a regular basis.

Gloves and full body coveralls - Gloves and full body coveralls will be inspected and replaced promptly if a tear develops.

Respirators - Respirators will be inspected and leak-checked each time they are put on. Respirator cartridges will be replaced daily, or more frequently if excessive resistance or breakthrough develops. All respiratory maintenance will be performed by a trained technician. Respirators will be cleaned daily. Each individual will be assigned exclusive use of a respirator. These respirators will be stored in separate plastic storage boxes with individuals names on them.

Employee-owned equipment. Where employees provide their own protective equipment, ECC shall be responsible to assure its adequacy, including proper maintenance, and sanitation of such equipment.

All personal protective equipment shall be of safe design and construction for the work to be performed.

Defective or damaged personal protective equipment shall not be used.

7.0 Training

ECC shall provide training to each employee who is required by this section to use PPE. Each such employee shall be trained to know at least the following:

- When PPE is necessary;
- What PPE is necessary;
- How to properly don, doff, adjust, and wear PPE;
- The limitations of the PPE; and,
- The proper care, maintenance, useful life and disposal of the PPE.

Each affected employee shall demonstrate an understanding of the training specified in this section, and the ability to use PPE properly, before being allowed to perform work requiring the use of PPE.

Should ECC have reason to believe that any affected employee who has already been trained does not have the understanding and skill required of this section, ECC shall retrain each such employee. Circumstances where retraining is required include, but are not limited to, situations where:

- Changes in the workplace render previous training obsolete; or
- Changes in the types of PPE to be used render previous training obsolete; or
- Inadequacies in an affected employee's knowledge or use of assigned PPE indicate that the employee has not retained the requisite understanding or skill.

ECC shall verify that each affected employee has received and understood the required training through a written certification that contains the name of each employee trained, the date(s) of training, and that identifies the subject of the certification.

13.0 DECONTAMINATION PROGRAM

1.0 Policy

ECC's Decontamination Program is prepared in accordance with 29 CFR 1910 and 1926 - specifically 1910.120 and 1926.65.

2.0 Purpose

The purpose of implementing a Decontamination Program is to control the cross contamination of potentially hazardous chemicals to employees, equipment, and the environment. A Decontamination Program shall be mandatory for all Level A, B, and C work activities.

3.0 Exiting

3.1 Temporary Exit

The following decontamination procedures will occur when the employee departs the EZ for breaks, lunches, end of shift or if protective clothing has been damaged or torn.

- ECC shall provide a change room for changing into and out of protective clothing. A container will be made available for contaminated clothing;
- Remove PPE prior to entering support zone;
- Rinse gloves with soap and water to remove excess contamination;
- Gloves, protective suits, and booties will be removed;
- Thorough washing of the entire body is required as soon as possible after doffing of protective outer garments;
- In no case will contaminated clothing be worn out of the EZ or the CRZ; and
- Protective clothing will be stored in a manner to avoid potential contamination of inner surfaces.

Employees leaving the Exclusion Zone to pick up or drop off tools or instruments and immediately returning will not require decontamination but will not be permitted past the first station.

3.2 Exit from Site

Exit from the site requires procedures as described below:

- Remove PPE before entering support zone;
- All suits, gloves, booties used during the day must be removed at the end of the day's

work or prior to leaving the site;
- Protective clothing will be stored in a manner to avoid potential contamination of inner surfaces; and
- Thorough washing of the entire body is required as soon as possible after doffing of protective outer garments.

4.0 Means of Decontamination

All personnel, clothing and equipment leaving the contaminated area of the site may require decontamination to remove any harmful chemicals. The decontamination facilities will be located in the Contamination Reduction Zone. The decontamination procedures will be an organized process, with a series of stations to provide the maximum level of decontamination. The decontamination area will be clearly defined and equipped with all necessary equipment. All equipment/solutions used for decontamination will also be decontaminated and/or disposed of properly.

The procedure will vary from site to site but will always include the following steps:

- Equipment drop;
- Outer boots and gloves wash/rinse (step off);
- Outer boots and gloves removal;
- Suit wash/rinse/removal;
- Inner glove wash/rinse;
- Face piece removal, wash/rinse;
- Inner glove removal; and
- Field wash (face, hands).

Personnel assigned to the decontamination process will assist workers and decontaminate equipment and reusable protective gear. All field equipment such as probes, tools, etc., will be decontaminated with a solution of alconox and water and rinsed with water before the equipment is stored for future use. Rinsate will be placed in 55 gallon drums.

For the decontamination of heavy equipment a bermed decontamination stage will be set up with a double layer of visqueen. The equipment will be brought to this area and washed with water and alconox. The decontamination fluids/wastes may be solidified using floor-dry and placed in 55 gallon drums.

In an emergency situation, in which personnel may need to be transported off-site for immediate medical attention, decontamination procedures will not be considered.

5.0 Disposal of Decontamination Materials

Materials such as liquids, rinsate, sludge, and personal protective gear resulting from decontamination activities, will be placed in 55-gallon drums or other suitable containers. Decontamination materials shall be disposed of at an appropriate disposal facility, with the other contaminated waste materials. In the event of any accident during this process, emergency decontamination procedures shall be performed.

6.0 Decontamination Station Set-Up

A decontamination station and appropriate decontamination procedures shall be established by the SSHO prior to the beginning of operations each day. The decontamination station shall be situated up-wind and up-gradient from the Exclusion Zone, be clearly marked, and provide a controlled access point for movement between the Exclusion Zone and Support Zone. Decontamination requirements shall be reviewed with field personnel during daily Tailgate Safety Meetings. The following decontamination procedures shall be implemented:

Level D:

- Move to the designated Decontamination area;
- Clean work boots of any accumulation of soil or mud;
- Remove leather work gloves; and
- Wash hands and face.

Level C:

- Move to the designated Decontamination area;
- Wash gloves, boots and any taped areas;
- Remove tape;
- Remove outer gloves;
- Remove suit from the inside out;
- Remove respirator face piece;
- Remove inner gloves; and
- Wash hands, face and any exposed skin.

Level B:

- Move to the designated Decontamination area;
- Wash gloves, airline hose/tanks, boots and any taped areas;
- Remove tape;

- Remove outer gloves;
- Remove/disconnect airline hose/tank
- Remove suit from the inside out;
- Remove respirator face piece;
- Remove inner gloves; and
- Wash hands, face and any exposed skin.

*Level A:

- Move to the designated Decontamination area;
- Wash gloves, boots, encapsulated suit and any taped areas;
- Remove tape;
- Remove outer gloves;
- Remove encapsulated suit;
- Remove SCBA;
- Remove inner gloves; and
- Wash hands, face and any exposed skin.

**Due to the extreme hazards involved in Level A field activities, Level A work shall only be conducted by certified emergency response personnel.*

7.0 Decontamination Equipment/Supplies

Decontamination supplies to be provided at the work site by Environmental Chemical Corporation include visqueen plastic, duct tape, traffic cones, barrier tape, a wading pool or large plastic wash tube (large enough to stand in with both feet), bucket, long handled scrub brush, waste collection containers (open-top 55 gallon drum with drum liner, or several lawn size garbage bags and Tri Sodium Phosphate (TSP) or equivalent soap/decontamination solution.

The decontamination solution shall be made by mixing approximately 1/8 cup of TSP with one to two gallons of water (in a bucket), and shall be made daily for use. The SSHO shall ensure that the decontamination station is set up completely prior to beginning work each day. All field personnel exiting an Exclusion Zone must pass through the decontamination station and complete the required decontamination procedure before entering the Support Zone. All waste generated from decontamination shall be properly packaged and managed as a regulated hazardous waste, if appropriate.

8.0 Equipment Decontamination

In addition to personnel, all equipment and hand tools used in the Exclusion Zone shall be

decontaminated in the CRZ prior to entering the Support Zone. Equipment decontamination will consist of the following: wiping down with lint free rags moistened with decontamination solution prior to entering the Support Zone; tires and bucket/blade shall be cleaned with a wire brush and all soils collected and placed with excavated spoils. ECC's SSHO shall be responsible for monitoring all vehicle decontamination prior to exiting the site. Personnel engaged in vehicle decontamination shall wear protective equipment including disposable clothing and respiratory protection consistent with the requirements of this specification and the SSHP.

A clean area shall be established by ECC for performing equipment maintenance. This area shall be used when personnel are required by normal practices to expose themselves to contact with ground soil and crawling under a vehicle to change engine oil. All equipment shall be decontaminated by wash down in the CRZ prior to maintenance work.

Maintenance work such as greasing heavy equipment will not require decontamination unless the job requires body contact with the ground soil within the EZ or CRZ. Seats of equipment and vehicles used in the EZ will not be cloth covered. They will be free from cracks or holes that would allow dust to enter seat padding or shall be covered with a temporary sheet vinyl covering.

14.0 HEARING CONSERVATION PROGRAM

1.0 Policy

Environmental Chemical Corporation's (ECC's) Hearing Protection Program is prepared in accordance with 29 CFR 1910.95 and 29 CFR 1926.

2.0 Purpose

The purpose of ECC's Hearing Protection Program is to protect the hearing of employees who may be exposed from noise levels exceeding the permissible exposure levels (PELs) set by OSHA.

3.0 Hearing Conservation Program Requirements

ECC shall administer a continuing, effective hearing conservation program whenever employee noise exposures equal or exceed an 8-hour time-weighted average sound level (TWA) of 85 decibels measured on the A scale (slow response) or, equivalently, a dose of fifty percent.

3.1 Action Level

An 8-hour time-weighted average of 85 decibels or a dose of fifty percent shall also be referred to as the action level.

4.0 Monitoring

When information indicates that any employee's exposure may equal or exceed an 8-hour time-weighted average of 85 decibels, ECC shall develop and implement a monitoring program.

Where circumstances such as high worker mobility, significant variations in sound level, or a significant component of impulse noise make area monitoring generally inappropriate, ECC shall use representative personal sampling to comply with the monitoring requirements of this paragraph unless ECC can show that area sampling produces equivalent results.

All continuous, intermittent and impulsive sound levels from 80 decibels to 130 decibels shall be integrated into the noise measurements.

Instruments used to measure employee noise exposure shall be calibrated to ensure measurement accuracy.

Monitoring shall be repeated whenever a change in production, process, equipment or controls

increases noise exposures to the extent that:

Additional employees may be exposed at or above the action level; or

The attenuation provided by hearing protectors being used by employees may be rendered inadequate to meet the requirements of paragraph (j) of this section.

Protection against the effects of noise exposure shall be provided when the sound levels exceed those shown in Table 1.0 when measured on the A scale of a standard sound level meter at slow response.

When employees are subjected to sound exceeding those listed in Table 1.0, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce sound levels within the levels of Table 1.0, personal protective equipment shall be provided and used to reduce sound levels within the levels of the table.

If the variations in noise level involve maxima at intervals of 1 second or less, it is to be considered continuous.

TABLE 1.0 - PERMISSIBLE NOISE EXPOSURES (1)

Duration per day, hours	Sound level dBA slow response
8.....	90
6.....	92
4.....	95
3.....	97
2.....	100
1 1/2.....	102
1.....	105
½	110
1/4 or less.....	115

Footnote(1) When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. If the sum of the following fractions: C(1)/T(1) + C(2)/T(2) C(n)/T(n) exceeds unity, then, the mixed exposure should be considered to exceed the limit value. Cn indicates the total time of exposure at a specified noise level, and Tn indicates the total time of exposure permitted at that level. Exposure to impulsive or impact noise should not exceed **140 dB** peak sound pressure level.

5.0 Employee Notification

ECC shall notify each employee exposed at or above an 8-hour time-weighted average of 85 decibels of the results of the monitoring.

6.0 Audiometric Testing Program

ECC shall establish and maintain an audiometric testing program as provided in this paragraph by making audiometric testing available to all employees whose exposures equal or exceed an 8-hour time-weighted average of 85 decibels. The program shall be provided at no cost to employees.

Hearing measurements (audiograms) made periodically are the best way to determine whether a hearing conservation program is preventing noise-induced hearing loss. Hearing measurements are made at least annually. For very high noise exposures, measurements shall be made more often, until the noise exposure is reduced to safe levels.

Hearing measurements also help to accomplish the following:

- Document hearing-threshold changes that may occur during employment;
- Determine the ability to hear (communicate) effectively at work, i.e., direction, warning signals;
- Assist in proper job placement; and
- Diagnose pre-existing hearing loss prior to employment and establish "baseline" hearing ability.

Audiometric tests shall be performed by a licensed or certified audiologist, otolaryngologist, or other physician, or by a technician who is certified by the Council of Accreditation in Occupational Hearing Conservation, or who has satisfactorily demonstrated competence in administering audiometric examinations, obtaining valid audiograms, and properly using, maintaining and checking calibration and proper functioning of the audiometers being used. A technician who operates microprocessor audiometers does not need to be certified. A technician who performs audiometric tests must be responsible to an audiologist, otolaryngologist or physician.

6.1 Baseline Audiogram

Within 6 months of an employee's first exposure at or above the action level, ECC shall establish a valid baseline audiogram against which subsequent audiograms can be compared.

6.2 Annual Audiogram

At least annually after obtaining the baseline audiogram, ECC shall obtain a new audiogram for each employee exposed at or above an 8-hour time-weighted average of 85 decibels.

6.3 Evaluation of Audiogram

Each employee's annual audiogram shall be compared to that employee's baseline audiogram to determine if the audiogram is valid and if a standard threshold shift has occurred. This comparison may be done by a technician.

If the annual audiogram shows that an employee has suffered a standard threshold shift, ECC may obtain a retest within 30 days and consider the results of the retest as the annual audiogram.

The audiologist, otolaryngologist, or physician shall review problem audiograms and shall determine whether there is a need for further evaluation. ECC shall provide to the person performing this evaluation the following information:

- A copy of the requirements for hearing conservation;
- The baseline audiogram and most recent audiogram of the employee to be evaluated;
- Measurements of background sound pressure levels in the audiometric test room.

Records of audiometer calibrations required by paragraph (h)(5) of this section.

6.4 Follow-up Procedures

If a comparison of the annual audiogram to the baseline audiogram indicates a standard threshold shift, the employee shall be informed of this fact in writing, within 21 days of the determination.

Unless a physician determines that the standard threshold shift is not work related or aggravated by occupational noise exposure, ECC shall ensure that the following steps are taken when a standard threshold shift occurs:

- Employees not using hearing protectors shall be fitted with hearing protectors, trained in their use and care, and required to use them.

- Employees already using hearing protectors shall be refitted and retrained in the use of hearing protectors and provided with hearing protectors offering greater attenuation if necessary.

- The employee shall be referred for a clinical audiological evaluation or an otological examination, as appropriate, if additional testing is necessary or if ECC suspects that a medical pathology of the ear is caused or aggravated by the wearing of hearing protectors.

- The employee is informed of the need for an otological examination if a medical pathology of the ear that is unrelated to the use of hearing protectors is suspected.

If subsequent audiometric testing of an employee whose exposure to noise is less than an 8-hour TWA of 90 decibels indicates that a standard threshold shift is not persistent, ECC:

- Shall inform the employee of the new audiometric interpretation; and
- May discontinue the required use of hearing protectors for that employee.

6.5 Standard Threshold Shift

As used in this section, a standard threshold shift is a change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2000, 3000, and 4000 Hz in either ear.

In determining whether a standard threshold shift has occurred, allowance may be made for the contribution of aging (presbycusis) to the change in hearing level by correcting the annual audiogram according to the procedure described in Appendix F: "Calculation and Application of Age Correction to Audiograms."

6.6 Audiometric Test Requirements

Audiometric tests shall be pure tone, air conduction, hearing threshold examinations, with test frequencies including as a minimum 500, 1000, 2000, 3000, 4000, and 6000 Hz. Tests at each frequency shall be taken separately for each ear.

Audiometric tests shall be conducted with audiometers (including microprocessor audiometers) that meet the specifications of, and are maintained and used in accordance with, American National Standard Specification for Audiometers, S3.6-1969, which is incorporated by reference as specified in Sec. 1910.6.

6.7 Audiometer Calibration

The functional operation of the audiometer shall be checked before each day's use by testing a person with known, stable hearing thresholds, and by listening to the audiometer's output to make sure that the output is free from distorted or unwanted sounds. Deviations of 10 decibels or greater require an acoustic calibration.

Audiometer calibration shall be checked acoustically at least annually. Test frequencies below 500 Hz and above 6000 Hz may be omitted from this check. Deviations of 15 decibels or greater require an exhaustive calibration.

7.0 Hearing Protectors

ECC shall make hearing protectors available to all employees exposed to an 8-hour time-weighted average of 85 decibels or greater at no cost to the employees. Hearing protectors shall be replaced as necessary.

ECC shall ensure that hearing protectors are worn:

- By an employee who is required to wear personal protective equipment; and
- By any employee who is exposed to an 8-hour time-weighted average of 85 decibels or greater, and who:
- Has not yet had a baseline audiogram established pursuant to paragraph (g)(5)(ii); or

Has experienced a standard threshold shift.

Employees shall be given the opportunity to select their hearing protectors from a variety of suitable hearing protectors provided by ECC.

ECC shall provide training in the use and care of all hearing protectors provided to employees.

ECC shall ensure proper initial fitting and supervise the correct use of all hearing protectors.

8.0 Hearing Protector Attenuation

ECC shall evaluate hearing protector attenuation for the specific noise environments in which the protector will be used.

Hearing protectors must attenuate employee exposure at least to an 8-hour time-weighted average of 90 decibels.

For employees who have experienced a standard threshold shift, hearing protectors must attenuate employee exposure to an 8-hour time-weighted average of 85 decibels or below.

The adequacy of hearing protector attenuation shall be re-evaluated whenever employee noise exposures increase to the extent that the hearing protectors provided may no longer provide adequate attenuation. ECC shall provide more effective hearing protectors where necessary.

9.0 Training Program

ECC shall institute a training program for all employees who are exposed to noise at or above an 8-hour time-weighted average of 85 decibels, and shall ensure employee participation in such program.

The training program shall be repeated annually for each employee included in the hearing conservation program. Information provided in the training program shall be updated to be consistent with changes in protective equipment and work processes.

ECC shall ensure that each employee is informed of the following:

- The effects of noise on hearing;
- The purpose of hearing protectors, the advantages, disadvantages, and attenuation of various types, and instructions on selection, fitting, use, and care; and
- The purpose of audiometric testing, and an explanation of the test procedures.

10.0 Access to Information and Training Materials

ECC shall make available to affected employees or their representatives copies of this standard and shall also post a copy in the workplace.

ECC shall provide to affected employees any informational materials pertaining to the standard that are supplied to ECC by the Assistant Secretary.

ECC shall provide, upon request, all materials related to ECC's training and education program pertaining to this standard to the Assistant Secretary and the Director.

11.0 Record keeping

ECC shall maintain an accurate record of all employee exposure measurements required by 29 CFR 191.95.

11.1 Audiometric tests

ECC shall retain all employee audiometric test records. This record shall include:

- Name and job classification of the employee;
- Date of the audiogram;
- The examiner's name;

- Date of the last acoustic or exhaustive calibration of the audiometer; and
- Employee's most recent noise exposure assessment.
- ECC shall maintain accurate records of the measurements of the background sound pressure levels in audiometric test rooms.

11.2 Record Retention

ECC shall retain records required in this paragraph (m) for at least the following periods.

- Noise exposure measurement records shall be retained for two years.
- Audiometric test records shall be retained for the duration of the affected employee's employment at ECC.

11.3 Access to Records

All records required by this section shall be provided upon request to employees, former employees, representatives designated by the individual employee, and the Assistant Secretary. The provisions of 29 CFR 1910.20.

11.4 Transfer of Records

If ECC ceases to do business, ECC shall transfer to the successor employer all records required to be maintained by this section, and the successor employer shall retain them for the remainder of the period as required by this standard.

15.0 COLD STRESS MONITORING PROGRAM

1.0 Purpose

ECC's Cold Stress Monitoring Program has been established for ECC employees working in cold environments. The purpose of this program is to implement cold stress monitoring and preventative measures to control employee cold disorders.

2.0 Cold Disorders

Cold injury is classified as either localized, as in frostbite, or generalized as in hypothermia. The main factors contributing to cold injury are exposure to humidity and high winds, contact with wetness or metal, inadequate clothing, age and general health. Physical conditions that worsen the effect of cold includes allergies, vascular disease, excessive smoking and drinking, and specific drugs and medicines.

2.1 Hypothermia

Air temperature alone is not enough to judge the cold hazard of a particular environment. Most cases of hypothermia develop in air temperatures between 2-10 C (30-50 degrees F). However, by the time you consider a factor such as the windchill, the effective temperature could be significantly lower.

Symptoms of hypothermia include the following: uncontrollable shivering and the sensation of cold, the heartbeat slows and sometimes becomes irregular, pulse weakens and the blood pressure changes. Other symptoms that can be seen before complete collapse are cool skin, slow, irregular breathing, low blood pressure, apparent exhaustion, fatigue, confusion and inappropriate behavior.

Sedative drugs and alcohol increase the risk of hypothermia. Sedative drugs interfere with the transmission of impulses to the brain. Alcohol dilates the blood vessels near the skin surface, which increases heat loss and lowers body temperature.

2.2 Frostbite

Frostbite can occur without hypothermia when extremities do not receive sufficient heat from the central body stores. This can occur because of inadequate circulation and/or because of inadequate insulation. Frostbite occurs when there is freezing of the fluids around the cells of the body tissues. This freezing is from exposure to extremely low temperatures. The condition results in damage to and loss of tissue. The most vulnerable parts of the body are the nose, cheeks, ears, fingers.

2.2.1. Degrees of Frostbite

First degree: freezing without blistering or peeling;
Second degree: freezing with peeling and blistering;
Third degree: freezing with death of skin tissues and possibly of the deepest tissues.

2.2.2. Symptoms of Frostbite

1.) Skin discoloration;
2.) Pain may be felt at first, but subsides;
3.) Blisters may appear;
4.) The affected part is cold and numb.

2.3 Trench Foot

This condition may be caused by long, continuous exposure to cold without freezing, combined with persistent dampness or actual immersion in water. Edema (swelling), tingling, itching, and severe pains occur, and may be followed by blistering, death of skin tissue, and ulceration. When other areas of the body are affected, the condition is known as chilblains.

2.4 Frostnip

This occurs when the face or extremities are exposed to a cold wind, causing the skin to turn white.

3.0 Evaluating Cold Environments

Indices for evaluating cold environments include Threshold Limit Values (TLVs) for cold stress and windchill index (Table A.). The cold stress TLVs are intended to protect workers from the severest effects of cold stress (hypothermia) and cold injury and to describe exposures to cold working conditions under which it is believed that nearly all workers can be repeatedly exposed without adverse health effects. The TLV objective is to prevent the deep body temperature from falling below 36 degrees C (96.8 degrees F) and to prevent cold injury to body extremities (deep body temperature is the core temperature of the body determined by conventional methods for rectal temperature measurements). For a single, occasional exposure to a cold environment, a drop in core temperature to no lower than 35 degrees C (95 degrees F) should be permitted. In addition to provisions for total body protection, the TLV objective is to protect all parts of the body with emphasis on hands, feet, and head from cold injury.

The windchill factor is a cooling effect of any combination of temperature and wind velocity or air movement. The windchill index should be consulted by everyone facing exposure to low

temperatures and wind. The windchill temperature have no significance other than that expressed - the effect on the body.

The windchill index does not take into account the following:

1.) the body part exposed to cold;
2.) The level of activity with its effect on body heat production;
3.) The amount of clothing worn.

Table A. Windchill Index

Estimated Wind Speed (in mph)	Actual Temperature Reading (°F)											
	50	40	30	20	10	0	−10	−20	−30	−40	−50	−60
	Equivalent Chill Temperature (°F)											
calm	50	40	30	20	10	0	−10	−20	−30	−40	−50	−60
5	48	37	27	16	6	−5	−15	−26	−36	−47	−57	−68
10	40	28	16	4	−9	−24	−33	−46	−58	−70	−83	−95
15	36	22	9	−5	−18	−32	−45	−58	−72	−85	−99	−112
20	32	18	4	−10	−25	−39	−53	−67	−82	−96	−110	−121
25	30	16	0	−15	−29	−44	−59	−74	−88	−104	−118	−133
30	28	13	−2	−18	−33	−48	−63	−79	−94	−109	−125	−140
35	27	11	−4	−20	−35	−51	−67	−82	−98	−113	−129	−145
40	26	10	−6	−21	−37	−53	−69	−85	−100	−116	−132	−148
(Wind speeds greater than 40 mph have little additional effect.)	*LITTLE DANGER* In < hr with dry skin. Maximum danger of false sense of security				*INCREASING DANGER* Danger from freezing of exposed flesh within one minute.				*GREAT DANGER* Flesh may freeze within 30 seconds.			
	Trenchfoot and immersion foot may occur at any point on this chart.											

* Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA.

☐ Equivalent chill temperature requiring dry clothing to maintain core body temperature above 36°C (96.8°F) per cold stress TLV.

4.0 Cold Stress Prevention

In preventing cold stress one must consider factors relating both to the individual and the environment.

Acclimatization, water and salt replacement, medical screening, continuing medical supervision, proper work clothing, and training and education will contribute to the prevention of cold stress and injury related to working in a cold environment.

Control of the environment involves engineering controls (i.e. heaters, warm air jets, spot heating, heated warming shelters), administrative work practice controls (i.e. rest breaks, assigning extra workers, enforcing frequent intake of warm drinks - no caffeine or alcohol, allowing new employees time to adjust to conditions before they work full-time in cold environments), work-rest schedules, environmental monitoring, and consideration of the windchill temperature. The "buddy system" is highly recommended while conducting work activities in cold environments.

4.1 Engineering Controls

- spot heating should be used to increase temperature at the workplace.
- If fine work is to be performed with bare hands for 10 or 20 minutes or mor, special provisions should be made to keep the worker's hands warm.
- Shield work area if increased air velocity (wind, draft, and ventilating equipment).
- Unprotected metal chairs should not be used.
- Implement heated warm shelters and make available for workers.
- At temperatures below -1C (30F), metal handles of tools and control bars should be covered with thermal insulating material.

4.2 Administrative Work Practices Controls

- A work-rest schedule to reduce the peak of cold stress.
- Enforce frequent intake of warm, sweet caffeine-free, non alcoholic drinks or soup.
- Moving work to warmer areas whenever possible.
- Assigning extra workers to highly demanding tasks.
- Allowing new employees time to adjust to conditions before they work full-time in cold environments
- Arranging work to minimize sitting still or standing for long periods of time.
- Teaching workers the basic principles of preventing cold stress and emergency response to cold stress.

5.0 A Control Program For Cold Stress

A control program for cold stress should include the following elements:

- Medical supervision of workers;
- Employee orientation and training on cold stress;
- Work-rest regimens, with heated rest areas and enforced rest breaks;
- Scheduled drink breaks for recommended fluids;
- Environmental monitoring to determine wind chill;
- Reduction of cold stress through engineering and administrative controls, and the use of personal protective equipment.

16.0 HEAT STRESS MONITORING PROGRAM

1.0 Purpose

The hazards of exposure to hot environments may cause a variety of illnesses including heat rash, muscle cramps, heat exhaustion and heat stroke. Onset of signs and symptoms of exposure can occur rapidly, and may progress to a medical emergency (i.e., heat stroke) without early intervention.

Heat stress is a hazard during warm weather or when personnel are wearing PPE, which aggravates the heat stress hazard. Heat stress can occur even when temperatures are moderate if the body's physiological processes fail to maintain a normal body temperature. The resulting physical reactions that occur are fatigue; irritability; anxiety; and a decrease in concentration, dexterity, and/or movement. Onset of signs and symptoms of exposure can occur rapidly, and may progress to a medical emergency (i.e. heat stroke) without early intervention. In extreme cases, death can result if the patient is not given immediate treatment. The purpose of ECC's Heat Stress Monitoring Program is to control heat exposure to employees.

2.0 Control Measures

To control the exposure to heat stress during any site activity, the following safety procedures shall be implemented:

- All employees shall be monitored for heat stress;
- Potable drinking water shall be available at all times;
- Frequent rest breaks shall be taken;
- A buddy system shall be utilized;
- Shade (i.e., fixed or portable canopy) shall be provided;
- Employees shall be encouraged to eat a normal diet and get proper rest; and
- Employees shall be encouraged to refrain from consuming diuretics, including caffeine from coffee and tea beverages, or any form of alcohol. (Note: Consumption of alcohol is prohibited during work hours).
- To control exposure to heat stress hazard, monitoring shall commence when personnel are required to wear personal protective equipment greater than Level D. The American Conference Government of Governmental Hygienists (ACGIH) has set TLVs for heat extremes (presented in Table 16.1). This table presents levels for fully acclimatized, fully clothed (e.g., lightweight pants and shirt) workers and for workers wearing low permeability personal protective equipment (PPE).

Table 16.1 Heat Threshold Limit Values for Different Work Schedules

WORKLOAD						
Work/Rest Regimen	Light Street Clothing	Light PPE Clothing	Moderate Street Clothing	Moderate PPE Clothing	Heavy Street Clothing	Heavy PPE Clothing
Continuous Work	86° F	80° F	80° F	72° F	77° F	71° F
75% Work 25% Rest each hour	88° F	82° F	82° F	76° F	79° F	73° F
50% Work 50% Rest each hour	90° F	84° F	85° F	79° F	81° F	75° F
25% Work 75% Rest each hour	92° F	86° F	88° F	82° F	86° F	80° F

Note: Light moderate work includes operating heavy equipment. Heavy work includes hand shoveling or other manual labor activities.

3.0 Monitoring

Heat stress monitoring shall begin when ambient conditions exceed 85 °F when working in Level D and 70°F when working in Modified Level C (see Table 16.2). For clear weather conditions (i.e. 100 percent sunshine) ambient temperatures shall be decreased by 5 °F (i.e., 65 °F and 80 °F respectively) to determine when to begin monitoring. Ambient conditions shall be determined by maintaining a properly calibrated outdoor thermometer in the shade at each work station, or by monitoring local weather reports throughout each work shift.

Heat stress exposure shall be evaluated by monitoring the heart rate. The radial pulse shall be taken for 30 seconds immediately upon beginning to rest (i.e., at the beginning of a rest break). This rate shall be multiplied by two to determine the heart rate at initial rest. This rate should not exceed 110 beats per minute (bpm). Following three minutes of rest, the heart rate shall be taken again (same procedure). The difference between the initial and third minute heart rate should be greater than 10 bpm.

If the initial rate exceeds 110 bpm OR the difference between the initial and third minute rate is less than 10 bpm, then the work period shall be shortened by 33 percent and the rest period increased by 33 percent.

Table 16.2 Heat Stress Monitoring Frequency

Temperature	Modified Level D	Modified Level C	Level C or B
> 90°F	every 45 minutes	every 30 minutes	every 20 minutes
85-90 °F	every 60 minutes	every 45 minutes	every 30 minutes
80-85 °F	every 90 minutes	every 75 minutes	every 60 minutes
70-80 °F	every 120 minutes	every 105 minutes	every 90 minutes

The SSHO shall be responsible for taking all heart rates. All heart rate monitoring shall be recorded on an Exposure Monitoring Log. Monitoring shall begin at the first rest break. The first rest break shall be taken within the first hour of work when ambient conditions exceed 85°F if working in Level D, and within the first 30 minutes if ambient conditions exceed 70 °F if working in Modified Level C.

17.0 CONFINED SPACE ENTRY PROGRAM

1.0 Policy

State and federal safety regulations require that each employer generate and implement a written confined space entry program. Confined space entry programs shall at a minimum meet the requirements of the following regulations:

- Confined Space, General Industry Safety Orders Section 5158 and 5159, Cal OSHA Title 8 for projects sites within California; and
- Permit Required Confined Space Entry, 29 CFR 1910.146, Fed-OSHA regulation.

State and federal safety regulations require that each employer generate and implement a written confined space entry program.

2.0 Purpose

The purpose of ECC's Confined Space Entry Program is to be in accordance with OSHA requirements
and to provide a safe working environment to those employees conducting confined space entry activities. A confined space is defined as any location with:

- Limited means of entry and exit;
- Not designed for continuous occupancy; and
- Individual is physically capable of entering.

3.0 Examples of Confined Spaces

- Tanks, pipes, vaults, tunnels, silos, trenches, and manholes.

4.0 Hazards of a Confined Space

The two most potential hazards in a confined space is a lack of oxygen and a flammable atmosphere.

- Lack of oxygen (less than 19.5%). Normal air has 21% oxygen; and
- A flammable atmosphere has a lower explosive limit (LEL) greater than 10%.

5.0 Confined Space Entry Procedures

The following confined space entry procedures must be considered prior to entry.

- Remove ignition sources (e.g., welding equipment, lighters, vehicles);
- Lockout, blockout and/or tagout mechanical, electrical, and liquid gas systems;
- Test and document the atmosphere for oxygen level, flammable vapors and toxic vapors;
- No entry if less than 19.5% oxygen unless wearing an air-supplied respirator;
- No welding, cutting or sparks if LEL is above zero on the test unit;
- Introduce a constant source of fresh air to ensure complete air exchange;
- Standby person must be present until everyone is out;
- Full body rescue harness must be worn whenever in a confined space. A tri-pod will be required for all vertical entries;
- Ladder must be secured and must not be removed while workers are in the confined space;
- Adequate, low voltage (24 volts), protected illumination must be used; and
- All electrical equipment must be properly grounded.

6.0 Standby Person

- The standby shall perform and record confined space monitoring until work is completed;
- Must be current in First Aid and CPR training;
- Must be present at all times and have constant communication;
- Shall not leave confined space without a backup standby;
- Shall report an emergency, if necessary; and
- In the event of a fire, earthquake, etc., shall order employee(s) in the confined space to exit.

7.0 Permit Required Confined Space

A permit required confined space can be defined as having one or more of the following:

- The entrant could be entrapped;
- The entrant could be engulfed;
- The entrant could be exposed to a dangerous atmosphere; and
- The entrant could be exposed to any other serious health hazard.

8.0 Confined Space Entry Permit

All required confined space entry permits shall be posted near the entry and specify the following:

- Location of project;

- Task description;
- Hazard identification;
- List of personnel for entry;
- Special equipment such as tools and respiratory equipment;
- Atmospheric test results (oxygen, combustible gas, toxic);
- Special procedures (ventilation, lockout/tagout, chemical cleaners, decontamination); and
- Signature approval.

An entry permit is voided if the following situations occur:

- Any condition which prohibits entry;
- Job is interrupted for more than 60 minutes;
- Illness or injury in the confined space;
- Severe weather; and
- Earthquake.

9.0 Ventilation Procedures

Ventilation procedures shall be implemented during all permit required entries. The following procedures shall be incorporated:

- Use intrinsically safe ventilation equipment;
- Blow into the tank rather than exhaust from tank;
- Vent flammable vapors to a safe location; and
- Continue ventilation to maintain flammable vapors below 10%.

10.0 Monitoring Procedures

- The confined space shall be tested for oxygen deficient or enriched atmospheres, explosive conditions (10% LEL) and hazardous chemical concentrations above the PEL, TLV or IDLH;
- Record all monitoring results prior and during the confined space entry;
- Instruments shall be properly calibrated and intrinsically safe; and
- Test all areas (top, middle and bottom) in a confined space.

11.0 Emergency Planning and Procedures

- Anticipate hazards (communicate problems, fires);
- Develop a response plan (extraction, 911, emergency vehicle); and

- Use safety harnesses and lifelines/lanyards.

Confined spaces can be deadly if safety procedures are not followed. Use the established guidelines and procedures. Do not enter a confined space if you are unsure or do not understand. Do not rely on your senses to tell you it is safe. TEST IT!

ENVIRONMENTAL CHEMICAL CORPORATION
CONFINED SPACE ENTRY PERMIT

PERMIT ISSUED BY:_____ NUMBER:_____ DATE_____

This permit is required for entry into all confined spaces according to the company confined space entry program and applicable State and Federal Regulations.

ENVIRONMENTAL HEALTH & SAFETY DEPARTMENT SECTION

ENTRY DATE:_____ STANDBY:_____
WORK AUTHORIZED:_____
WORK LOCATION:_____
PPE REQUIRED:_____
EMERGENCY EQUIPMENT:_____
ENTRY PERSONNEL:_____
ENTRY TIME: _____ EXIT TIME:_____ BREAKS: _____

SUPERVISOR SECTION

HAZARD/CHEMICAL	LIMIT/PEL	TIME	RESULT	TIME	RESULT	TIME	RESULT
Oxygen 19.5% (min)							
Flammable10% (max)							

MONITORING EQUIPMENT TYPE	SERIAL#	DATE CALIBRATED

BEFORE SIGNING THIS PERMIT THE JOB SUPERVISOR SHALL ENSURE THE FOLLOWING:

#	ITEM	YES	NO	N/A
1.	Entry procedure reviewed.	___	___	___
2.	Employee retrieval method implemented	___	___	___
3.	Emergency communication capability available	___	___	___
4.	All personal involved have been trained in confined space entry	___	___	___
5.	Atmosphere has been monitored for hazardous conditions	___	___	___
6.	All safety and personal protective equipment is on hand	___	___	___
7.	All pipes carrying materials to/from the space removed/blanked.	___	___	___
8.	Shut off valves/switches tagged and in off position (lockout/tagout)	___	___	___
9.	Actions taken to prevent injury due to mechanical movement	___	___	___
10.	All sources of ignition removed.	___	___	___
11.	Continuous ventilation activated.	___	___	___
12.	Access restricted to authorized personnel only.	___	___	___

ALL PRE-ENTRY REQUIREMENTS HAVE BEEN MET.
SUPERVISOR SIGNATURE_____ Date_____

18.0 EXCAVATION AND TRENCHING SAFETY PROGRAM

1.0 Policy

Field personnel may be exposed to several serious hazards associated with excavation activities. All excavation work shall be performed in accordance with 29 CFR 1926 Subpart P - Excavations (1926.650 - 1926.652).

2.0 Purpose

A primary initial hazard with excavation operations is contact with underground utilities including electrical, gas, water/sewer and chemical pipeline. To mitigate these hazards, the Field Supervisor shall take the following action during excavation operations:

- Verify the exact location of each authorized excavation with the client representative and/or on-site officials prior to breaking ground;
- Make every attempt to determine the presence or absence of any underground utilities in the region by contacting Underground Service Alert, the client and/or local utility services;
- Hand dig the first two to three feet of the excavation in areas where contact with utilities is possible or unknown; and
- Arrange for the deactivation of utilities whenever possible and appropriate for the circumstances.

Surface encumbrances (trees, boulders, poles) that are located so as to create a hazard to employees shall be removed or supported, as necessary, to safeguard employees.

An additional primary hazard associated with excavations is exposure to the open, excavated area, resulting in falls and/or collapse. To mitigate this hazard, the following safety actions shall be taken:

- Excavated areas shall be clearly marked and secured with barricades and caution tapes to prevent unauthorized and/or accidental entry into work areas;
- Necessary foot and vehicle traffic shall be directed away from and around excavation work areas, and the routes clearly marked; and
- When possible, the sides of excavations shall be sloped or benched at a 45° - 54° angle.

When using protective systems requiring soil classification, each soil and rock deposit shall be classified by a competent person as "Stable Rock, Type A, Type B, or Type C." The classification shall be made based on the results of at least one visual and at least one manual analysis. Such

analysis shall be conducted by a competent person using acceptable visual and manual tests or other recognized methods of soil classification. The manual test consists of soil plasticity, dry strength, thumb penetration, pocket penetrometer or results from a hand operated shearvane.

The slopes and configurations of sloping and benching systems for excavations 5 to 20 feet in depth shall be selected and constructed by a designated competent person and shall be in accordance with the following requirements.

Soil analysis shall be done by a competent person to determine the soil or rock type.

Soil or Rock Type	Maximum Allowable Slope (Horizontal:Vertical)
Stable Rock	Vertical (90 degrees)
Type A	¾:1 (53 degrees)
Type B	1:1 (45 degrees)
Type C	1-½:1 (34 degrees)

No soil classification is required if 1-½:1 (horizontal:vertical) or 34 degrees slope is used. If a 1-½:1 (horizontal:vertical) 34 degrees slope is not used, a soil classification must be made.

3.0 Notification Procedures

Any project involving trenching or excavations that are five feet or deeper into which a person is required to descend shall be reviewed by the field safety and health staff. At no time will ECC allow employees or subcontractors in excavations greater than 5 feet in depth without the proper shoring, sloping/benching, or protective control measures implemented.

Certain states (i.e., California) require that notification from OSHA be given in the event employees descend into the excavation. A copy of Cal-OSHA's Annual Excavation Permit can be obtained from the corporate office (D. Osaki).

4.0 Excavation Safe Work Practices

- A *Competent Person* must be present during excavation/trenching activities. A Competent Person is defined as one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

- Walls and faces of all excavations and trenches five feet or greater in depth, into

which employees may descend, shall be guarded by sloping, shoring or shielding.

- Design of protective systems shall conform with accepted engineering practice, and applicable state and federal regulations.

- All design work shall be pre-approved by a registered professional engineer for excavations greater than 20 feet in depth.

- The Project Manager or competent person shall ensure that installation of protection systems conforms to accepted engineering practice, and applicable state and federal regulations.

- The design engineer shall visit the site to assure proper installation of the protection system(s).

- Employees working in an excavation shall at ALL times be supervised.

- Changes shall not be made in the system design without the approval of the design engineer.
- If there is any evidence of possible cave-ins or slides, employees will immediately exit the excavation, and work in the area of the excavation shall cease until the necessary safeguards have been taken.

- For employees who are conducting work activities at depths greater than 4 feet,. periodic air monitoring shall be conducted in the excavation/trench area.

- For employees who are conducting work activities at depths greater than 4 feet,. ladders, runways or an approved escape route shall be implemented.

- Established entry and egress routes from the excavation/trench area shall not be more than 25 feet (lateral) apart.

19.0 UNDERGROUND STORAGE TANK (UST) REMOVAL PROGRAM

1.0 Policy

ECC's Underground Storage Tank (UST) Removal Program will be performed in accordance with American National Standards Institute (ANSI), American Petroleum Institute (API), American Society of Mechanical Engineers (ASME), American Society for Testing and Materials (ASTM), and National Fire Protection Association (NFPA) standards; and other local regulations. ECC personnel shall also comply with all applicable safety standards under 29 CFR 1910 and 1926.

2.0 Purpose

The accurate location of the UST and underground utilities will substantially reduce subsequent risks. ECC will use local underground service alert to mark underground utilities. In the event that heavy equipment operations (i.e., cranes) are located near overhead utilities, extreme caution will be enforced. The table below indicates the minimum safe clearance in regards to power line voltage.

Overhead Clearance

POWER LINE VOLTAGE (kV)	MINIMUM SAFE CLEARANCE (feet)
0-50 kV	10
51 to 100 kV	12
101 to 200 kV	15
201 to 300 kV	20
301 to 500 kV	25
501 to 750 kV	35
751 to 1000 kV	45

3.0 Mobilization

All required work zones and necessary equipment will be mobilized on-site. All specified safety and emergency equipment will be staged on site. Sanitary facilities will be provided at each work area, as well as drinking water and a potable water supply for washing hands and face.

4.0 Removal and Disposal of Tank Contents

Hazards associated with the removal of the tank contents are minimal as removal will be done by

pneumatic pump or vacuum truck. The tank and any venting apparatus as well as the vacuum truck will be appropriately grounded per API RP 1604 during content evacuation and inerting of the UST. Possible inhalatory or dermal exposure may occur if spill happens during the hook-up of the hose to the tank or breathing of vapors from the hose or piping during the removal of the tank contents. During sampling of the tank contents, care must be taken for inhalatory and dermal exposures. Respiratory and eye protection will be implemented during these operations. Care will be taken to ensure that a proper connection is obtained before opening the drain valve.

5.0 Excavation and Exposure of the UST

The major hazards associated with excavation to expose the UST include hitting underground utility lines, flying debris during saw-cutting of the concrete or asphalt surface, inhalation of hydrocarbon vapor if the UST is cut or punctured during excavation or from soil contamination, caving of the excavation, and general physical hazards of working with heavy equipment such as backhoes and trucks. UST and underground utilities will be located prior to excavation. Excavations will be sloped to prevent caving. No person shall be allowed to enter any excavation greater than five feet deep without the proper shoring requirements. Hazards associated with operation of heavy equipment will be controlled by the use of trained operators and minimizing the personnel and the number of different activities at the site during the operation of the equipment. While excavating the soils around the perimeter of the tanks, precautions will be taken to prevent mixing of contaminated soil with uncontaminated soil.

6.0 Preparation of Tank for Removal

Before removal of the tank, ECC will demonstrate to the satisfaction of the local and federal authorities that the tank has been sufficiently inerted. Under no circumstance will a tank be removed without the prior approval of the fire/health departments. The tank will be excavated approximately 3/4 of tank depth, making checks for contamination periodically. If no contamination is encountered, the soil will be stockpiled a minimum of 2 feet from the edge of the excavation, or at a distance equal to half the depth of the excavation, whichever is greater. If contamination is encountered, it will be segregated and placed on 6 mil polyethylene liner.

The tank will be removed using equipment and methods that will ensure safe removal. Hazards associated with this activity include inhalation of hydrocarbon vapor or contact with organic products during inerting or rinsing of the tank, static charge generation, fire hazards during disconnecting of piping associated with the tank, collapse of the tank, and general physical hazards of falling, tripping, slipping, and working around heavy equipment. The tank will be bonded and grounded before the removal of any flammable liquids in order to eliminate any static charge build-up. A proper grounding rod is three-fourths by ten feet long copper driven into the ground to eight feet. The NEC specifications further add that it may slant up to forty-five degrees or be buried in the trench of

specified depth. Bolted connectors can be used conforming to UL 467. Static charge protection serves to inhibit charge generation, inhibit charge storage, minimize ignitable material, inhibit the creation of a spark gap, and inhibit the buildup of sufficient energy to create a spark. Initial and regular air monitoring should be conducted to ensure that proper personnel protective equipment is employed. The atmosphere inside the tank and associated piping, when tested with a combustible gas meter, will have a reading less than 10 percent of the lower explosive limit (LEL) during excavation activities. Prior to removing each tank from the excavation and site, the tank will be inerted so that the atmosphere is less 5 percent of the lower explosive limit (LEL) and the oxygen content is less than 8 percent.

Personnel required to work around the tank will not stand on top of the tank or near excavation face that leans against the tank. If work has to be conducted from these locations, a life-line will be provided and a dedicated person will attend the life-line and will be ready to retrieve the person.

7.0 Removal and Disposal of UST and Piping

Hazards associated with this activity include inhalation of hydrocarbon vapors and contact with organic products if the tank is not adequately inerted or there are spills when removing the UST from the excavation. Other hazards include fire hazards of a potentially explosive atmosphere inside the tank, caving-in of the excavation when the tank is removed, and general physical hazards of falling, tripping, and working around heavy equipment. Care will be taken to ensure that the tank is adequately inerted. This can be done by measuring the atmosphere inside the tank immediately before removing the tank. The SSHO will obtain tank removal clearance from the local authorities. The excavation will be enlarged on one side of the tank to allow the tank to roll out from its original position slightly before being lifted to minimize the disturbance to the surrounding soil. Inspection of all chains, slings and hooks will be done prior to tank removal. Any defective chains, slings or hooks will be replaced. The tank will be lifted slowly to prevent rupture of the tank. Field personnel should maintain as much clearance as possible from air borne loads at all times to avoid being struck by a falling load. The use of a guideline should be used so that employees can maintain a greater distance from the load. All unauthorized personnel shall remain outside the Exclusion Zone. Hazards associated with operation of heavy equipment will be controlled by the use of trained operators and minimize the personnel and the number of different activities at the site during the operation of the equipment. Good housekeeping practice will be stressed in the daily Tailgate Safety Meeting to minimize the physical hazards.

20.0 ELECTRICAL SAFETY PROGRAM

1.0 Policy

OSHA's electrical standards address the government's concern that electricity has long been recognized as a serious workplace hazard, exposing employees to such dangers as electric shock, electrocutions, fires and explosions. The objective of the standards is to minimize such potential hazards by specifying design characteristics of safety in use of electrical equipment and systems. ECC's Electrical Safety Program complies with OSHA Standards 29 CFR 1926 (Construction) Subpart K - Electrical (1926.400 to 1926.449); 29 CFR 1910 (General Industry) Subpart S - Electrical (1910.301 - 1910.399).

2.0 Purpose

The purpose of the Electrical Safety Program is to control potential electrical hazards that may exist while conducting work activities at ECC project sites.

3.0 Safe Work Practices

- Always call an electrician in case of need of electrical work except for changing 110 volt A.C. light bulbs, resetting breakers or working on automotive type circuits.

- All electrical wiring of equipment must be considered "live" and dangerous. A shock from 110 volts can be fatal.

- All permanent electrical wires must be hung on insulators, messengers, in conduit or trays. All temporary electrical wires must be hung so they are not in mud or water. GFCIs will be used on all electrical wiring.

- Never handle electrical wires that are "hot" while standing or sitting in a wet place without taking extra precautions to obtain insulation from the ground. Be sure conditions are safe before starting work.

- Do not place electric bulbs where drops of water can hit them. Do not spray down electrical equipment.

- Electricians shall not touch, install, or attempt to repair any electrical equipment unless they are fully familiar with it; until it is locked and tagged out; and until they are positive it is safe. Never take your first chance with electricity.

- Always do your work so that you do not become a conductive path.

- Do not open a manual switch to disconnect power from a running motor except in cases of extreme emergency where the regular starter is not functioning.

- Cultivate the habit of turning your face away when opening or closing switched on circuit breakers or when doing anything that could cause an arc or flash. Never turn your face and then grope for a switch handle.

  - Never close an electrical switch slowly or hesitatingly. Close it quickly and positively;
  - Remember that arc burns may be severe; and
  - Do not remove a fuse from any circuit until the switch has first been opened.

- In case of a blown fuse or tripped circuit breakers, do not restore power until a thorough check has been made of the equipment to prevent closing into a fault.

- All electrical equipment shall be installed in such a manner so as to be readily and safely accessible to authorized employees to maintain and repair. Such equipment shall be guarded by rails, wooden platforms, insulating mats or electrically non-conductive material wherever necessary.

- All repairs or adjustments or other work on any type of electrical equipment shall be performed only by qualified electricians.

- Electrical equipment and wiring shall be inspected systematically and documented at regular intervals to ensure a safe operating condition. Defective equipment shall be repaired or replaced at once.

- Fuses or equivalent protective devices of the correct type and capacity shall be installed on all electrical equipment to protect against excessive overloads or other failures.

- Switches and circuit breakers shall be installed so that they are readily accessible and can be operated without danger of contact with moving or "live" parts.

- Switch board shall be well lighted for personnel operating in front of board and for maintenance and repair. The rear of the switch boards shall be so guarded as to prevent anyone getting near them and, if possible, shall be enclosed.

- All rooms or building which contain switch boards or control equipment shall be kept free of debris and refuse at all times.

- All junctions on switch boxes must have covers in place before starting operation.
- When repairs are finished or before an employee closes the switch, he shall make certain that the closing will not start a fire or endanger a fellow employee.

- Wire, pieces of wire, or other conducting materials shall not be used as a substitute for properly designed fuses. Where circuit breakers are used, they shall be maintained in proper operating condition and be properly adjusted.

- No employee working in an elevated position on electrical equipment shall do so without using an approved safety belt and life line, unless there are proper guard rails around such elevated positions.

- Hand held electric tools shall not be operated at high potential voltages.

- All electrical installations, temporary or permanent, shall comply with the applicable provisions of the national electrical safety code.
- Electrical wire, conduit, apparatus, and components of equipment shall be approved or listed by the Underwriters Laboratories, Inc., or factory mutual laboratories, for the specific application. Extension cords shall be 3-wire grounded type listed by the Underwriters Labs, Inc. The rated load shall not be exceeded.

- All 115-, 120-, and 220-volt, single-phase receptacle outlets used for construction operations shall be protected by a ground-fault interrupter (GFI) program. This requirement includes receptacles on stationary and portable systems.

- Always use a fiberglass or non-conductive ladder when doing electrical work.

4.0 Grounding

- "Grounding" means making an intentional permanent connection to the general mass of earth in such a manner as will insure at all times the immediate discharge of electric energy to the earth without danger.

- All equipment that may become accidentally charged with electric current shall be effectively grounded.

- Ground wire connections to the apparatus shall be made by means of an approved

clamp or terminal soldered or welded to the ground wire and securely bolted to the apparatus, where its removal will be unnecessary for inspection or repairs.

- Wherever possible, ground wires shall be installed in such a manner that they may be inspected for continuity and be protected from mechanical injury.

- All fence enclosures surrounding switch gear, transformers, etc. shall be effectively grounded. Three feet clearance shall be provided between transformer and fence.
- Installation of electrical equipment is not to be considered complete until it has been properly and effectively grounded.

5.0 Electrical Lockout Procedures

This section is prepared in accordance with 29 CFR 1926.417 "Lockout and tagging of circuits"

All electrical equipment must be locked out according to the following procedure prior to maintenance activities:

- Inform operator and/or foreman of intent to shutdown equipment;

- Turn off equipment;

- Lockout equipment with lock, lock-out hasp, and tag. Sign and date tag. Keep key;

- Attempt to start equipment; if equipment remains energized, report to foreman or electrician and do not proceed with maintenance activity. If equipment is de-energized, proceed with maintenance as planned;

- When maintenance is finished, clear area of tools and debris;

- Inform operator and/or foreman of intent to start equipment;

- Make sure personnel are clear of equipment;

- Test run;

- Replace tag and lockout on lockout board.

21.0 LOCKOUT/TAGOUT PROGRAM

1.0 Policy

ECC's Lockout/Tagout Program is in accordance with all applicable federal, state and local regulations including the following:

- GISO Section 3314 - "Cleaning, Repairing, Servicing & Adjusting Prime Movers, Machinery and Equipment";
- GISO Section 2320.4 - "De-Energized Equipment or Systems"; and
- 29 CFR 1910.147 - "The Control of Hazardous Energy (Lockout/Tagout)".

2.0 Purpose

The purpose of this written program is to prevent injuries and accidents from energized electrical sources and other types of stored energy during the installation, maintenance and removal of electrical equipment and machinery. This program covers the servicing and maintenance of machinery and equipment in which the unexpected energization or start-up of the machine or equipment, or release of stored energy could injure employees. This energy can be in the form of electricity, air pressure, water pressure, spring pressure or potential energy of position. The program establishes the procedures for affixing appropriate lockout devices or tagout devices to energy isolating devices, and to disable machines or equipment to prevent the unexpected energization, start-up or release of stored energy.

An energy control procedure shall be developed and utilized by the employer when employees are engaged in the cleaning, repairing, servicing or adjusting of prime movers, machinery and equipment.

3.0 Responsibilities

Supervisory personnel are responsible for:

- Ensuring only "Authorized Workers" are assigned to work on energized systems; and
- Ensuring that the provisions for the written program are implemented and that all employees follow the requirements of the written program. Disciplinary action may be taken against any employee who fails to follow or enforce the program.

Employees are responsible for:

- Accordance with the Lockout/Tagout Program; and

- Upon observing a machine or piece of equipment which is locked out, to not attempt to start, energize, or use the machinery or equipment.

4.0 Training

All authorized employees shall receive on-site training in the recognition of applicable hazardous energy source, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control. All affected employees shall be instructed in the purpose and use of the energy control procedure.

All employees whose work areas are or may be in an area where energy control procedures may be utilized, shall be instructed about the procedures, and about the prohibitions relating to attempts to restart or energize machinery or equipment which is locked out or tagged out.

Retraining shall be provided for all authorized and affected employees whenever:

- There is a change in job assignments;
- There is a change in machines, equipment or processes that present new hazards; and
- Whenever inspections reveal or the employer believes there are deviations or inadequacies in the program.

5.0 Lockout/Tagout Procedures

5.1 Preparation for Lockout

Authorized employees shall determine which switch, valve or other energy isolating devices shall be used. More than one energy source (electrical, mechanical, pneumatic) may be involved. Before lockout commences, job authorization shall be obtained.

5.2 Sequences of Lockout Procedures

Notify all affected employees that a lockout is required and the reason. If the equipment is operating, shut it down following normal procedures. Operate the switch, valve or other energy isolating devices so that the energy source is disconnected or isolated from the equipment. Stored energy must also be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding, etc. Lockout energy isolating devices with an individually assigned lock. After ensuring that no personnel are exposed, ensure that the equipment will not operate by engaging the power button or normal operating controls.

5.3 Procedures Involving More Than One Person

If more than one individual is required to lockout equipment, each shall place his/her own lock on the energy isolating device. One designated individual or supervisor, with knowledge of the work crew, may lockout/tagout for the entire crew. No member of the work crew shall start work until advised by the designated individual that the lockout is complete and it is safe to begin. The designated individual is responsible for carrying out all the steps of the lockout procedures. The designated individual shall not remove any lock or tag until personally verifying that all members of the crew are clear of the equipment.

5.4 Procedures Involving Personnel Changes During the Job

Employees being replaced or exchanged on a job during a shift shall ensure that the lock and tag of his/her replacement are substituted for his/her own before leaving the job. Employees being replaced on a job at the end of a shift shall ensure that the locks and tags of the replacement employee are substituted for his/her own before leaving the job.

5.5 Procedures When Work is Left Unfinished

Locks, tags and all other safety warning devices shall be left in place during all short absences such as breaks or trips for parts. When work is incomplete and temporarily suspended, all locks, tags and other safety warning devices shall be left in place.

5.6 Actions When Physical Locking is Impossible

When it is impossible to use a lock, another means of disconnecting the equipment or machinery must be used. Other means include: unplugging the equipment, disconnecting the conductors, fuse brackets or removing fuses. All steps of the process are the same as Lockout. A tag must be placed on the plug, conductor, fuse bracket or other means.

5.7 Restoring the Equipment to Service

Close and secure all cover panels and doors. If all cannot be closed, place barricades or rope off a safety zone. Advise all affected employees that the system is to be re-energized. Ensure that all persons are clear of the equipment. Remove all locks and tags. Only the person who placed the locks and tags may remove them. If the person is unavailable, only the supervisor may remove the locks and tags after personally ensuring it is safe to do so. Energize the equipment thereafter.

22.0 VEHICLE AND HEAVY EQUIPMENT OPERATIONS

1.0 Policy

ECC shall follow all heavy equipment operations in accordance with 29 CFR 1926.

2.0 Purpose

Physical hazards during mobilization and demobilization can arise from activities including off-loading heavy equipment or safety equipment from tractor-trailers and locating equipment to designated areas of use. Hazards will be mitigated by avoiding close proximity to or becoming situated between moving equipment or other immovable objects. Field personnel may be exposed to a variety of other physical injury hazards associated with equipment operations during field activities. These hazards include noise, struck-by injuries, eye hazards, hand and foot injuries and related hazards. The following minimum measures shall be implemented for equipment operations at all ECC project sites:

- The minimum required work uniform for all field personnel (i.e., Level D protection) shall be general work clothes, steel-toed construction boots (ANSI approved), safety goggles or glasses, work gloves, high visibility vests, ear protection and a hard hat (ANSI approved);
- Good housekeeping and adequate work space shall be established before operation of any equipment, and shall be maintained throughout the duration of the operation;
- Equipment shall be inspected for condition and operation prior to use. A Safety Inspection Checklist for Construction Equipment shall be completed.
- Field personnel shall only approach operating equipment from the operators angle of view, and only after making eye contact;
- Only trained and qualified persons shall be assigned to operate individual equipment.
- Operators shall follow the 3 point mount and dismount rule when getting into or out of heavy equipment.

3.0 Vehicle Traffic

Employees may be exposed to vehicle accident hazards associated with the operation of vehicles on site. To control these hazards, the following safety requirements shall be enforced.

- Seat belts shall be worn ANYTIME a vehicle is in motion, regardless of speed or distance to be traveled. Seat belt requirements also apply to the operation of backhoe and other construction equipment;

- The basic speed law shall be followed at all times. Vehicles shall never be operated at a speed that is not safe for the conditions (i.e., road surface, traffic, visibility, weather, etc.).

23.0 HOISTING/RIGGING AND CRANE OPERATIONS PROGRAM

1.0 Policy

ECC's Hoisting/Rigging and Crane Operations Program shall comply with 29 CFR 1926.

2.0 Purpose

Hoisting apparatus is used to raise, lower, and transport heavy loads for limited distances. Hoists can be either rigid suspended or hook suspended and include electric, air, and hand-operated chain hoists. This equipment must never be overloaded or used to transport people. Operators should examine hoists regularly and repair or replace any damaged or malfunctioning parts.

Cranes raise, lower, and shift objects through use of a long moveable arm. All operating handles should be within easy reach of the operator and be marked clearly to indicate which way they control the crane. Cranes should have adequate safeguards to provide safe footing and access ways for the operator to prevent injuries and to limit the action of the crane arm and hoisting devices.

All hoisting ropes must be appropriate for the weight the crane is bearing. Sheaves and drums should be inspected for wear and replaced to avoid loss of rope strength. Crane movements should always be governed by a standard code of signals transmitted by the crane director to the crane operator. Only properly trained and supervised operators should be allowed to work on cranes.

Potential hazards involved with crane operations include:

- Personnel injury to operator and workers;
- Property damage; and
- Equipment damage.

Inspection requirements include:

- Inspection by the operator prior to each lift;
- Check brakes and all required safety devices;
- Load capacity rating of crane; and
- Monthly Equipment Inspection.

Training requirements include:

- Qualified crane operator(s).

Control measures to avoid accidents and injuries include:

- Use qualified and trained crane operators;
- Ground personnel shall not be allowed to work under suspended loads;
- The operator shall not exceed the load capacity rating for the crane;
- The load capacity shall be posted and clearly visible on the crane;
- The crane jacks must be placed on firm ground before picking up a load;
- Loads shall be lifted to the minimum height necessary to accomplish the task;
- The load shall be well secured and balanced in the sling or hook before being lifted more than a few feet;
- Crane operators shall inform their Supervisor(s) of any prescribed medication that they are taking that would impair their judgment;
- Personnel shall not be lifted with cranes unless designed specifically for that purpose;
- The hoist rope or cable shall not be wrapped around the load;
- Cranes, derricks, drill rigs, booms or similar equipment shall have a minimum 10 feet clearance from overhead electrical power lines;
- Loads shall never be carried over personnel;
- The rated capacity on lift trucks and cranes shall be posted on the vehicle so as to be clearly visible;
- The load capacity ratings shall not be exceeded at any time;
- The operator shall pre-inspect/assess for safe access to the given worksite;
- The operator and crew shall wear required PPE at all times when crane is in operation in the Exclusion Zone;
- Maintain good housekeeping in rig vicinity to prevent slip, trip, fall hazards; and
- Be aware of possible thunderstorm activity; shut down and disperse from mast area if thunderstorm is in vicinity.

24.0 FALL PROTECTION PROGRAM

1.0 Policy

Each employee on a walking/working surface (horizontal and vertical surface) with an unprotected side or edge which is 6 feet (1.8 m) or more above a lower level shall be protected from falling by the use of guardrail systems, safety net systems, or personal fall arrest systems as required by Subpart M of 29 CFR 1926 - *Fall Protection* (1926.500 to 1926.503).

2.0 Purpose

In the event fall protection is required, ECC shall comply with Federal OSHA standards and client requirements. In general, employees shall be protected by standard guardrail, catch platforms, temporary floors, safety nets, or personal fall protection devices in the following situations:

- On access ways (excluding ladders) or work platforms from which they may fall 6 feet or more;
- On access ways or work platforms over water, machinery, or dangerous operations; and
- On runways from which they may fall 4 feet or more.

All employees will be trained by the SSHO and/or ECC's Corporate Health and Safety Manager in the safe use of access ways and fall protection systems and the recognition of hazards related to their use, including the:

- Nature of access and fall hazards in the work area;
- Correct procedures for constructing, erecting, maintaining, using, and dismantling access ways and fall protection systems;
- Maximum intended load-carrying capacities of access ways and fall protection systems; and
- All applicable requirements from this section.

3.0 Hoist Areas

Each employee in a hoist area shall be protected from falling 6 feet (1.8 m) or more to lower levels by guardrail systems or personal fall arrest systems. If guardrail systems or portions thereof, are removed to facilitate the hoisting operations, and an employee must lean through the access opening or out over the edge of the access opening, that employee shall be protected from fall hazards by a personal fall arrest system.

4.0 Work Areas/Activities

4.1 Excavations

Each employee at the edge of an excavation 6 feet (1.8 m) or more in depth shall be protected from falling by guardrail systems, fences, or barricades when the excavations are not readily seen because of plant growth or other visual barrier.

Each employee at the edge of a well, pit, shaft, and similar excavation 6 feet (1.8 m) or more in depth shall be protected from falling by guardrail systems, fences, barricades, or covers.

4.2 Dangerous Equipment

Each employee less than 6 feet (1.8 m) above dangerous equipment shall be protected from falling into or onto the dangerous equipment by guardrail systems or by equipment guards.

Each employee 6 feet (1.8 m) or more above dangerous equipment shall be protected from fall hazards by guardrail systems or by equipment guards.

4.3 Low Slope Roofs

Employees engaged in roofing activities on low-slope roofs (a roof having a slope less than or equal to 4 in 12 (vertical to horizontal) with unprotected sides and edges 6 feet (1.8 m) or more above lower levels shall be protected from falling by guardrail systems, safety net systems, personal fall arrest system, or a combination of warning line system and guardrail system, warning line system and
safety net system and safety monitoring system (a competent person who is responsible for recognizing and warning employees of fall hazards).

4.4 Steep Roofs

Employees on a steep roof with unprotected sides and edges 6 feet (1.8 m) or more above lower levels shall be protected from falling by guardrail systems with toeboards, safety net systems, or personal arrest systems.

5.0 Training Requirements

ECC shall provide a training program for each employee who might be exposed to fall hazards. The employee shall be able to recognize the hazards of falling and shall be trained in the correct working procedures in order to minimize the hazards. An Activity Hazard Analysis and SSHP shall

incorporate fall protection procedures should fall hazards exist on the project site.

5.1 Trainers (Competent Person)

Training shall be conducted by a competent person who is qualified in the following areas:

- The nature of the fall hazards in the work area;
- The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used;
- The use and operation of guardrail systems, personal fall arrest systems (OSHA only recognizes full-body harnesses when using a personal fall arrest system), safety net systems, warning line systems, safety monitoring systems, controlled access zones, and other protection to be used;
- The role of each employee in the safety monitoring system when this system is used;
- The limitations on the use o mechanical equipment during the performance of roofing work on low-sloped roofs;
- The correct procedures for the handling and storage of equipment and materials and the erection of overhead protection; and
- The role of employees in fall protection plans;
- The Fall Protection Standard.

5.2 Certification of Training

Certification of training shall be documented in ECC's Tailgate Safety Meeting Form and in ECC's SSHP.

5.3 Retraining

Retraining is required during the following situations:

- Changes in the workplace render previous training obsolete;
- Changes in the types of fall protection systems or equipment to be used render previous training obsolete; or
- Inadequacies in an affected employee's knowledge or use of fall protection systems or equipment indicate that the employee has not retained the requisite understanding or skill.

25.0 EMERGENCY RESPONSE AND CONTINGENCY PROGRAM

1.0 Policy

ECC's Emergency Response and Contingency Program is prepared in accordance with 29 CFR 1910.120/ 29 CFR 1926.65 - *HAZWOPER Standard,* and 8 CCR 5192.

2.0 Purpose

Emergency conditions that may be anticipated during work activities include:

- Fire involving combustible materials;
- Medical emergency due to heat stress, physical accident or exposure to toxic materials;
- Release of hazardous materials.

In the event of a release of hazardous materials or fire during transferring/repacking procedures, ECC's project manager will be the response manager and will determine the appropriate level of response.

3.0 Emergency Supplies

At a minimum, the following supplies shall be immediately available for on-site use:

- First aid equipment and supplies;
- Emergency eyewash station and shower as per ANSI Z-358.1;
- Emergency use respiratory equipment (SCBAs);
- Spill Control material and equipment;
- Type ABC fire extinguisher, 10 lb. capacity, minimum of two; and
- An emergency vehicle parked at exit from the cleared area.

All first aid practices/supplies shall comply at a minimum with 29 CFR 1910.151 and 1926.50.

4.0 Contingency Plan Execution

In the event an emergency situation should arise while performing site activities, ECC employees shall follow client procedures. Be prepared to give the following information when calling the client representative:

- Your name;
- Description of the emergency;

- Exact location of the emergency; and
- Any other pertinent information;

Upon discovering an emergency the following series of events will occur:

- Notification of personnel;
- Stop work activities if necessary;
- Lower background noises; and
- Begin emergency procedures (not in order, depending on the situation):
- Survey casualties;
- Assess existing and potential hazards to site personnel and off-site populations;
- Request aid if necessary;
- Allocate resources;
- Extricate and stabilize victims;
- Bring the hazardous substance under control; and
- Evacuate if necessary.

5.0 Emergency Numbers

Emergency telephone numbers (i.e. police, fire, hospital, ECC project contact, client contact) will be posted in a conspicuous location.

6.0 Communications

Communications will be verbal within the visual range, but may be amended if use of PPE and equipment prevents verbal communication. A 9-1-1 emergency air horn shall be implemented in accordance with CFR 29 Part 1910.165. One solid blast shall alert employees to evacuate from the site as part of ECC's non verbal communication. A designated meeting point shall be established prior to work activities.

Additional internal communication among personnel on-site and off-site personnel shall be implemented. Internal communication will be used to:

- Alert team members to emergencies;
- Maintain site control;
- Communicate changes in work to be accomplished to an emergency situation; and
- Pass along safety information, such as air change, amount of air time left before break, etc.

7.0 Emergency Recognition and Prevention

Emergency recognition and prevention training will be included in the daily tailgate safety meetings. By discussing the tasks to be performed, time constraints, emergency procedures, and hazards that may be encountered, personnel should be alert to the dangers and potential emergencies.

8.0 Site Evacuations

Safe distances will be determined at the time of the emergency. The following factors which influence safe distances will be taken into consideration:

- Toxicological properties of the substance;
- Physical state of the substance;
- Quantity released;
- Rate of release;
- Method of release;
- Vapor density relative to air;
- Wind and speed direction; and
- Local topography.

On-site safety stations will be located in the Support Zone. The safety station will include first aid equipment, fire extinguisher, eye wash station, hand tools, extra monitoring devices, and communication system.

26.0 SPILL AND DISCHARGE CONTROL PROGRAM

1.0 Policy

A spill containment program shall be implemented in ECC's SSHPs in accordance with 29 CFR 1910.120 (b)(4), 29 CFR 1926.65 (b)(4) and 8 CCR 5192.

2.0 Purpose

ECC will provide contingency measures for potential spills and discharge from trucks handling off-site transportation and any other potentially hazardous materials on-site. ECC will:

- Provide methods, means, and facilities to prevent contamination of soil, water, air, structures, equipment, or material from a release due to ECC's operations;
- Provide equipment and personnel to perform emergency measures to mitigate spills and control their spreading;
- Dispose of contaminated materials; and
- Provide a decontamination program to clean previously uncontaminated areas.

3.0 Equipment Required

ECC will have the following equipment on-site at all times in order to handle hazardous material releases:

- Non-combustible absorbent;
- Front-end loader (to be available for emergency response-not necessarily on-site);
- 55 gallon drums (DOT 17-E or 17-H); and
- Shovels.

4.0 Contingency Plan

As per client instructions the following requirements will be met during a spill response action:

- Notify the client contact immediately;
- Take immediate measures to control and contain the spill;
- Isolate and contain hazardous spill areas;
- Deny entry to unauthorized personnel;
- Do not allow anyone to touch spilled material;
- Stay upwind; keep out of low areas;
- Keep combustibles away from the spilled material;

- Use water spray to reduce vapors and dust, as needed;
- Take samples for analysis to determine that cleanup is adequate;
- If released from tanks, prevent discharge beyond site boundaries; and
- Caution should be given (opening, sampling, and over-packing) when handling drums and containers.

5.0 Notification of Spills and Discharges

ECC will present a report no later than two days after a release to include the following items:

- Description of material spilled, including identity, quantity, and a copy of the waste disposal manifest;
- Exact time and location of the spill, and the description of the area involved;
- Containment procedures utilized;
- Description of the cleanup procedures employed at the site, including disposal of spill residue;
- Summary of the communications ECC had with other agencies; and
- Determination if the spill is reported to the EPA and/or reportable, and the date upon which the report to the appropriate agency was made, as well as the name of the agency representative who accepted the report.

27.0 FIRE PROTECTION PROGRAM

1.0 Policy

ECC's Fire Protection Program is prepared in accordance with 29 CFR 1910 Subpart L Fire Protection (1910.155 to 1910.165) and 1926 Subpart F - Fire Protection and Prevention (1926.150 to 1926.159).

2.0 Purpose

All fires including extinguished fires and regardless of size, must be reported immediately after they occur to the client contact. ECC and subcontractor vehicles MUST yield right of way to emergency vehicles with flashing lights on. No vehicle or equipment shall be parked or stored within 15 feet of a fire hydrant.

3.0 Flammable and Combustible Liquids

Fuel (flammable vapor and gases), air (oxygen) and heat (a source of ignition) are necessary for a fire. Fires and explosions cannot occur without the presence of all three of these elements.

ECC shall incorporate the following control methods:

- All flammable liquids shall be stored in suitable metal containers only;
- Paint brushes, empty paint cans, rags, paint cloths, drop cloths, etc. shall be removed from the building at the end of the workday and stored in an approved location;
- Gasoline or any other low flash point flammable liquid shall not be used for cleaning purposes or to start fire; and
- Smoking or the use of spark or flame producing equipment in areas where flammable liquids are being used or stored is strictly prohibited.

Flammable mixtures may be ignited by many ignition sources, including open flames, gasoline engines, diesel engines, lighting, electrical lamps, power tools, fixtures, switches, nonexplosion-proof appliances, welding, and static electricity discharges. Because of the possibility of fire and explosion at the site, portable fire extinguishers (A:B:C) will be readily available to field personnel.

4.0 Hot Work

Before any hot work is performed on the project site, ECC personnel shall obtain a Hot Work Permit. A hot work site shall have a designated fire watch. This person's sole responsibility shall be to monitor the hot work and have immediate access to the fire extinguisher located at each hot work

site (a portable fire extinguisher (A:B:C) will be readily available). The fire watch shall remain at his/her designated watch for 30 minutes from the conclusion of hot work activities.

5.0 Fire Extinguishers

ECC is responsible for providing an adequate number of fire extinguishers. Extinguishers shall be suitably placed, distinctly marked, readily accessible and maintained in a fully charged and operable condition.

28.0 UNEXPLODED ORDNANCE (UXO) SAFETY PROGRAM

1.0 Purpose

ECC recognizes that there are no "safe" procedures for dealing with UXO, merely procedures which are considered least dangerous. However, maximum safety in any UXO operation is achieved through adherence to applicable safety precautions, a planned approach and intensive supervision. Only those personnel absolutely essential to the operation are allowed in the restricted/exclusion area during UXO operations. Safety is a firmly established habit when working with UXO. Safety is the leading edge of quality.

2.0 UXO Training

All of ECC's UXO qualified personnel are US citizens who have graduated from the U.S. Army Bomb Disposal School, Aberdeen, MD, or the U.S. Naval Explosive Ordnance Disposal (EOD) School, Indianhead, MD. Graduates of the EOD Assistant Course, Redstone Arsenal, AL, or Elgin AFB, FL.

3.0 UXO/Explosive Hazard Recognition

Before starting work, all field personnel will attend an Site Specific UXO/Explosive Hazard recognition and safety briefing, provided by the UXO Supervisor. Any additional UXO information gained during work on the site is incorporated into daily tailgate safety briefings, and given to all site personnel. Prior to the start of any work, zones will be established and clearly identified to delineate work activities. As zones are identified, UXO clearance activities will begin.

4.0 Basic Safety Precautions

a. ECC UXO operations are not conducted until a complete UXO safety plan for the operation involved is prepared and approved. This site specific plan is based upon limiting exposure to a minimum number of personnel, for a minimum time, to the minimum amount of UXO consistent with safe and efficient operations.

b. Only UXO qualified personnel are involved in UXO procedures. Non-UXO qualified personnel are utilized to perform UXO related procedures only when supervised by UXO qualified personnel. All ECC personnel engaged in operations are thoroughly trained in explosive safety and be capable of recognizing hazardous explosive exposures.

c. When operations involving UXO containing electro explosive devices (EEDs) are being accomplished in a suspect electromagnetic radiation (EMR) field insure proper (EMR) precautions

are taken. In addition; do not wear outer or undergarments made of materials which have high static generating characteristics when working on UXOs. Materials of 100 percent polyester, nylon, silk, or wool are highly static-producing, and insure any person handling a UXO suspected of containing EEDs ground themselves prior to touching the UXO.

The following safety precautions are applicable to all UXO personnel:

- Suspend all operations immediately upon approach of an electrical storm;
- Observe the hazards of electromagnetic radiation (EMR) precautions and grounding procedures when working with, or on, electrically initiated or susceptible OE;
- Chemical munitions will not be disturbed, handled or disposed of. ECC personnel will only provide assistance to the client, if required;
- Do not dismantle, strip, or handle any UXO unnecessarily;
- Avoid inhalation and skin contact with smoke, fumes, dust and vapors of detonations and OE residue;
- Do not attempt to extinguish burning explosives or any fire which might involve explosive materials;
- Do not manipulate external features of ordnance items unless specifically called for in EOD procedures;
- Incorporate appropriate property and personnel protective measures for shock and fragmentation when conducting OE operations;
- Do not subject OE to rough handling or transportation. Sand bag, chock and block appropriately;
- Carry explosives in an appropriate container;
- Hand carry no more than two items (one in each hand) at a time and then only as required by the operation being performed;
- Destroy shaped charge munitions by crushing the cone to prevent formation of the explosive jet;
- The preferred method for disposing of white phosphorous (WP) is to blow the munition in a manner that disperses the WP into the air versus down into the ground;
- Do not transport damaged WP munitions unless fully submerged in water;
- Avoid unnecessary movement of armed or damaged UXOs;
- Avoid the forward portions of munitions employing proximity fusing;
- Assume unknown fuses contain cocked strikers or anti-disturbance features; and
- Non-UXO personnel will not perform any activities on the sites without a UXO qualified individual with them.

5.0 General Safety Precautions By Ordnance Type

The following sub-paragraphs describe safety precautions for various types of munitions/disposal

operations.

5.1 Bombs

- Ensure fuze wells do not contain fuze components;
- Exercise caution when packing fuze wells of bombs;
- Bombs that have are considered to have mechanical or electrical impact/impact inertia tail fusing will be blown in place only;
- Igniters for fire bombs could possibly contain sodium and will not be allowed to come in contact with water; and
- Igniters for Fire bombs will not be subjected to any shock due to the all ways acting fusing employed.

5.2 Clusters, Dispensers, and Launchers

- Approach and work from the sides of a dispenser;
- Consider an intact dispenser as fully or partially loaded;
- Consider any payloads outside the container or dislodged inside as armed; and
- Take precautions for the most hazardous payloads until positively identified.

5.3 Projectiles

- Determine if the projectile has been fired and, if so, consider it armed;
- Check for the presence of unburned tracers;
- Avoid the rear and front of rocket assisted projectiles;
- Handle projectile components such as powder increments, cartridges, and primers with caution; and
- Seal the open ends of projectiles or sheared projectile components with tape or other suitable material before transporting.

5.4 Grenades

- Do not attempt to re-install safety pins in dud fired grenades;
- Do not attempt to withdraw impinged firing pins from the fuze of a dud fired grenade; and
- Do not dispose of grenades by functioning them as designed.

5.5 Rockets

- Approach and work on rockets from the side;

- Do not dismantle or strip dud fired rockets or rocket motors;
- Do not expose electrically fired munitions to radio transmissions within 25 feet;
- Do not transport an unfired rocket motor until having shielded the motor igniter from EMR; and
- Dispose of unfired rocket motors, with or without warheads, in such a manner as to prevent them from becoming propulsive.

5.6 Guided Missiles

- When found, restrict vehicular movement in the area of a guided missile;
- Avoid entanglement with guidance wires of wire guided missiles;
- Restrict radio communications in the vicinity of a dud fired missile;
- Approach and work on missiles from the side and rear quarter;
- Do not dismantle or strip dud fired missiles or missile motors;
- Do not transport an unfired missile motor until having shielded the motor igniter from EMR; and
- Dispose of unfired missile motors, with or without warheads, in such a manner as to prevent them from becoming propulsive.

6.0 UXO Safety Precautions for Site Characterization.

a. Make every effort to identify the UXO. Visually examine the item for markings and other identifying features such as shape, size, and external fittings. However, do not move the item to inspect it. If an unknown UXO is encountered, proper authorities must be notified.

b. Any time a suspected chemical munition is encountered, all personnel will withdraw upwind from the munition to a safe area, and the proper authorities will be notified

c. Avoid inhalation of, and skin contact with smoke, fumes, and vapors of explosives and related hazardous materials.

d. Consider UXO which has been exposed to fire and detonation as extremely hazardous. Chemical and physical changes may have occurred to the contents which render it much more sensitive than it was in its original state.

e. Do not rely on the color coding of UXO for positive identification of contents. Munitions having incomplete or improper color coding have been encountered.

f. Avoid the area forward of the nose of a munition until it can be ascertained the item does not contain a shaped charge. The explosive jet can be fatal at great distances forward of the longitudinal

axis of the item. Assume any shaped charge munitions to contain a piezoelectric (PZ) fusing system until the fusing system is positively identified. A PZ fuze is extremely sensitive, can function at the slightest physical change, and may remain hazardous for an indefinite period of time.

g. Approach an unfired rocket motor from the side. Ignition will create a missile hazard and hot exhaust.

(1) Do not expose rocket motors to any EMR source.
(2) If an unfired rocket motor must be transported, it shall be positioned in the direction which offers the least exposure to personnel in the event of an accidental ignition.

h. Assume practice UXO contain live charges until determined otherwise. Expended pyrotechnic/practice devices may contain red/white phosphorus residue.

I. Do not approach a smoking white phosphorus (WP) UXO. Burning WP may detonate the burster or dispersal explosive charge at any time.

7.0 Ordnance Avoidance for HTRW Activities.

a. Investigative activities on potential ordnance contaminated sites are accomplished using approved ECC ordnance avoidance procedures.

8.0 Restricted/Exclusion Area Operations.

a. On Ordnance and Explosives sites, ECC's site safety personnel shall establish a restricted/exclusion area for each UXO team operating on the site. The purpose of the area is for the protection of the public and other personnel from the blast and fragmentation hazards of an accidental detonation. The area is established based on the following minimum factors:

(1) Previous site use that caused the contamination: impact area, open burn/ open detonation, burial, etc.
(2) Project type: surface clearance, subsurface clearance, sifting operation, sampling, etc.
(3) Known ordnance contamination, distances to public exposure, terrain, etc.

b. When multiple UXO teams are operating on a site, the restricted/exclusion area and team separation distances shall never be less than 200 feet.

c. During the time frame that UXO operations are being accomplished, only personnel necessary for the UXO operation shall be within the restricted/exclusion area. When non-essential personnel enter

the restricted/exclusion area, all UXO operations must cease. ECC ;

(1) Plans for, provides, and knows the measures to be taken in the event of an accident.

(2) Provides a designated emergency vehicle in the area in case of an accident or other emergency.

(3) Coordinates with the appropriate airspace representative and assure appropriate notification procedures are arranged.

(4) When non-essential personnel must enter the restricted/exclusion area, the following are accomplished:

a) The individual/individuals receive a safety briefing,

b) are escorted by a ECC UXO qualified individual; and

c) all UXO operations must cease within the established restricted/exclusion area.

d: Before any movement of a UXO, the fuze condition must be ascertained. If the condition is questionable, consider the fuze to be armed. The fuze is considered the most hazardous component of a UXO, regardless of type or condition.

(1) Do Not dismantle or strip any UXO.

(2) Do Not depress plungers, turn vanes, or rotate spindle, levers, setting rings, or other external fittings on UXOs.

(3) Do Not subject mechanical time fuses to any unnecessary movement.

(4) Do Not remove fuses from UXO.

(5) Positively identify and review all safety precautions prior to handling any ordnance.

e. All ECC personnel working within the restricted/exclusion area shall comply with the following:

(1) Do not conduct operations without an approved Site Specific Safety and Health Plan and an approved Work Plan.

(2) Do not smoke, except in authorized areas.

(3) Do not have fires for heating or cooking, except in authorized areas.

(4) Do not conduct explosive operations during electrical, sand, dust, or snow storms.

(5) Explosive operations are conducted during daylight hours only.

(6) During magnetometer operations, UXO teams shall not wear safety shoes or other footwear which would cause the magnetometer to present a false indication.

f. If records search indicated WP munitions were fired or destroyed in the area, extra care shall be taken when uncovering a buried UXO.

9.0 Excavation Operations.

a. Hand excavation is the most reliable method for un-covering UXO. Hand excavation will be

accomplished only by UXO qualified personnel.

b. Earth moving machinery (EMM) may be used to excavate buried UXO, if the UXO is deeper than 12 inches. EMM shall not be used to excavate within 12 inches of a UXO. When excavation gets within approximately 12 inches of a UXO, hand excavation shall be used to uncover the UXO. EMM may be operated by non-UXO personnel, under the direct supervision of UXO personnel.

(1) If more than one EMM will be used on the same site, they will be separated by the same separation distances required for multiple teams on that site.
(2) During excavation operations, only those personnel absolutely necessary for the operation shall be within the restricted area/exclusion zone.
(3) Excavation and trenching shall comply with the provisions of 29 CFR 1926 subpart P.

10.0 Disposal Operations.

The following sub-paragraphs outline the procedures ECC personnel will use to perform both electric and non-electric demolition operations.

a. As a general rule, UXO will be detonated in place when the situation allows. All detonation-in-place operations are conducted by electrical means to assure maximum control of the site, except in situations where static electricity or EMR hazards are present, in this case non-electrical means can be used.

(1) The "two-man rule" is in effect during and ECC disposal operation.
(2) Exercise extreme care in handling and preparing high explosives for detonation. They are subject to detonation by heat, shock, and friction.
(3) Do not pack bomb fuze wells with explosives unless it can be positively confirmed that the fuze well does not contain any fuze components.
(4) WP UXO shall not be detonated into the ground. The UXO shall be counter-charged bottom center line when possible.

b. The following safety rules will be adhered to at all times:

(1) Carry blasting caps in approved containers, out of the direct rays of the sun, and located at least 25 feet from other explosives, until they are needed for priming.
(2) During the approach or progress of an electrical storm all operations will cease and All personnel will retire to a place of safety.
(3) Do not use any explosives or accessory equipment that is obviously deteriorated or damaged.
(4) Always point the explosive end of blasting caps, detonators, and explosive devices away

from the body during handling.

(5) Use only the equivalent of a commercial No. 8 blasting cap or greater
(6) When using more than one cap in a demolition operation insure they are of the same manufacturer.
(7) Do not bury blasting caps.
(8) Test electric blasting caps for continuity at least 25 feet from any other explosives prior to connecting them to the firing circuit. The wires will remain shunted until ready to be connected to the firing circuit.

c. In the event of a misfire, do not approach the disposal site for at least thirty minutes after the expected detonation time,. When conducting non-electric procedures, the wait time shall be thirty minutes plus the fuse burn time.

d. A post-search of the detonation site shall be conducted to assure a complete disposal was accomplished.

e. If the situation dictates, protective measures to reduce shock, blast, and fragmentation shall be taken.

f. Inert ordnance will not be disposed of or sold for scrap until the internal fillers have been exposed and unconfined. Venting or exposure may be accomplished in any way necessary.

11.0 UXO Sweep Operations

Before sampling operations or non-UXO personnel entering the site, the UXO team will perform visual and magnetometer sweeps of the work areas ensuring they are free of UXO or that all UXO encountered are clearly marked. Non-UXO personnel will remain off-site until completion of the initial visual and magnetometer sweep.

Magnetometer

The Schonstedt GA-52 is an inexpensive and highly portable magnetometer that will be used to quickly screen surface and near-surface areas for OE hazards. Its design is that of a fluxgate gradiometer used for detecting subsurface ferrous metal items. The locator is a hand-held unit and uses two fluxgate magnetometers, aligned and mounted a fixed distance apart to detect changes in the earth's ambient magnetic field caused by ferrous metal. An audio signal is provided to the operator when a ferrous metal object is encountered. During magnetometer sweeps the UXO team will wear work boots with lug soles to eliminate interference with the magnetometer's sensitivity.

During sweep operations, magnetic anomalies may be investigated by the UXO personnel. If the anomaly is located in a non-critical area the UXO Supervisor may choose to clearly mark the anomaly and Only minor excavations, one foot or less, may be accomplished to identify or confirm UXO. If the anomaly is more than one foot deep, it is considered to be UXO and is clearly marked.

12.0 Transportation.

If UXO must be transported off-site for disposal, the provisions of 49 CFR 100-199, DA Pam 385-64, state and local laws shall be followed.

29.0 ASBESTOS ABATEMENT STANDARD OPERATING PROCEDURES

1.0 Purpose

The purpose of this document is to establish, manage, and enforce ECC's asbestos abatement standard operating policies and procedures is in accordance with the following regulation:

- 29 CFR 1910; Occupational Safety and Health Standards;
- 29 CFR 1926 Safety and Health Regulations for Construction;
- 29 CFR 1926.1101 Asbestos;
- 40 CFR 61 NESHAPS;
- 40 CFR 763 Asbestos;
- EPA 340/1-90-018 (1990) Asbestos/NESHAPS Regulated Asbestos Containing Materials Guidance;
- EPA 340/1-90-019 (1990) Asbestos/NESHAPS Adequately Wet Guidance;
- NIOSH-01 (1991) Manual of Analytical Methods;

2.0 Scope

The scope of these standard operating procedures encompasses those who are involved with indoor/outdoor renovation and demolition asbestos abatement projects that are subject to Federal, state, and local regulations. Friable asbestos containing material (ACM) shall be removed prior to any activity which would cause disturbance to the friable ACM or which would prevent access to them for subsequent removal. In addition, non-friable ACM that may become friable during renovation or demolition activities shall be removed prior to such activities. Friable ACM is not required to be removed if 1) the ACM is incased in concrete or similar material 2) if the structure is being demolished under order of a state or local governmental agency. In the event that ACM remains in the building during demolition, adequate amounts of water must be used during the demolition of the structure and consequential handling and disposal activities of the construction debris.

3.0 Program Administrator

ECC's Project Manager/competent person is/are responsible for the implementation and enforcement of these standard operating procedures. In addition, the competent person shall be adequately trained and is responsible for the planning, training, and inspection of asbestos projects performed in the field. It is also the responsibility of the competent person to ensure that all asbestos abatement supplies and materials are present and accounted for until the completion of project. The onsite competent person shall maintain an inventory list of these abatement supplies at all times.

4.0 Establishing a Regulated Work Area

The OSHA regulated work is constructed prior to the beginning of any OSHA Class I, II, and III asbestos activity. The regulated area shall remain intact for the duration of the asbestos work. The regulated work area is established by:

(1) posting of asbestos warning signs and asbestos barrier tape to entry ways,
(2) restrict entry to area to authorized personnel,
(3) remove all moveable objects from the proposed work area (preclean with HEPA vacuum or wet wiping if necessary),
(4) shut down, lock-out, and tag-out any heating, ventilation, and air conditioning (HVAC), and power supply systems,
(5) establish a temporary power supply, and
(6) if needed, pre-clean contaminated work area,
(7) practice good housekeeping.

The work area is demarcated with asbestos warning signs and barrier tape to limit access to authorized personnel only. Asbestos warning signs are posted at all work area entries/exits. Asbestos barrier tape cordons off the work area(s). Only authorized personnel wearing appropriate respirator (half-face with HEPA filters) and personal protective equipment (full body coverall, eye protection, hard hat, etc.), are allowed to enter the work area. Posted in the clean room of the decontamination unit are the sign-in/sign-out form to be signed by workers and authorized personnel who enter and exit the regulated area. Once inside the work area, all personnel follow the safe working procedures, as described herein and in ECC's site specific, Site Safety and Health Plan (SSHP). If the work area requires no pre-cleaning, workers mobilize equipment and materials into the work area and begin the work area preparation. If pre-cleaning is required, the work team commences with the pre-cleaning wearing the appropriate Level C PPE with, at a minimum, air purifying (HEPA filter) respirator.

The PM/competent person supervise the de-energizing of the work area. All electricity, HVAC systems, etc., is locked out and tagged out. A gas powered generator, located outside the work area, is used to supply the needed electricity inside the work area. All electrical equipment is grounded with a Ground Fault Circuit Interrupter. The PM/competent person performs the lockout and tag-out procedure prior to the preabatement visual inspection. Power is turned off at the main electrical box supplying the work area and is pad locked closed. A sign is affixed denoting the following:

DO NOT BREAK SEAL

MEN AT WORK

CONTACT PM/competent person, ECC

PHONE NUMBER

The PM/competent person confirms the lockouts by testing the outlets, lights, and HVAC inside the work area. In addition, HVAC systems running through a work area surfacing other areas of a structure must also be locked and tagged out, and thoroughly sealed with six mil poly sheeting. The PM/competent person documents all of the above procedures in the daily log.

In addition, outside the work area, the job board is constructed and shall contain the following information:

- emergency phone numbers,
- client contact numbers,
- regulatory notifications/permits,
- hazard communications procedures,
- asbestos work plan,
- personal air sampling results,
- material safety data sheets,
- Name of Contractor
- Asbestos Contractor's License
- CSLB license
- OSHA Notification
- Site Safety Health Plan.

4.1 Background Exposure Monitoring

The competent (or third party licensed consultant) performs the background exposure monitoring inside the proposed work area. Plus, he/she verify locations and quantities of asbestos to be removed. Background air monitoring is usually performed one day prior to the set up of the work area. Air samples are sent to an accredited laboratory for analysis via phase contrast microscopy (PCM) . The airborne fiber concentration obtained during this initial air monitoring (static) serve as the regulated area's baseline airborne fiber concentration not to be exceeded during any phase of the asbestos remediation. If baseline levels are monitored at or above the PEL, ECC employees must don Level C PPE (See ECC's SOP regarding respirators) when entering the work area. At this point, ECC's exposure monitoring shall begin.

4.2 Asbestos Abatement Control Systems

OHSA Class I, II, and III abatement projects incorporate several types of containment systems

designed to control the migration of airborne contaminants to the outside environment. ECC uses negative pressure enclosures, glovebags, and minienclosures to accomplish this.

4.2.1. Negative Pressure Enclosures

A negative pressure enclosure (NPE) shall be constructed, where feasible, when performing OSHA Class I and II removal actions. The NPE shall be cosntruct by:

- construct critical barriers over windows, unused doorways, HVAC vents, electrical conduits, and all other openings inside the regulated work area with two layers of six mil polyethylene sheeting, spray glue and waterproof duct tape;
- walls shall be covered with two layers of 4 mil poly sheeting or equivalent and shall be sized to minimize seams. Wall poly sheeting shall overlap with floor at least 12 inches. No seams shall be located at the floor/wall joint. Water proof duct shall be used to secure poly sheeting;
- floors shall be covered with two layers of six mil poly sheeting or equivalent. Floor poly sheeting shall extend up walls at least 12 inches and shall be sized to minimize seams. No seams shall be located at the wall/floor joint. Waterproof duct tape shall be used to secure poly sheeting;
- cover all other surfaces (e.g. vents, holes, electrical fixtures, HVAC exhaust and intake vents etc.) inside the work area with two layers of six mil poly sheeting or equivalent making sure to minimize seams. Only waterproof duct shall be used to secure poly sheeting;
- cover immovable objects left inside the work area with six mil polyethylene sheeting,

- establish three or five stage decontamination chamber contiguous to the regulated work area with shower unit located in the middle of the unit;
- Setup pressure differential units (PDUs) inside the work area to provide the required negative pressure, minimum negative 0.02 to the containment (change in work area air volume every 15 minutes). A sufficient number of PDUs are placed inside the work area in strategic locations to ensure a continuous flow of outside air to the work environment. Clean air is forced through the decontamination unit (and make-up air ports for large containments) and drawn across the work area. The PDU must be in operation and produce at least four (4) air changes per hour for the duration of the asbestos abatement project. Exhaust from the PDUs is fed via flexible duct to the outside air environment;
- Workers shall secure drop-poly underneath removal areas to facilitate removal activities. In addition, at least one fire extinguisher are placed inside the work area or one within 50 feet of any point in the containment, and one fire extinguisher

outside the work area. Exit signs and arrows are posted throughout the work area.

- mobilizes equipment and materials to the work area. All equipment and materials (HEPA vacuums, airless sprayer, hand-held prayers, amended water, encapsulant, disposable towels, waste bags, fire extinguishers, flashlights, scaffolding, etc.) are mobilized into the work area before starting any remediation.

4.2.2. Glovebag Systems

Glove bags (positive or negative) made from six mil ploy sheeting material are impermeable to air and water and shall be used where it is not feasible to remove asbestos inside a negative pressure enclosure or intact on a structural component (e.g. pipe, elbow, tee fixture). The following operating procedures apply to glove bag work:

- the glove bag shall be seamless;
- appropriate labels shall be affixed to the glove bag;
- each glove bag is smoke tested prior to use;
- glove bags shall be used for one removal activity;
- upon completion of the removal, the glove bag shall be deflated using a HEPA vacuum to suck out the air inside the bag;
- two workers shall be utilized on each glove bag during removal;
- any loose material adjacent the glove bag shall be adequately wetted prior to setting attaching the glove bag to the pipe;

4.2.3. Minienclosure Systems

ECC shall employ minienclosures when large areas of TSI or block insulation material is to be removed. The minienclosure shall accommodate two workers and be kept under negative pressure, via HEPA vacuums, for the entirety of the asbestos abatement. The minienclosures shall have a dry, two stage decontamination chamber attached to the enclosure using spray adhesive and duct tape. The minienclosure shall be smoke tested before it is used and air movement shall be directed away from worker, whenever possible.

4.2.4. Outdoor Removal Work

All of the standard operating procedures discussed in section 5.2 above apply to work outdoors with the exception of the following:

- construction of isolation barriers are not required if wet methods are performed

before, during, and after removal activities. A poly sheet drop cloth shall be secured underneath all asbestos work areas;

- in lieu of constructing a three or five stage decontamination unit for personnel decontamination, workers may doff contaminated coverall in the work area after HEPA vacuuming and wet wiping coverall, respirator, and exposed skin.
- disposable and non-disposable PPE shall be placed (while in the work area) in approved, labeled sealed disposal containers for proper disposal or cleaning.
- Access to work area shall be restricted with physical barrier, signs and barrier tape to limit traffic to authorized personnel only.

5.0 Remediation Procedures inside a Regulated Work Area

Where feasible, project personnel work in teams of two and follow the standard operating procedures listed below.

5.1 Standard Work Practices

- workers begin remediation work at a location that is furthest away from the three or five stage decontamination chamber;
- work progresses towards the decontamination unit;
- adequately wet (with amended water) material prior to disturbing and removing ACM;
- remove in manageable sections;
- place in disposal containers as soon as practical;
- adequately wet (with amended water) material with prior to placing in disposal container;
- where feasible, remove structural components containing asbestos intact (wetted with amended water) and carefully lower to the ground to be wrapped with six mil poly sheeting;
- ACM shall be lowered to the disposal container and wetted (amended water) prior to disposing. ACM removed and dropped ACM at or above 10 feet shall be done so on inclined chutes into the approved disposal container. At or above 50 feet, ACM shall be dropped via an enclosed, leak-tight chute into approved disposal container;
- mist work area as needed with amended water--ensure that there is no visible emissions of any kind;
- use HEPA vacuums to collect debris and dust;
- use wet rags to clean up debris and dust;
- use of proper respirator--at a minimum, half-face air purifying respirator equipped with HEPA filter/cartridges;

- maintain level C PPE;

5.2 Prohibited Work Practices

- high-speed abrasive disc saws that are not equipped with point of cut ventilator or enclosures with HEPA filtered exhaust air;
- compressed air
- dry sweeping, shoveling, or other dry clean up of dust and debris;
- Allowing removed ACM to accumulate (and become dry) anywhere in the work area.
- employee rotation as a means of reducing employee exposures to asbestos.

5.3 Pre-Work Visual Inspection

The pre-work visual inspection is conducted by the PM/competent person and ensures that the control area complies with applicable Federal, state, and local regulations. The inspection covers the following:

- ensure that the asbestos warning signs and barrier tape demarcate the planned work area,
- ensure that the necessary critical barriers are secure and intact,
- ensure that the decontamination chamber is secure,
- ensure that the polyethylene sheeting is properly placed under work sites,
- ensure the integrity of the containment system (repair all rips, tears, and breeches);
- ensure that the negative pressure differential of minus 0.02 exist between the inside and outside of the containment area.
- ensure that all safety equipment is on site, such as, fire extinguishers, first aid, flashlight, emergency exit signs and arrows.

After the inspection, workers correct any deficiencies found during the inspection. The PM/competent person documents that the work area has been set-up for accordance with applicable regulations and project specifications.

5.4 Daily Monitoring of Work Area

Monitoring work practices and engineering controls of the controlled area(s) shall be performed daily by the competent persons and shall consist, at minimum, of the following:

- Proper work practices are followed;

- Personnel are wearing appropriate PPE;
- Integrity of containment barriers are intact. Any breach or compromise to the containment shall be addressed immediately;
- Required amount of negative pressure is maintained (minus 0.02 inch of water). Manometer readings shall be recorded in the competent person's note book;
- Daily inspection of the PDU(s) shall be performed. In addition, the pressure gauge reading shall be recorded immediately after any filter change. In the event that the pressure gauge reads less than the initial reading, the PDU shall be turned off and checked for leakage, tears, or a rupture of the HEPA filter inside the unit. In such a case, ECC will employ a back-up PDU during maintenance of the original PDU. All documentation shall be recorded in the competent person's note book.

5.5 Daily Clean Up Procedures

At the end of each shift, workers shall HEPA vacuuming and wet wipe clean equipment and containment barriers so that no visible debris is present. Workers use duct tape to seal the ends of the HEPA vacuum hoses. At the end of each day, the PM/competent person ensures that the work area is free from any visible dirt, dust, or debris and that all engineering controls are functioning prior to existing the containment. All personnel must decontaminate in the decontamination unit before leaving the work site. Prior to encapsulation and clearance sampling, all horizontal and vertical surfaces shall be HEPA vacuuming/wet wipe/HEPA vacuum/wet wipe cleaned to remove all dust and debris.

5.5.1. Personal Decontamination

In the clean room, workers and authorized visitors shall:

- Remove street clothing and places personal belongings in locker;
- don nylon swim suit(optional);
- don overalls and foot coverings;
- apply tape around ankles, wrists, etc. to secure protective wear;
- inspects, dons, and performs negative and positive pressure checks for seal of respirator;
- don hood over respirator head straps;
- enters equipment room.

In the equipment room, workers and authorized visitors shall:

- Put on any additional clothing (deck shoes, hard hat, etc.)

and collect necessary tools and materials, and proceeds to the work area.

Workers exiting the work area shall use the following exiting procedures:

In the equipment room, workers and authorized visitors shall:

- Remove all clothing (including gloves, goggles, and boots) except respirator;
- place disposable protective clothing and equipment in labeled, impermeable asbestos waste bags;
- place cleaned non-disposable equipment in labeled, impermeable plastic bags, or equivalent;
- proceed to shower or walk-off pan.

Once in the shower, workers and authorized visitors shall:

- Wash entire head and body with soap and water including respirator and cartridges (without removing);
- remove respirator and wash covered face area with soap and water and exit shower. Waste water is periodically filtered through a five (5) micron filter prior to discharging into the sanitary sewer system.

In the clean room, workers and authorized visitors shall:

- Dry off, don street clothes;
- Clean and dry respirator, replaces filters(if applicable)

5.6 Final Clearance and Tear Down Procedures for a Regulated Area

The following standard operating procedures for the final clearance visual inspection, clearance monitoring, and tear down of a non-pressurized control area is conducted as per ASTM E 1368, 40 CFR 763, 29 CFR 1926.1101, and State regulations where applicable.

5.6.1. Pre-Clearance Visual Inspection

The PM/competent person conducts the pre-clearance visual inspection prior to the final clearance air monitoring and inspects for:

(1) integrity of encapsulated material,
(2) ensure that the entire work area is free from dust, dirt, or debris and,

(3) ensure that the entire area has been sprayed with lock-down encapsulant.

Once the work area passes the final clearance visual inspection, the area is ready for final clearance air monitoring.

5.6.2. Final Clearance Visual Inspection for a Crawl Space Area

The PM/competent person performs the final clearance visual inspection in the crawl space area using a screw driver and a strong light (75 watt minimum) to search for asbestos debris. If excessive debris material is found, the area is recleaned until it passes final inspection. In addition, the PM wears a personal air sampling pump for the duration of the inspection to monitor crawl space air during the inspection. After the work area passes the final clearance visual inspection, the soil in the work area is encapsulated with a penetrating encapsulant designed for soil.

5.6.3. Final Clearance Air Monitoring

The PM/competent person (or third party licensed consultant) sets up a high flow air monitoring pumps w/stands throughout the work area. Where work areas consist of multiple floors, the pumps are distributed, accordingly. Final clearance samples are collected in accordance with applicable regulations and Section 12.0 below. After collecting a minimum of 1200 liters of air, the final clearance air sampling is terminated and samples shipped to the approved laboratory for PCM or TEM analysis. Clearance levels for airborne fiber concentrations inside the work area are, depending on the project specifications, 0.01f/cc or 0.005 f/cc.

5.6.4 Containment Tear Down Procedures

The PM/competent person ensures that the following procedures are performed during the tear down or removal of the regulated area:

- decontaminate and demobilize all equipment, tools, and safety equipment remaining inside the regulated area;
- ensure that all HVAC filters (adjacent work area) have been removed and disposed of as asbestos contaminated and wet wipe HVAC duct when necessary;
- remove all asbestos signs and barrier tape;
- tear down decontamination unit;
- clean up floor and drop poly by rolling poly inward and placing in double, properly labeled disposal bag, seal, and cart to dumpster;
- PM inspects previous work area(s) for any debris, tools, equipment, and materials.

6.0 Security Guard Interface

Where applicable, each day before leaving the work site, the PM/competent person ensures that the job site is secure.

7.0 Asbestos Containing Material Repair and Encapsulation Procedures

Encapsulation materials used during the repair of ACM includes the following: bridging, penetrating, lock-down, ground-sealer, and insulation cement. All encapsulating procedures complies strictly with federal, state, industry, and contract standards. ECC follows the manufactures recommended thinning and application procedures when working with encapsulants. Encapsulants are applied using an airless sprayer. Level C PPE with negative pressure APR (minimum) is worn is worn during the encapsulation of the regulated area. The following standard operating procedures shall be used when encapsulating ACM:

- In the event that ACM material is encapsulated, remove any loose or hanging ACM prior to encapsulating;
- Any filler material applied to gaps in existing material shall contain no asbestos, adhere well to the substrate, and provide and adequate base for encapsulating agent;
- use airless sprayer, with nozzle pressure adjusted to minimize disturbance of the friable ACM;
- do not apply encapsulating materials to ACM which is has water damage or is structurally deteriorating, that show poor adhesion to the surface to which they are applied, or which are in locations subject to frequent physical damage;
- apply a coating of encapsulating agent to friable ACM exposed , but not removed, during renovation, and to porous surfaces that have been stripped of ACM;
- after encapsulation, use signs, labels, or other marking device to indicate the presence of encapsulated friable ACM.

8.0 Disposal and Transportation of Asbestos Containing Waste

The intent of this waste disposal program is to establish and enforce standard operating procedures in the disposal and transportation of regulated and non-regulated ACM. Applicable regulations include, in part, the following: 40 CFR 61 subpart M, 49 CFR 171-179, 29 CFR 1926. 1101, and State regulations.

8.1 General

The disposal program mandates proper procedures for the disposal, labeling, storage, and

documentation of ACM.

8.2 Containerization of ACM and ACM debris

The containerization of regulated and non-regulated ACM and associated debris waste is accomplished by placing ACM (adequately wetted with amended water) in leak-tight six mil polyethylene bags, wrap in six mil polyethylene sheeting, or equivalent container(s). Each container shall not be overfilled and sealed shut to prevent the accidental opening and/or leaking. Wire or cord ties is never used when securing waste bag. Large components removed intact and wet may be wrapped in two layers of six mil polyethylene sheeting. The wrap is made leak-tight using spray glue and duct tape for transport to the landfill. To avoid rips and tears in polyethylene sheeting, ACM consisting of sharp-edged components, such as, nails, screws, metal lath, tin sheeting, and the like, shall be placed in approved waste drums for transport to the landfill. The accumulation of water inside the waste bags or polyethylene sheeting is prohibited.

8.3 Waste Container Removal Procedures

All disposal waste bags and wrapped sheeting is decontaminated using HEPA vacuuming and wet-cleaning methods before leaving the regulated work area. Bagged waste is transported out of the work area through either the decontamination unit or a waste pass-out airlock chamber. Waste bag-out procedures utilizes two teams of workers: the workers outside the containment, and the workers inside the containment. The "inside" team HEPA vacuums and wet wipes labeled bagged waste immediately before transporting it into the decontamination or pass-out air lock chamber. The "outside" team member(s), wearing Level C personal protective equipment (a different color or markings to distinguish from inside workers), places the bagged waste in a clean, properly labeled second container (bag, wrap, or drum) and removes it from the decontamination chamber and places in the approved staging area outside the work area. The outside team member ensures that the second container is properly sealed.

8.4 Labeling Requirements of ACM Containers

Each container of *regulated* asbestos waste shall have the following labels affixed:

(a) Danger label:

DANGER

CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST

CANCER AND LUNG DISEASE HAZARD

(b) Generator's label:

STATE AND FEDERAL LAW
PROHIBITS IMPROPER DISPOSAL
IF FOUND, CONTACT THE NEAREST
POLICE OR PUBLIC SAFETY
AUTHORITY OR THE _____(State) DEPARTMENT
OF ENVIRONMENTAL

NAME OF GENERATOR

LOCATION OF WASTE GENERATED(address)

MANIFEST NUMBER

(c) DOT placard:

(Diamond placard with Black zebra stripe on top half)

RQ, Asbestos
CLASS 9 NA2212

Attach permanent asbestos hazard warning label, as shown above, to salvaged structural components or members which are covered or coated with friable ACM.

To label non-regulated ACM containers, affix asbestos warning labels and generator's labels ("a" and "b" above) only.

8.5 Temporary Storage of ACM

Labeled ACM containers are stored in a approved temporary storage area until ready to transport to the approved landfill. The temporary storage areas shall be lined with six mil polyethylene sheeting. The ACM containers are covered with six mil polyethylene sheeting. All entries/exit are locked when not in use and the appropriate signs shall be posted. Roll-a-way bins are used for the transport of ACM to the disposal facility. Inside the bin, floor sheeting is installed first and extends twelve inches up the sidewall of the bin. Wall sheeting is secured down overlapping the floor sheeting. The dumpster is locked with a pad lock when not in use and has the following asbestos warning signs, or equivalent, posted on two sides of the bin:

DANGER

CONTAINS ASBESTOS FIBERS

AVOID CREATING DUST

CANCER AND LUNG DISEASE HAZARD

BREATHING ASBESTOS DUST MAY CAUSE SERIOUS BODILY HARM

In addition, asbestos barrier tape is secured around the storage bin which reads :

ASBESTOS

CANCER AND LUNG DISEASE HAZARD

AUTHORIZED PERSONNEL ONLY

RESPIRATORS AND PROTECTIVE CLOTHING

ARE REQUIRED IN THIS AREA

8.6 Contingency Planning

If at any time during the disposal of asbestos containing waste a leak, tear, rip, or hole appears in the bag, personnel immediately seal the leakage off with duct tape and decontaminate the exposed area using HEPA vacuuming and/or wet methods. The affected bag is enclosed in a clean, properly labeled container (waste bag, wrap, or drum).

In the event there is a liquid spill in the waste bin, employees contain spills with cotton rags, towels, or sheeting and then remove affected bags. The bags and the sheeting is decontaminated using HEPA vacuuming and wet-cleaning techniques. Personnel spray area(s) with lock-down encapsulant before placing containers back into the waste bin.

8.7 Transporter and Disposal Site

The collection, hauling, and disposal procedures of asbestos waste comply with applicable regulations. ECC contracts with licensed and registered asbestos waste transporters and disposal facilities who transport in a manner that ensures the containment of asbestos fibers. Collectors, haulers, and disposal facilities provide ECC with all required license, permits, and registration forms before commencement of the project. In addition, all dump receipts, trip tickets, transportation manifest or other documentation of disposal delivered to the generator for his records. ECC ensures that hazardous waste manifest are complete, accurate and updated when issued to the waste hauler. Asbestos waste are landfilled only at environmental protection agency (EPA) and/or state approved asbestos landfills. Vehicles containing ACM shall be clearly marked with asbestos warning signs (see above) when loading and unloading the ACM waste. In the event that friable ACM is not containerized in accordance with Federal and state regulations, the ACM shall be buried immediately

upon deposit at the disposal site.

9.0 Interface with Trades Involved with Construction

ECC conforms to 29 CFR 1926.1101, State regulations, where applicable, and notify employers of other trades working adjacent any of the regulated work areas for asbestos remediation. Project Manager appraises other employers or his representatives:

- Integrity of the containment,
- measures taken to ensure safety of the asbestos remediation work; and
- measures being taken to ensure that employees outside the work area are not exposed to airborne fibers.

In addition, any employer of other trades working adjacent to asbestos regulated area(s) are obliged to examine the integrity of all enclosures barriers, and inquire of methods of containment and effectiveness of controlling airborne fibers from entering to the outside environment.

10.0 Safety Precautions

Asbestos abatement projects have become increasingly sophisticated as the body of knowledge grows regarding effective control methods. A great deal of attention has been given to protecting workers and confining fibers. The extra burden of dealing with the asbestos hazard can easily create situations where the basic and more immediate safety hazards can be overlooked.
Safety hazards can manifest if good work practices are not followed. Potential hazards include: electrical considerations, ladders and scaffolding, working surfaces, fire consideration, heat related disorders and body protection. The methods used in an abatement project (sealing the work area, using wet methods, working at heights on ladders and scaffolding, and shutting down normal building systems) add new dimensions to the task of providing a safe working environment.

10.1 Personal Protective Equipment and Working Procedures

ECC provides, require the use of, and maintain in sanitary and reliable condition protective equipment necessary to protect any employee from any hazard which could cause injury or illness. The PM/competent person ensures that all personnel at the work site follow all personal protective equipment requirements and working procedures listed below.

10.1.1 Personal Protective Equipment

- Provide, and require the use of, respirators at all times when in the regulated area;

- Provide, and require the use of, special whole body clothing, including shoes, for any employee exposed to airborne concentrations of asbestos;
- Provide work gloves as part of whole body protection to employees exposed to asbestos. This is particularly important when metal lath, suspended ceiling grids, and other materials are being removed in the work area;
- Supply protective hard hats to be worn on job sites where there is exposure to falling objects, electric shock, or burn;
- Wear non-fogging face shields or goggles for operations involving potential eye injury. Full face respirators are most effective (if non-fogging);
- Where feasible, arrange work so that workers are not having to reach up, and look directly into their work site. Employees are elevated so that they are not directly under the work site;.
- Employees are instructed in the use of proper lifting methods. ECC uses the "buddy system" for lifting and moving heavy objects.

10.1.2. Materials Used on Asbestos Abatement Projects

- Use hand carts or rolling pallets whenever possible. Keep manual material handling to a minimum.

- Scrapers, package knives, wire cutters, chisels, and other sorts of bladed tools are frequently used. Always cut away from the body. Provide tools with insulated handles.

- Many puncture and cut wounds occur when removing metal lath or cutting duct work. Use care and have a good first aid kit available.
- Check with material supplier on irritant properties of material used. (Always have a material safety date sheet on all of materials and familiarize workers with any cautions or special considerations for their safe use.)

10.2 Fire Considerations

ECC considers fire prevention/control a high priority during all stages of asbestos-related work. Pertaining to are exits, travel distances, emergency lighting, and alarm systems.

No entry/exit areas are not sealed or blocked with immovable object which conflict with OSHA, NFPA and local fire code requirements. ECC establishes the means of exiting the containment as well as develop emergency plans to include alternative exits in emergency situations. All personnel are kept abreast of all emergency fire plans as the work sites change.

ECC conducts a pre-work survey to determine potential fire hazards, sources of ignition, hot-spots, and location of exits. Coordinate this with the number of workers to be in the area, the square footage and the types and amount of combustible/flammable materials that remains on site.

Some protective clothing burns and/or melts quickly. It can shrink, adhere to skin and drip as it burns. Heavy black smoke is a combustion by-product. Polyethylene starts to burn slowly and pick up speed as more heat is generated. It gives off heavy smoke as the fire progresses. Flame spread is slow and steady. Poly also produces toxic gases during thermal decomposition. Workers would not be adequately protected from smoke with respirators used for asbestos work. Sheeting is kept away from heat sources such as transformers, steam pipes, boilers, etc., that heats up during removal. Polyethylene should not be allowed to contact surfaces above 150°F.

To avoid fire problems in asbestos control area, ECC ensures that each employee adheres to the following fire prevention activities:

- Ensure all sources of ignition are removed. Be sure that gas and other fuel sources are cut off and that pilot lights in boilers, heaters, hot water tanks, compressors, etc., are extinguished;
- Locate "hot spots" . Quite often you will have to drape equipment instead of sealing off to prevent overheating (i.e., computers, terminal boards, switch panels, transformers);
- Cut off supply to steam lines, electric and steam heaters, and radiators. Do not permit the polyethylene to lay against hot surfaces;
- Do not allow lighters, matches, etc., into the work area. Strictly enforce no smoking, eating, chewing or drinking inside the work area;
- When using an oxygen/acetylene torch to cut pipe, etc., post a fire watch with an appropriate fire extinguisher or a charged hose. Do not use CO2 extinguisher in confined or enclosed spaces. Multi-purpose Dry Chemical fire extinguisher are recommended in most instances;
- When using a cutting torch, know what is on the other side of the wall and below the floor. Use sheet metal or a treated tarp to catch sparks;
- Reduce the amount of flammable/combustible materials inside a space to minimum prior to hanging plastic. This includes removal of any chemicals, flammable liquids, heat sensitive materials, etc.;
- Mark exits from work area and post directional arrows when exits are not visible from remote work areas. This can easily be done using duct tape on the polyethylene walls and barriers. It is recommended that these directional arrows be placed close to the ground to assist workers who may be crawling in smokey conditions to escape a fire;

- Keep trash and debris to a minimum (i.e., tape, poly, bags, lumber, etc.);
- If the work area is large and many workers are present, several emergency exits may be needed. Choose exits that are locked from outside but can be opened from the inside. A daily inspection should be conducted to insure secondary exits are not blocked;
- Lighting of exits and exit routes should be provided;
- In case of fire, the fire hazard becomes more immediate than the asbestos hazard and workers may need to violate the plastic barriers. This should be discussed with workers in the emergency action plan for the job site;
- Be alert for flammable vapors in industrial areas (solvents such as naphtha, toluene, xylol, etc.). This is especially critical in industrial vacuuming operations where vacuuming motors are not explosion proof;
- A telephone should be available at all times for notification of authorities in an emergency;
- Post local Fire Department and Rescue Squad phone numbers. Advise them of the operations in progress;
- Ensure that you have a monitor outside <u>at all times</u> trained in emergency procedures;
- Do not interfere with the building's fire protection system. If sprinkler systems are disabled, fire officials may require a fire watch with charged fire hoses at all times.

10.3 Electrical Considerations

ECC employs many electrical devices on their remediation projects that include, but are not limited to: Lights, HEPA vacuum cleaners, negative air systems, sump pumps, and the like. ECC inspects the electrical equipment used for any damage, proper grounding, and integrity of insulation on a regular basis. The inspection is performed regularly by the PM/competent person and documented on the Equipment Safety Inspection Form.

With the above mentioned items in place, there are still several basic items that should not be overlooked. All metal tools have insulated handles. Where practical, wood or fiberglass ladders are used to reduce or eliminate a ground path if a worker contacts an energized circuit.

10.4 Electrical Safety Review

The use of wet methods increases the potential for electrical shock when working around electrical panels, conduit, light fixtures, alarm systems, junction boxes, computers, transformers, etc.

De-energize as much equipment to the extent possible. Use portable flood-light systems for lighting and regularly check the system and wiring for damage.

- Use non-conductive scrapers and vacuum attachments (wood, plastic, rubber);
- Supply workers with heavy insulated rubber boots and/or gloves when working around energized wiring or equipment (lighting, panel boxes, transformers);
- Ensure all electrical equipment in use is properly grounded before the job starts. This means checking outlets, wiring, extension cords and power pickups. Check for the ground-pin on plugs. These checks should also be made while setting up and periodically during the job. Use care not to violate insulated coverings with scrapers, scaffolding wheels, etc. Rolling a heavy cart or scaffold over a extension can easily cause internal damage;
- Avoid stringing electrical wiring across floors. Elevate wiring if possible to keep it away from water on the floor and damage from foot traffic and moving scaffolds. Duct tape is used for this;
- Do not allow water to accumulate in puddles on work area floors. NESHAP regulations require damp conditions, not standing water.
- Ensure electrical outlets are tightly sealed and taped to avoid water spray;
- Always perform a pre-work walk through to identify potential sources of electrical hazards to abatement workers, or equipment that may be damaged by wet removal methods;
- Determine operating voltages of equipment and line before working on or near energized parts. De-energize and lock out when possible;
- Electrical equipment and lines should be considered energized unless tested and determine otherwise. A "Tic Tracer" instrument checks cords, flexible conductors, and outlets;
- Energized parts must be insulated or guarded from employee contact and any other conductive object;
- Extension cords used with portable electric tools and appliances must be the three-wire grounded type and connected to a Ground Fault Interrupter (GFI) circuit.

Extension cords:

- Should be protected from accidental damage;
- Should not be fastened with staples, hung from nails, or suspended by wire (tape is an acceptable alternative).

Portable electric hand tools should meet the following requirements:

- Should be equipped with 3-wire cord having a ground wire permanently fixed to the tool frame; or
- Should be of double-insulated type and labeled as such;

- For circuits over 600 volts, if electrical disconnects are not visible and open or locked out, the following requirements should be met;
- Circuits to be de-energized are clearly identified and isolated from all energy sources;
- Notification received from a designated employee that all switches and connections that could supply energy have been de-energized, locked out and plainly tagged to show men at work;
- Visual inspections and tests made to assure de-energizing of lines and equipment;
- Protective grounds applied to disconnected lines or equipment;
- Separate tag and lockout attached for each crew requiring de-energizing of same line or equipment;
- Tags should not be removed from completed work until designated employees report that crew members are clear and protective grounds they installed are removed.

10.4.1. Ladders/Scaffolding

During the remediation of asbestos-containing material scaffolding and ladders are used by ECC employees. All scaffolding and ladder used during the project complies with 29 CFR 1926.451 and 1910.25; ANSI 14.1, 14.2.

10.4.2. Ladders

The following items on a ladder are checked on a regular basis:

- Ladders are always maintained in good condition;
- Complete inspections are done periodically;
- No unauthorized repairs are made;
- Defective ladders are not used;
- Safety feet spreaders and other components of ladders are in good condition. (Missing safety feet create sharp edges that cut the polyethylene floor covers.;
- Movable parts operate freely without binding or undue play;
- Rungs are kept free of grease or oil;
- Ladders are not used for other than their intended purpose. (Ladders should not be used as a platform or wallboard.;
- Extension-type ladders should be used with a 12 lean ratio (1 foot out for every 4 feet of elevation);
- Step ladders should only be used when fully open;
- The user faces the ladder while going up and down;
- Tops are not used as steps. If needed, get a longer ladder;
- Bracing on the back legs is not used for climbing. Double sided ladders with steps

on the back are available for this purpose;

- Portable ladders are used by one person at a time;
- Ladders are secured to prevent displacement during use;
- All ladders have well designed safety shoes;
- Hook or other type ladders used in structures are positively secured;
- Wood or fiberglass ladders should be selected to avoid electrical hazards of metal ladders.

10.4.3. Scaffolding

Most asbestos remediation projects involve the use of scaffolding. Proper set up, regular inspection and basic maintenance should not be overlooked. In many removal projects, manually propelled mobile scaffolding provides a convenient and efficient work platform. OSHA standards require that when free standing mobile scaffolding is used, the height does not exceed four times the minimum base dimension. This requirement is based on the fact that scaffolding is easily turned over. Since relatively little force is required to tip a scaffold, it becomes important to make sure that wheels on mobile scaffolds move freely and are in good repair. If rented scaffolding is used, all components should be inspected prior to accepting it. Wheels should turn freely and be lubricated. All components such as cross bracing, railings, pin connectors, planking or scaffold grade lumber should be available before the units are assembled.

When workers are riding mobile scaffolding, the base dimension should be at least one half of the height. The force to move a mobile scaffolding must always be applied to the base. Workers on the top must never try to move the scaffold. Workers should be careful to keep debris bagged and obstacles off the floor where mobile scaffolds are used. If a wheel catches on debris on the floor when the unit is moved, additional force are required to move it. This additional force may be all that is needed to turn the unit over.

Guard rails should always be installed on scaffolding used for abatement projects. Workers are usually looking up while working and can easily step off the edge of an unprotected scaffold. OSHA requires that Guard rails be used when scaffolding is from 4 to 10 feet tall and less than 45 inches wide. Scaffolding 10 feet or higher should always have Guard rails.

Planking used on a scaffold should not extend farther than 12" over the edges and should always be secured to the frame.

10.4.4. Slips, Trips, and Falls

Because areas sealed with polyethylene sheeting inside the work area are kept damp to reduce

airborne fibers, they become very slick. Disposable booties are a also potential trip hazard as are air and electrical lines. All of these conditions create potential worker hazards even before remediation. ECC complies with CFR 1910 subpart D as guidelines to mitigate slips, trips, and falls. ECC enacts the following work practices to this end:

When asbestos and other debris are removed, the accumulations is bagged and removed from the floor as soon as possible. This simple step, which may require more initial effort, makes cleanup easier and the overall job far safer.

- Consider the height of the work, equipment in use, and numerous trip hazards. Take a look at your "walking surfaces";
- The use of disposable booties may be impractical in many removal situations. They may come apart and create a serious trip hazard. Seamless rubber boots, slip-on shoes or safety shoes with non-skid soles may be an alternative depending on the job;
- Inspect ladders and scaffolding for condition. Ensure railings are adequate on scaffolds;
- Minimize water on floors. Wet polyethylene is very slick and water increases the risk of electrical shock;
- Use care around air lines and electrical cords;
- Suspend electrical lines and cords when possible using tape;
- No running, jumping or horseplay in work area should ever be allowed;
- Minimize debris on floors;
- Pick up tools, scrapers, etc.

11.0 Emergency Response And Contingency

Emergency conditions that may be anticipated during work activities include:

- Fire involving combustible materials;
- Medical emergency due to heat stress, physical accident or exposure to toxic materials;
- Release of hazardous materials.

In the event of a release of hazardous materials during transferring/repacking procedures, ECC's PM/competent person determine the appropriate level of response.

11.1 Emergency Supplies

At a minimum, the following supplies are immediately available for on-site use:

- First aid equipment and supplies;
- Emergency eyewash station and shower as per ANSI Z-358.1;
- Spill Control material and equipment; and
- Type ABC fire extinguisher, 10 lb. capacity, minimum of four.

11.2 Contingency Plan Execution

In the event an emergency situation should arise while performing site activities, employees follow regulatory procedures. Be prepared to give the following information when calling the Government Officer In-Charge:

- Your name
- Description of the emergency
- Exact location of the emergency
- Any other pertinent information

Upon discovering an emergency the following series of events occur:

1. Notification of personnel
2. Stop work activities if necessary
3. Lower background noises
4. Begin emergency procedures (not in order, depending on the situation)
   - Survey casualties
   - Assess existing and potential hazards to site personnel and offsite populations
   - Request aid if necessary
   - Allocate resources
   - Extricate and stabilize victims
   - Bring the hazardous substance under control
   - Evacuate if necessary.

11.3 Emergency Numbers

Table 11.1 lists important numbers on-site personnel may need to call in the event of an emergency.

Table 11.1 Emergency Numbers

ORGANIZATION	TELEPHONE NUMBER
Health Department Chemtrec	

Poison Control Center	911
State Police	911
Fire Department	911
Chemical Spills	1-800-424-8802
Ambulance	911
Client	

11.4 Communications

Two sets of communication systems are established; internal communication among personnel on site, and external communication among on-site and offsite personnel. Internal communication are used:

- Alert team members to emergencies. Maintain site control;
- Communicate changes in work to be accomplished to an emergency situation;
- Pass along safety information, such as air change, amount of air time left before break, etc.
- Radios and visual signals are used for communication during operations.

11.5 Emergency Recognition and Prevention

Emergency recognition and prevention training includes daily tailgate safety meetings. By discussing the tasks to be performed, time constraints, emergency procedures, and hazards that may be encountered, personnel should be alert to the dangers and potential emergencies.

11.6 Site Mapping

A site map highlighting the following items, are used to predict potential areas of concern as well as evacuation routes from the site, and are kept in the ECC site office as well as in all project vehicles.

- Hazard areas;
- Site terrain, topography, buildings, barriers;
- Evacuation routes;
- Work crew locations;
- Site accessibility by land, sea, and air;

- Offsite populations or environments at risk.

A full size map is kept in the field office.

11.7 Site Evacuations/Refugees

Safe distances are determined at the time of the emergency. The following factors which influence safe distances are taken into consideration:

- Toxicological properties of the substance;
- Physical state of the substance;
- Quantity released;
- Rate of release;
- Method of release;
- Vapor density relative to air;
- Wind and speed direction;
- Local topography.

On-site safety stations are located in the Support Zone. The safety station include first aid equipment, fire extinguisher, hand tools, extra monitoring devices, oxygen, and communication system.

11.8 Decontamination and Medical Treatment

Whether or not to decontaminate a victim is based on the type and severity of the illness or injury and the nature of the contaminant. If decontamination cannot be done the victim is wrapped in blankets, plastic, or rubber to reduce the possibility of contamination to other personnel. The medical facility is informed of the potential contamination and a site representative accompanies the victim.

11.9 Documentation and Review

After the response ECC prepares an Emergency Response Report. It includes such things as a chronological history of the emergency, facts, actions, personnel present, sample results (if taken), summary of injuries, and possible exposures. This Report is given to the client within 2 days of the incident and following immediate verbal notification.

12.0 Air Monitoring Strategies

ECC's exposure monitoring program and strategies shall be established and maintained for the duration of asbestos remediation projects. Asbestos air monitoring include both employee and area exposure monitoring which meet EPA re-occupancy standards for a controlled work area, and provide analytical data (29 CFR 1926, 40 CFR 763, and job specifications). An independent industrial hygiene (IIH) firm is employed to perform project air monitoring. ECC reserves the right to collect personnel air samples. ECC's exposure monitoring plan shall be under the review of a Certified Industrial Hygienist for the duration of the project.

ECC's exposure monitoring program shall provide statistical, objective data of employee and environmental exposure to airborne fibers through the analysis of baseline, process, personal, and final clearance air monitoring. Air samples shall be collected in a 8 micrometer porosity cassette mounted in an open-face filter holder.

The IIH will be responsible for collecting air samples:

- the starting and stopping of the pumps
- the setting and recording of air flow rates using a calibrated rotameter at the beginning and at the end of the sampling period
- periodic inspection of cassette for overloading; and
- ensuring that all the record keeping of the sampling process is accurate and complete. At the end of the day, all air monitoring cassettes will be delivered over to the approved laboratory for the approved analysis.

The IIH shall employ one of two types of sampling forms in terms of cassette distribution: Full-period Continuous Single Sampling or the Full-Period Consecutive Sampling. The former strategy uses one cassette throughout the sampling period while the second form uses two cassettes consecutively in conducting the sampling. The latter strategy is employed when the IIH has reason to believe that the cassette is, or may become overloaded in work areas where dust and particulate matter may be found in high concentrations, i.e. crawl space, basements, and boiler rooms.

12.1 Initial Baseline or Background Monitoring

These air monitoring and resultant exposure assessment determinations shall be conducted immediately before the work site preparation begins. The assessment will be used to justify and verify ECC's proposed accordance measure for a particular regulated area. ECC's work plan shall be flexible enough to adjust to such assessment demands.

12.2 Periodic Exposure Monitoring

The IIH shall conduct time weighted averages (TWA) and 30 minute ceiling concentration, or excursion limit (EL) in the breathing zone of employee's which will be a representative of employees exposure to airborne fiber concentrations in a particular work area. The TWA and the EL monitoring shall be for the determination of eight hour time weighted average and thirty minute ceiling concentrations, respectively. Personnel sampling should run continuously for the duration of the sampling period stopping only for lunch and breaks (outside the work area). At air monitoring termination, the IIH shall check the air flow with a calibrated rotameter, mark the time cassette was terminated, and assist the employee in removing the pump assembly from their waist.

The IIH shall record the following information on the air sampling form for all exposure monitoring: test number, name of person conducting test, name of person tested, date, time, place of tests, conditions during the test, and volume of air collected. The IIH shall follow the check list below when performing 8-hr TWA personal air monitoring:

- Turn personal air monitoring pump on and secure pump mechanism around employees waist. The cassette shall be secured at the employee's breathing zone (employees lapel or collar),
- record air flow with calibrated rotameter and time cassette was started,
- periodically inspect cassette's filter for overloading,
- at break times, mark time off/on,.
- at lunch, record air flow and time cassette was stopped, take off of employee. Check for overloading and decide whether or not to use second cassette for the afternoon work period.
- At the end of the shift, record air flow with a calibrated rotameter, mark time cassette was stopped, and remove the pump assembly from employee,
- Decontaminate personal pump using wet-cleaning techniques.

Thirty minute EL personal air monitoring will be conducted daily to represent employee ceiling concentration to airborne fibers. The test should run for thirty minutes during the day's most invasive work procedure or process. Procedures for the 30-minute EL shall be the following:

- Turn personal air monitoring pump on and secure pump mechanism around employees waste. The cassette shall be secured at the employee's breathing zone (employees lapel or collar),
- record air flow with calibrated rotameter and time the cassette was started,
- at thirty minutes, note air flow with a calibrated rotameter, mark time the cassette was stopped, and remove pump assembly from the employee.

12.3 Area Exposure Monitoring

Representative 8-hr area exposure monitoring shall be conducted by the IIH on a daily basis both outside and inside the work area. Sampling points shall be set up, at a minimum:

- entrance to the decon (outside work area);
- at the pressure deferential unit exhaust (outside work area);
- occupied areas adjacent work area (outside work area);
- random locations (outside work area); and
- two samples inside the work area.

All of the standard operating procedures pertaining to air monitoring techniques shall apply for area exposure monitoring.

12.4 Final Clearance Monitoring

Aggressive final clearance monitoring, where required, shall be performed by the IIH after the abatement work and final visual inspections have been completed. In lieu of final clearance monitoring, area process samples shall be used as clearance monitoring data as long as analytical results from the process samples are within the airborne fiber concentration limits of clearance sampling criteria. Final clearance air monitoring shall consist of the following:

- Place five (minimum three) pumps and tripod stands inside the work area,
- blow the exhaust from a one horsepower leaf blower on walls, ceilings, floors, ledges, and other surfaces throughout the work area,
- Place a 20" fan in the center of the work area; where work areas consist of multiple sites, use additional fans,
- attach cassette to tubing and record flow rate with calibrated rotameter,
- leave the work area (decontaminate) and leave the fan(s) on, and
- turn off pumps, check air flow with calibrated rotameter and record time, turn off fans.

Cassettes shall be delivered to the approved laboratory on a daily basis. When work area airborne fiber concentrations, as determined by laboratory analysis, do not exceed 0.01 f/cc or background concentrations (whichever is greater), the work area's containment barriers shall be torn down and the work area cleaned up.

12.5 Termination of Exposure Monitoring

ECC shall implement a negative exposure assessment program, as per 29 CFR 1926.1101 (f) (2) (iii). The criteria below will be used to justify the termination of exposure monitoring:

- Produce objective data showing that the product or material containing asbestos or the activity involved in the repair, removal, and encapsulation of the material will produce asbestos fiber levels above the TWA and EL limits under conditions having the greatest potential for releasing asbestos.

- Produce evidence that the job now proposed closely resembles a previous job performed within the last twelve months, conducted in accordance, and is similar with regards to: types of materials worked on, kinds of engineering controls used, standard working procedures followed, and experience of employees.

- The results of initial exposure monitoring of the current job made from breathing zone air samples that are representative of the 8 hour TWA and 30-minute EL of each employee covering operations which are most likely during the performance of the entire asbestos job to result in exposures over the PELs

12.6 Notifications of Exposure Monitoring

ECC's exposure monitoring program discloses all exposure monitoring (background, personal, environmental, clearance) results to the contracting officer or his representative, the NQP, and employee on a daily basis as per specifications, section 02081.

The QCM shall submit fiber counts and airborne concentration results to the client within sixteen (16) hours after termination of exposure monitoring. The QCM shall notify the contracting officer immediately if any airborne fiber concentration exceeds 0.01f/cc.

The QCM shall notify employee three (3) days after sampling has been terminated. TWA and EL results will be made available to employee, in writing, by posting laboratory results on the project board located in ECC's on-site office. The results of employees exposures will be filed in the individuals' file.

13.0 Medical Monitoring Plan

The purpose of this medical surveillance program is to establish and enforce standard operating

procedures for medical monitoring and employee access to all medical records of the employee(s), who are, or may reasonably be expected to be, exposed to asbestos at or above the permissible exposure level and who are required to wear respirators. Accordance with these requirements will meet the minimum requirements in 29 CFR 1926.1101, and 40 CFR 763.121 (m).

13.1 Scope of Medical Monitoring Plan

This program applies to all employees of Environmental Chemical Corporation who perform asbestos related services.

13.2 Program Administrator

Project Manager and/or competent person is responsible to implement and enforce this program.

13.3 Medical Examination-General

ECC shall provide or make available at no cost to the employee, medical examinations relative to exposure to asbestos as required by Federal and state regulations. ECC shall ensure that all medical examinations or procedures are performed by or under the supervision of a licensed physician.

13.4 Preplacement

ECC shall provide or make available to its employees, within 30 calendar days following employment in an occupation exposed to airborne concentrations of asbestos fibers, a comprehensive medical examination, which shall include:

1. A medical and work history
2. A complete physical examination with emphasis on the respiratory system, the cardiovascular system and the gastrointestinal system
3. Completion of the Initial Medical Questionnaire in Appendix D
4. A chest X-ray according to Table 2 of
5. Pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV_1)
6. Any additional tests deemed appropriate or necessary by the examining physician or the physician interpreting the chest x-ray.
7. A chest roentgenogram at the discretion of the physician

13.4.1. Annual examination

ECC shall provide or make available a comprehensive medical examination annually, similar to the

protocol of the initial medical examination to all of its employees engaged in occupations exposed to airborne concentrations of asbestos fibers.

13.4.2. Termination of employment

ECC shall provide or make available, within 30 calendar days before or after the termination of employment to its employee engaged in an occupation exposed to airborne concentrations of asbestos fibers, a comprehensive medical examination similar to the preplacement examination.

13.4.3. Recent Examinations

No medical examinations shall be provided, if adequate records show that the employee has been examined in accordance with the 29 CFR 1926.1101where applicable. within the past one year.

13.5 Physician's Recommendation

Upon completion of the medical examination the physician shall furnish to ECC the following information:

1. Any recommended limitations on the employee and upon the use of personal protective equipment such as clothing or respirators
2. The physician's opinion as to whether the employee has any detected medical conditions that could place the employee at an increased risk of material health impairment from exposure to asbestos
3. A statement that the employee has been informed by the physician of the results of the examination and of any medical conditions that may result from asbestos exposure.

Upon receipt of the copy of the physician's written opinion, ECC shall provide a copy to the affected employee within 30 days.

13.6 Medical Records

ECC shall retain complete and accurate medical records of its employees for the length of employment plus 30 years.

13.6.1. Access to Records

The contents of the records of the medical examination shall be made available to the EPA, the Assistant Secretary of Labor for Occupational Safety and Health, to the Director of NIOSH, to authorized physicians and medical consultants, and upon request by the employee, to his or her physician. Any physician who conducts a medical examination required as per 29 CFR 1926.1101, where applicable. shall furnish to ECC all the information specifically required by this section, and any other medical information related to occupational exposure to asbestos fibers.

13.7 Exempted Operations

When ECC relies on objective data that demonstrates that products made from or containing asbestos are not capable of releasing fiber of asbestos or a combination of these minerals, in concentrations at or above the permissible exposure limit under the expected conditions of processing, use, or handling, such operations shall be exempt from initial monitoring requirements as per 40 CFR 763.121 (f) (2). ECC shall establish and maintain an accurate record of objective data reasonably relied upon in support of exemption

13.8 Transfer of Records

Whenever ECC ceases to operate in asbestos remediation, and if there is no successor to receive and retain the records for the prescribed period, ECC will notify the EPA Administrator at least 90 days prior to disposal and upon request, shall transmit them to the administrator.

30.0 RADIATION PROTECTION PROGRAM

A separate manual is dedicated to Environmental Chemical Corporation's Radiation Protection Program. Please contact Mr. Dean Osaki or Mr. Marc Mizrahi for more information. The following sections are included in ECC's Radiation Protection Program.

<u>Radiation Protection Program</u>

1.0 Introduction
2.0 Organization & Responsibilities
3.0 Project Related Activities
4.0 Records and Reports
5.0 Standard Operating Procedures
- 5.1 Radiation Protection Procedurs
- 5.2 Portable Instrument Operating Procedures
- 5.3 Transportation
- New SOPs

31.0 CHEMICAL HYGIENE PLAN (PROGRAM)

1.0 Policy

This plan applies to all employees engaged in the laboratory use of hazardous chemicals. This plan does not apply to uses of hazardous chemicals which do not meet the definition of laboratory use, and in such cases, the employee attest with the relevant standard in 29 CFR part 1910, subpart Z, even if such use occurs in a laboratory.

The plan is prepared in accordance with OSHA regulation 29 Code of Federal Regulations (CFR) 1910.1450. The plan specifically addresses:

- Designation of personnel responsible for implementation of the CHP, including the assignment of a Chemical Hygiene Officer (CHO);
- Criteria to determine and implement control measures to reduce employee exposure to hazardous chemicals including engineering controls, the use of personal protective equipment, and hygiene practices;
- Provisions for employee information and training regarding the handling of hazardous chemicals; and
- Procedures to be followed in the event of an emergency, including the location and proper use of available emergency equipment.

2.0 Purpose

The purpose of this program is to limit chemical exposures and to protect the health of laboratory employees.

ECC has developed and carried out the provisions of a written Chemical Hygiene Plan.

- Capable of protecting employees from health hazards associated with hazardous chemicals in the laboratory;
- Capable of keeping exposures below the permissible exposure limits; and
- The chemical hygiene plan is readily available to employees.

3.0 Responsibilities

Laboratory Director: Mona Risk - Has the ultimate responsibility for health and safety of all employees and holds appropriate managers responsible, and provides the staff ongoing support for the CHP.

Chemical Hygiene Officer (CHO): Bhupinder Sabharwal - The CHO is qualified in training and experience regarding the following:

- Developing, administering, and updating the laboratory CHP;
- Assisting management with CHP implementation;
- Monitoring procurement, use, and disposal of chemicals in the laboratory;
- Ensuring the appropriate personal protective equipment (PPE) is available as needed; and
- Gathering and maintaining Material Safety Data Sheets (MSDS).

Laboratory Manager: Wes Johnson - Has overall responsibility for chemical hygiene in the laboratory including:

- Ensures workers know and follow the chemical hygiene plan, that protective equipment is available in working order, and that appropriate training is provided, subject to the approval of the CHO;
- Assists group supervisors and laboratory employees in development of safety precautions for new projects and procedures; and
- Monitors instrumentation and physical plant and arranges for proper periodical maintenance.

Laboratory employees shall:

- Conduct all activities in a safe and healthful manner following the CHP;
- Use the appropriate Personal Protective Equipment;
- Exercise prudent and careful work practices to ensure the safety of all workers;
- Stop any task that jeopardizes health and safety;
- Notify supervisors of any potential health or safety hazards that are observed in the laboratory; and
- Ensure that all chemical containers are properly labeled identifying the chemical and its hazards.

4.0 Basic Rules and Procedures For Working With Chemicals

- Identify the chemical's hazards, as determined from the MSDS and other appropriate references;
- Understand the appropriate safeguards for using chemicals, including personal protective equipment;
- Identify location and proper use of emergency equipment;
- Use proper personal hygiene practices while working in the laboratory;

- Use appropriate procedures for emergencies, including evacuation routes, spill clean-up procedures and proper waste disposal;
- Know the location of the nearest telephone and the emergency telephone numbers;
- Know the location of all items of safety equipment (eyewash station, fire extinguisher, safety showers, first-aid kit) and how to use them;
- Do not smell or taste chemicals;
- Absolutely no smoking is allowed in the laboratory area;
- No eating, drinking, chewing gum or tobacco products, or application of cosmetics are permitted in areas where laboratory chemicals are present. Wash hands before conducting these activities;
- Use a pipette bulb for all pipetting. Mouth pipetting is prohibited;
- Handle and store laboratory glassware with care to avoid damage;
- Do not use damaged glassware. Glassware which is chipped, cracked, or stressed shall be repaired or appropriately disposed of;
- Follow proper procedures when utilizing glassware for specialized tasks. Seek instruction when unsure or before performing a task for the first time;
- Wash areas of exposed skin before leaving the laboratory;
- Avoid practical jokes, horseplay, or other behavior which may confuse, startle, or distract another worker;
- Wear shoes at all times in the laboratory. Do not wear sandals, perforated shoes or cloth sneakers as these may not provide adequate protection to the entire foot;
- Assure that appropriate eye protection is worn by all persons, including visitors, where chemicals are stored or handled;
- Wear appropriate gloves and other protective equipment when the potential for contact with toxic materials exists;
- Immediately inform management of unsafe conditions in the laboratory;
- Seek information and advice about hazards. Plan appropriate protective procedures and plan position of equipment before beginning any new operation;
- Confirm adequate hood performance before use;
- Do not use laboratory hood for materials storage. Do not allow materials to block vents or air flow; and
- Avoid working alone in the laboratory. Do not work alone in the laboratory if the procedures being conducted are hazardous or involve hazardous substances.

5.0 Chemical Procurement, Distribution, Storage, and MSDSs

5.1 Procurement

Prior to the purchase of chemicals by laboratory employees, the purchase must be approved by laboratory management according to the following procedure.

Prior to the purchase of chemical(s) by laboratory employees, a review concerning the properties and hazards of the substance is conducted by the Chemical Hygiene Officer and at least one of the following persons:

- Laboratory Manager; and
- Group Supervisor.

The chemical review covers the following:

- The specific hazards associated with the substance;
- The necessity of the purchase;
- Are safety precautions and protective equipment necessary for the safe handling of the substance currently in place; and
- Are additional safety measures and/or personnel training necessary for safe handling of the substance.

Prior to arrival of the new substance at the laboratory, the CHO or his/her designee trains laboratory employees in the safe handling and use of the new substance(s).

5.2 Storage and Inventory

All chemicals shall be stored in specified areas. Bench top, laboratory hoods, or desks are not to be used to store chemicals unless specifically designated as storage areas.

Chemicals shall be stored with chemicals of similar nature and hazards.

Chemicals are not to be stored with or near chemicals which are of incompatible nature or produce severe hazards (e.g., explosions, production of toxic gases, etc.) when combined.

Stored chemicals are to be examined a minimum of <u>annually</u> to determine if:

- The substances have exceeded the expiration date and therefore need replacing;
- The substances have deteriorated;
- The substances have been stored properly; and
- The containers have deteriorated or need replacement.

5.2.1. Inventory Procedures

- The CHO maintains an inventory of all laboratory chemicals;
- This inventory is updated a minimum of annually; and

- Unneeded, expired, or deteriorated materials are to be discarded at the time of this inventory.

5.3 Distribution

All laboratory chemicals shall only be used by laboratory employees trained in the handling and use of such chemicals.

Chemicals shall only be taken from storage for use in laboratory procedure.

Chemicals shall only be used in the laboratory area. Chemicals are not to be taken into private offices or other areas not specifically designated for chemical use.

5.4 Material Safety Data Sheets (MSDSs)

MSDSs are to be made readily available to laboratory employees by the CHO.

6.0 Environmental Monitoring

Regular monitoring of airborne concentrations of hazardous substances in the laboratory is typically not justified or practical when the type of work being conducted by ECC is taken into account. However, environmental or employee exposure monitoring shall be conducted by ECC as delineated by the following program.

6.1 Initial Monitoring

ECC measures employee exposure to any substance regulated by a standard which requires monitoring if any for the following conditions exist:

- There is reason to believe that employee exposure is near or exceeds the action limit, TLV, or PEL for a substance;
- An employee exhibits health hazard symptoms such as headache, rash, nausea, dizziness, coughing, irritation of the nose or throat, eye irritation;
- A complaint is received from one or more employees in a work area; and
- There is reason to believe that engineering controls (e.g., laboratory hoods) are not functioning adequately to protect employees.

6.2 Periodic Monitoring

If initial monitoring discloses employee exposure over the action level or PEL, ECC shall immediately comply with the exposure monitoring provisions of the relevant standard.

6.3 Termination of Monitoring

Monitoring is only terminated in accordance with the relevant standard (OSHA PEL).

6.4 Employee Notification of Monitoring Results

ECC will notify employees of monitoring results within 15 working days after receiving the monitoring results.

7.0 Housekeeping, Maintenance, and Inspections

7.1 Housekeeping

Good housekeeping practices makes for a safe environment. Secure all gas cylinders and label all chemicals to show nature and degree of hazard.

Common housekeeping practices contribute greatly towards chemical hygiene and safety. A clean work area is much safer than a cluttered or dirty one. Some appropriate housekeeping measures include:

- Keep all aisles, hallways, and stairs clear of all chemicals;
- Keep all work areas and especially workbenches clear of clutter and obstructions;
- All working surfaces and floors should be cleaned regularly;
- Access to emergency equipment, showers, eyelashes and exits should never be blocked by anything;
- Wastes should be kept in the proper containers and labeled properly;
- Any unlabeled containers are considered wastes by end of each workday. All chemicals are placed in proper storage areas by the end of each workday;
- All chemical containers are labeled with both the identity of the chemical and its hazards;
- All spills are promptly cleaned up, and the spilled chemical is properly disposed of; and
- No chemicals are stored in aisles, on desks or workbenches, on floors or in hallways, or left on shelves over the workbenches.

7.2 Maintenance

Proper maintenance and inspection of safety equipment is essential to insuring a safe working environment for laboratory employees. In order to accomplish this, ECC has instituted the following schedule for preventative maintenance and inspection of safety equipment. Performance of the

maintenance and inspection of safety equipment is the responsibility of the Group Supervisor of the area in which the equipment is located, with oversight by the Chemical Hygiene Officer.

7.2.1. Safety Showers

All safety showers shall be tested and inspected on a monthly basis.

7.2.2. Eyewash Fountains

All eyewash fountains shall be tested and inspected on a monthly basis.

7.2.3. Laboratory Hoods

All laboratory fume hoods shall be inspected on a weekly basis to insure proper operation.

7.2.4. First Aid Supplies

First Aid supplies in each area shall be inspected on a monthly basis to insure that adequate supplies exist for most anticipated routine instances.

7.2.5. Other Safety Equipment and Supplies

Other safety equipment and supplies shall be tested and inspected on a quarterly basis at a minimum.

Any equipment which is deemed to not be performing properly, is to be removed from service, either physically or by tagging. Any procedures which require this equipment for safe performance are to be halted until the equipment is properly reinstated to good working order.

7.3 Inspections

In order to insure that all safety equipment is properly functioning and that good housekeeping practices are being maintained, personnel shall perform inspections to assess laboratory safety.

Inspections are to be carried out on a monthly basis by laboratory personnel. These inspections are to identify and correct the following:

- Cleanliness and orderliness of the work area;
- Unsafe conditions or practices; and
- Condition of emergency and safety equipment.

8.0 Medical Surveillance Program

In the event that an ECC employee is suspected or known to have been exposed to a hazardous substance, such employee receives prompt and appropriate medical attention. This shall take place if one of the following conditions exist:

- Whenever an employee develops signs or symptoms associated with a hazardous chemical to which the employee may have been exposed in the laboratory;
- Whenever an event takes place in the work area such as a spill, leak, explosion, or other occurrence resulting in the likelihood of a hazardous exposure; and
- Whenever exposure monitoring reveals an exposure level routinely above the action level or PEL for an OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements.

ECC shall provide the physician the following information:

- The identity of the hazardous chemical(s) to which the employee may have been exposed;
- A description of the condition under which the exposure occurred including quantitative exposure data, if available; and
- A description of the signs and symptoms of exposure that the employee is experiencing, if any.

The CHO will receive the medical report from the attending physician(s). The CHO is responsible for distributing this information to all pertinent parties.

The CHO is responsible for notifying employees of the results of any medical examination or consultation regarding exposure to hazardous substances.

9.0 Protective Apparel and Equipment

9.1 Ventilation

Laboratory ventilation shall not be turbulent and shall be relatively uniform throughout the laboratory, with no high velocity or static areas.

General laboratory ventilation shall not be solely relied upon for protection from toxic substances released into the laboratory.

9.2 Laboratory Hoods

Laboratory exhaust hoods provide the primary engineering control for reducing employee exposure to airborne contaminants. Laboratory hoods shall be used when working with substances which are known to produce airborne contamination (e.g., particulates, vapors, etc.). Laboratory hoods shall also to be utilized when working with substances of unknown toxicity.

Laboratory hoods shall be maintained in good working order, and maintain a face velocity of 80 to 120 linear feet per minute.

9.3 Safety Shower

A drench type safety shower is to be located and clearly marked in each laboratory area in which hazardous chemicals are handled.

9.4 Eyewash Stations

Eyewash fountains shall be located and clearly marked in each laboratory area in which hazardous chemicals are handled.

9.5 Fire Extinguishers

Fire extinguishers are to be located and clearly marked in each laboratory area.

9.6 Personal Protective Equipment

Each laboratory employee will be furnished with:

- Laboratory coats;
- Safety glasses or goggles; and
- Protective gloves.

This should be appropriate protection for most laboratory procedures performed by ECC. Other protective equipment (e.g., respirators, face shields, etc.) are provided to laboratory employees on an "as-needed" basis as determined by the Laboratory Manager.

10.0 Records

All accidents, injuries, and near-misses must be reported to the CHO and investigated.

The CHO maintains records of all chemical inventories.

The CHO maintains an accurate record of any measurements taken to monitor employee exposures to hazardous substances.

All records are maintained, transferred, and made available in accordance with 29 CFR 1910.120.

RECORD KEEPING PROCEDURES	
RECORD	RESPONSIBILITY
Medical Records	CHO
Monitoring Records	CHO
Training Records	CHO
Hood Performance	CHO
Accident Reports	CHO
OSHA 200	CHO
Safety Inspection Checklist	CHO

11.0 Signs and Labels

ECC has posted prominent signs and labels of the following types:

Emergency telephone numbers of:

- Emergency personnel;
- Emergency facilities;
- Supervisors; and
- Laboratory employees.

Identification labels showing contents of containers, waste receptacles, and associated hazards.

Location signs for safety showers, eyewash stations, fire extinguishers, and other safety and first aid equipment.

Areas where food and beverage consumption and storage are permitted.

Warnings at areas or equipments where special or unusual hazards exist.

12.0 Spills and Accidents

ECC has established a written emergency plan and has communicated its contents to all laboratory employees. The plan includes procedures for:

- Ventilation failure;
- Prevention, containment, and cleanup of spills;
- Evacuation;
- Reporting;
- Fire Prevention and Emergency Action Plan.

All accidents or near accidents are to be carefully analyzed with the results distributed to laboratory management and employees.

13.0 Employee Information and Training

13.1 Employer Responsibility

ECC is responsible under the Chemical Hygiene Plan for employee training. The form and format of that training is at ECC discretion. The following sections outline the contents of the training programs and our training program options.

13.2 Employee Information

The employer must provide employees with information and training to ensure that they are aware of the hazards of the chemicals present in their work area. This information must be provided at the time of an employee's initial assignment to a work area where hazardous chemicals are present and prior to assignments involving new exposure situations.

Employees must be informed of:

- The contents of this standard;
- The location and availability of the employer's Chemical Hygiene Plan;
- The permissible exposure limits for OSHA regulated substances or recommended exposure limits for other hazardous chemicals where there is no applicable OSHA standard;
- Signs and symptoms associated with exposures to hazardous chemicals used in the laboratory; and

- The location and availability of known reference material on the hazards, safe handling, storage and disposal of hazardous chemicals found in the laboratory including, but not limited to Material Safety Data Sheets (MSDSs) received from chemical suppliers.

13.3 Employee Training

All employees who have the potential of being exposed to a substance in the course of their work are trained about the chemical hazards, including:

- Chemical detection methods if existing;
- The chemical's physical and health hazards;
- Appropriate protective measures, including ventilation and personal protective clothing;
- Details on labeling system used; and
- How to read and interpret MSDSs and label warnings.

13.4 Chemical Hygiene Plan Training

All laboratory employees receive training regarding the ECC Chemical Hygiene Plan. As a portion of this training, each laboratory employee receives copies of the ECC CHP, 29 CFR 1910.1450 (Occupational Exposures to Hazardous Chemicals in Laboratories), and the Emergency Plan. This training includes:

- The contents of the ECC CHP;
- The contents of the OSHA Laboratory Standard (29 CFR 1910.1450);
- The contents of the ECC Emergency Plan; and
- The location and availability of Material Safety Data Sheets.

14.0 Waste Disposal Program

ECC has instituted a program to insure that laboratory wastes are disposed of in a safe manner, and in accordance with all pertinent regulations. The Laboratory Manager, along with the Chemical Hygiene Officer, is responsible for development and implementation of these procedures. ECC Waste Disposal Program has the following elements:

- Waste collection and segregation;
- Waste storage;
- Waste disposal;
- Hazardous Waste Plan

14.1 Waste Collection and Segregation

Wastes shall be collected in containers in or near the area in which the waste is generated.

Containers are to be emptied on a regular basis. It is preferable if containers have a capacity of no more than one week's worth of generated waste.

The contents of this container shall be transferred to the appropriate storage container in the designated storage area.

The person adding chemicals to the container shall wear at least safety glasses, a laboratory coat, and appropriate gloves.

Any spill or leaks from the satellite container shall be cleaned promptly.

Separate containers must be provided for each different type of waste stream generated in each laboratory area.

Each container must be labeled to reflect the type of waste and its hazards.

The container shall be of a size and type that a single person can easily hold and control the container at capacity.

The container must be made of a material compatible with the waste types it is used to contain.

14.2 Waste Storage

Waste storage containers are larger containers used to accumulate waste materials collected in the smaller containers. These waste stroage containers shall be no larger than a 55-gallon drum and be manufactured from materials compatible with the wastes to be stored inside. The container shall meet Department of Transportation (DOT) specifications for the waste stream it is being used to contain.

Each container must be labeled to reflect the hazard type (e.g., corrosive, flammable, etc.) the safety precautions required, and the date the waste accumulation was started.

At least two persons shall present as a safety precaution when waste is being transferred from containers to the storage container.

The person emptying the contents of the container shall wear the protective clothing required for the

type of waste being handled. At a minimum, the employee shall utilize safety glasses, appropriate gloves, and a laboratory coat.

14.3 Waste Disposal

ECC shall track the length of time in which a drum of waste is accumulated to insure accordance with appropriate regulations.

ECC disposes of all wastes in a manner consistent with all pertinent regulations utilizing licensed facilities and transporters.

14.4 Definitions

14.4.1. Action Level

The concentration designated in 29 CFR Part 1910 for a specific substance, calculated as an eight-hour, time-weighted average, which initiates certain required activities such as exposure monitoring and medical surveillance.

14.4.2. Carcinogen

Any substance which meets one of the following criteria:

- Regulated by OSHA as a carcinogen;
- Listed under the category "Known to be Carcinogens" in the Annual Report on Carcinogens published by the National Toxicity Program (NTP);
- Listed under Group 1, "Carcinogenic to Humans" by the International Agency for Research on Cancer Monographs (IARC); and
- Listed as Group 2A or 2B by IARC or as "Reasonably Anticipated to be Carcinogens" by NTP and causes statistically significant tumor incidence in animals.

14.4.3. Hazardous Chemical

A chemical for which there is statistically significant evidence, based on at least one study conducted in accordance with established scientific principles, that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals that are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents that act on the hematopoietic systems, and agents.

14.4.4. Laboratory

A facility where the "laboratory use of hazardous chemicals" occurs. It is a work place where relatively small quantities of hazardous chemicals are used on a nonproduction basis.

14.4.5. Laboratory-Type Hood

A device located in a laboratory, enclosed on five sides with a moveable sash or fixed partial enclosure on the remaining side; constructed and maintained to draw air from the laboratory and to prevent or minimize the escape of air contaminants into the laboratory; and allows chemical manipulations to be conducted in the enclosure without insertion of any portion of the employee's body other than hands and arms.

14.4.6. Laboratory Use of Hazardous Chemicals

Handling or use of chemicals in which all of the following conditions are met:

- Chemical manipulations are carried out on a "laboratory-scale";
- Multiple chemical procedures or chemicals are used;
- The procedures involved are not part of a production process, nor in any way simulate a production process; and
- Protective laboratory practices and equipment are available and in common use to minimize the potential for employee exposure to hazardous chemicals.

14.4.7. Medical Consultation

A consultation which takes place between an employee and a licensed physician for the purpose of determining what medical examinations or procedures, if any, are appropriate in cases where a significant exposure to a hazardous chemical may have taken place.

14.4.8. Protective Laboratory Practices and Equipment

Laboratory procedures, practices and equipment accepted by laboratory health and safety experts as effective, or that the employer can show to be effective, in minimizing the potential for employee exposure to hazardous chemicals.

14.4.9 Reproductive Toxin

Chemicals which affect the reproductive capabilities including chromosomal damage (mutations) and effects on fetuses (teratogenesis).

32.0 DIVING MANAGEMENT PROGRAM

1.0 Policy

Environmental Chemical Corporation's Diving Management has been prepared in accordance with requirements of the following references:

OSHA (Occupational Safety and Health Administration) 29 CFR 1910 Subpart T
NAVSHIPS 0994-001-9010 (U. S. Navy Diving Manual) Volume 1
NAVSHIPS 0994-009-6010 (U. S. Navy Diving Operations Handbook)
OPNAVINST 9940.1 (Series) (U. S. Navy Diving Program)
OPNAVINST 3150.28 (Series) (Combined Diving Log-Accident/Injury Report)

All employees and subcontractors who participate in diving operations for ECC must read the Diving Management Program and attest in writing that they have read and understand the policies and procedures set forth therein. Questions concerning the information and procedures contained herein should be submitted to the Project Diving Supervisor. Subject to the approval of the Project Manager, the Project Diving Supervisor can initiate local modifications to accommodate deviations necessitated by local conditions and regulations, provided they do not violate the references listed above. Where documents are conflicting in policy, OSHA regulations take precedence.

2.0 Purpose

Environmental Chemical Corporation has established policies and procedures for the safe and efficient conduct of diving. The mode of diving operations is scuba. The procedures contained or referenced in this program are not intended to change or supersede the provisions of the regulations outlined in the foreword of this program. The Occupational Safety and Health Administration (OSHA), Department of Labor, has established a standard which regulates occupational safety and health requirements for commercial diving. OSHA has established safety and health criteria for personnel to include medical requirements recommended physical examination, operations procedures, equipment procedures, and requirements for record keeping. The standard applies to all diving operations conducted in connection with all types of work and employment within OSHA's jurisdiction unless specifically exempted. Because of the interrelated nature of every diving operation, it is necessary to include requirements that address personnel qualifications, assignments, medical fitness, operational procedures, generally and by diving mode, equipment, and record keeping. The approach has been to develop a standard which, based on the record, promotes employee safety and health by providing for safe and healthful working conditions, so far as possible, which are technically correct, technologically, and economically feasible.

3.0 Definitions and Terms

As used in the procedure, the listed terms are defined as follows:

TERM	DEFINITION
acfm	Actual cubic feet per minute.
AlternateDiving Supervisor	Alternate designated, in writing, by the Project Manager to act on behalf of the Project Diving Supervisor.
ASME Code or equivalent	ASME (American Society of Mechanical Engineers) Boiler and Pressure Vessel Code, Section VIII, or an equivalent code which the employer can demonstrate to be equally effective.
ATA	Atmosphere absolute.
Bell	An enclosed compartment, pressurized (closed or open bell), which allows the diver to be transported to and from the underwater work areas and which may be used as a temporary refuge during diving operations.
Bottom time	The total elapsed time measured in minutes from the time the diver leaves the surface in descent to the time that the diver begins ascent.
Bursting pressure	The pressure at which a pressure containment device would fail structurally.
Circle line search	Descending line leading to a clump with a second line attached used by divers to rapidly search small areas.
Cylinder	A pressure vessel for the storage of gases.
Decompression table	A profile or set of profiles of depth-time relationships for ascent rates and breathing mixtures to be followed after a specific depth-time exposure or exposures.
Dive location	A surface or vessel from which a diving operation is conducted.
Dive-location reserve breathing gas	A supply system of air or mixed-gas (as appropriate) at the dive location which is independent of the primary supply system and sufficient to support divers during the planned decompression.
Dive team	For U.S. Navy contract diving operations, a dive team will consist of a minimum of four ECC personnel, including a Project Diving Supervisor, who are assigned to diving duty in writing by the cognizant Group Director. The dive team members are required to be graduates of an approved U.S. Navy or Commercial Diving Course of Instruction. The Project Diving Supervisor must be knowledgeable of diving and the diving assignment involved.
Diving Supervisor	Person in charge of diving operations. May be the Project Diving Supervisor or the Alternate Diving Supervisor.
Diving Time/Water Time	Time spent in or underwater while engaged in a diving operation. Diving time shall start at the time the diver enters the water and ends when the diver exits the water and returns to the pier, diving boat, or diving platform.
Diving Training	Diver training prescribed by the Project Diving Supervisor in order to maintain diver proficiency.
Diver Orientation	Diver orientation shall be scheduled by the Project Diving Supervisor in order to familiarize or train diver personnel on new or unfamiliar technical functions to be performed by the dive team.
Diving Mode	A type of diving requiring specific equipment, procedures and techniques (SCUBA, surface-supplied air).
ECC	Environmental Chemical Corporation

TERM	DEFINITION
fsw	Feet of sea water (or equivalent static pressure head).
Heavy gear	Diver-worn deep-sea dress including helmet, breastplate, dry suit, and weighted shoes.
Hyperbaric condition	Pressure conditions in excess of surface pressure.
Jack-stay search	Two clumps with descending lines and a line of a specified length connecting the clumps used by divers to systematically and thoroughly search large areas.
Live boating	The practice of supporting a surface-supplied air or mixed-gas diver from a vessel which is underway.
Mixed-gas diving	a diving mode in which the diver is supplied in the water with a breathing gas other than air.
No-decompression limits	The depth-time limits of the "no-decompression limits and repetitive diving group designation table for no-decompression air dives", U. S. Navy Diving Manual or equivalent limits which the employer can demonstrate to be equally effective.
Post-Dive preparation time	Time spent in the breakdown, cleaning, preservation, and maintenance of diving equipment upon completion of a diving operation.
Pre-Dive preparation time	Time spent by diver personnel preparing diving equipment for a diving operation.
psi(g)	pounds per square inch (gauge).
Recompression chamber	A pressure vessel for human occupancy such as a surface recompression chamber, closed bell, or deep diving system used to decompress divers and to treat decompression sickness.
SCUBA diving	A diving mode independent of surface supply in which the diver uses open circuit self-contained underwater breathing apparatus.
Standby diver	A diver at the dive location available to assist a diver in the water.
Project Diving Supervisor	The Project Diving Supervisor must be knowledgeable of diving operations in general and all specific diving assignments involved. He is assigned in writing by the ECC and is responsible for the safe and efficient operation of all diving functions at the location to which he is assigned.
Surface-supplied air diving	A diving mode in which the diver in the water is supplied from the dive location with compressed air for breathing.
Treatment table	A depth-time and breathing gas profile designed to treat decompression sickness.
Umbilical	The composite hose bundle between a dive location and a diver which supplies the diver with breathing air, communications, power, or heat as appropriate to the diving mode or conditions, and includes safety line between the diver and the dive location.
Underwater stage	A suspended underwater work platform which supports a diver in the water.
Volume tank	A pressure vessel connected to the outlet of a compressor and used as air reservoir.
Working pressure	The maximum pressure to which a pressure containment device may be exposed under standard operating conditions.

4.0 Personal Qualifications

In the diving industry, employee qualifications are critical to safety and health. Lack of adequate training and experience has been one of the most frequent contributing causes to diving accidents and injuries. Establishing basic criteria for experience and training of participants in diving

operations can maximize employee safety and health.

All ECC diving team members (i.e., divers and support employees involved in diving operations, including the designated person-in-charge), must have experience or training in the use of tools, equipment, systems, techniques, operations and emergency procedures which pertain to their assigned tasks and diving mode (SCUBA). In addition, dive team members who are exposed to or control the exposure of others to hyperbaric conditions must be trained in diving-related physics and physiology. An understanding of the effects of pressure on gases and the physiological effects of diving on humans are equally important to an understanding of diving related physics and the safety requirements involved. Training in diving related physics is therefore specifically required and mandatory for ECC personnel assigned to diving functions.

The level of experience or training required for ECC diving personnel depends upon the particular function an employee fulfills on the dive team and the diving mode to which the employee is assigned. For example, a tender employed in shallow air diving would be required to have an understanding of the breathing air system, the operating procedures, the emergency procedures that pertain to this mode and the associated equipment.

For the purposes of this SOP, ECC personnel who perform diving operations must be graduates of a formal U. S. Navy or commercial diving school or as a minimum, be certified in SCUBA. OSHA has determined that requiring all dive team members to be trained to handle basic trauma and breathing emergencies offers the broadest possible protection to the greatest number of personnel. An approved CPR/First aid standard course or equivalent training is specified, with re-certification as a requirement.

5.0 Personnel Requirements and Qualification of Dive Team

The Diving Team organization shall be established in writing and approved by the ECC Program Manager.

5.1 General

Each dive team member shall be a graduate of an approved U. S. Navy or commercial diving course of instruction and certified in SCUBA and/or surface supplied air systems and have the experience or training necessary to perform this assigned tasks. This experience training shall include:

- If engaged in UXO operations divers shall also be a graduate of the U. S. Navy Explosive Ordnance Disposal School.
- The use of tools, and operation and maintenance of equipment and systems relevant to

assigned tasks
- Techniques of the assigned diving mode
- Diving operations and emergency procedures
- Task to be accomplished (to include purpose and function)

All dive team members shall be trained and maintain qualification in cardiopulmonary resuscitation (CPR), mechanical resuscitation, and first aid as defined by OSHA.

The SSHO shall establish a medical file for each ECC diver.

5.2 Assignments

Each dive team member shall be assigned tasks in accordance with the employee's experience or training, except that limited additional tasks may be assigned to an employee undergoing job orientation; provided that these tasks are performed under the direct supervision of an experienced dive team member. The employer shall not require a dive team member to be exposed to hyperbaric conditions against the employee's will, except when necessary to complete decompression or treatment procedures.

The Project Dive Supervisor shall not permit a dive team member to dive or be otherwise exposed to hyperbaric conditions for the duration of any temporary physical impairment or condition which is known to the employer and is likely to affect adversely the safety or health of a dive team member.

5.3 Project Diving Supervisor/Alternate Diving Supervisor

The Project Manager shall assign the Project Diving Supervisor and Alternate Diving Supervisor in writing. The Project Diving Supervisor is responsible for ensuring accordance with the provisions of this SOP, the SSHP, and the Work Plan. The Alternate Diving Supervisor is in charge of all aspects of the diving operation affecting the safety and health of dive team members when it is necessary for the Project Diving Supervisor to leave the site for any reason or to dive in order to resolve a project problem or perform a QC function.

The Project Diving Supervisor/Alternate Diving Supervisor shall be responsible for all diving operations, described herein, and shall terminate any operation when, in his opinion, it is considered unsafe to continue. The Diving Supervisor shall:

- Schedule required job orientation training for each new diving task, SCUBA, equipment maintenance and preventative maintenance on all diving equipment.
- Ensure that all safety precautions are carried out by direct observation and inspection of diving equipment, maintenance and diving procedures.

- Establish Emergency Plans.
- Determine the qualifications and proficiency of all personnel and permit NO dive to be made by any person not qualified to make such a dive.
- Determine the equipment requirements for all diving operations and ensure that adequate means are taken to make such equipment available at the scene.
- Plan the diving operation considering the job requirements, equipment and personnel available, and condition of the diving operation area.
- Ensure that the Diving Supervisor's Checklists, are completed and adhered to for all diving operations including training.
- Shall act as timekeeper and maintain the dive log.

5.4 UXO Diving Specialists

The project UXO Diving Specialists will be trained and experienced divers and UXO technicians. Their project responsibilities include:

- Shall have the knowledge and experience to perform the task at hand
- Will be a graduate of a Navy diving school or graduate of a commercial diving school or a certified civilian SCUBA diver
- May act as tender for other divers
- Notify the Diving Supervisor of any symptoms that may be construed as diving sickness
- Maintain a personnel dive log
- Maintain personnel diving equipment.

6.0 Pre-Dive Procedures

6.1 General

The Project Diving Supervisor will ensure that all UXO Diving Specialists comply with the contents of this SOP to include Attachments, local instructions, and the following requirements prior to each dive operation, unless otherwise specified.

6.2 Emergency Aid

A list shall be kept at the dive location of the telephone or call numbers of the following:

- An operational recompression chamber (if not at the dive location).

- Accessible hospitals.
- Available physician.
- Available means of transportation.
- First Aid Supplies (available at the dive site)
- A first aid kit appropriate for the diving operation.
- An emergency oxygen kit
- An American Red Cross standard first aid handbook or equivalent.
- A bag-type manual/mechanical resuscitator with transparent mask and tubing shall be available at the dive location.

6.3 Planning and Assessment

Planning of a dive operation shall include an assessment of the safety and health aspects of the following:

- Planned operation and diving mode.
- Surface and underwater conditions and hazards.
- Breathing air supply (including reserves).
- Thermal protection.
- Diving equipment and systems.
- Dive team assignment and physical fitness of dive team members (including any impairment known to the employer).
- Repetitive dive designation or residual air status of dive team members.
- Decompression and treatment procedures (including altitude corrections).
- Emergency procedures.

6.4 Hazardous Activities

To minimize hazards to the dive team, diving operations shall be coordinated with other near by activities. UXO diving operations will be conducted in accordance with the work plan and the SSHP.

6.5 Employee Briefing by Diving Supervisor

Dive team members shall be briefed on:

- The tasks to be undertaken.
- Safety procedures for the diving mode.
- Any unusual hazards or environmental conditions likely to affect the safety of the diving

operation.

- Any modifications to operating procedures necessitated by the specific diving operation.

Prior to making individual dive team member assignments, the Project Diving Supervisor shall inquire into the dive team member's current state of physical fitness, and indicate to the dive team members the procedure for reporting physical problems or adverse physiological effects during and after the dive.

6.6 Equipment Inspection

All equipment will be checked by the divers for proper working order. Any equipment not working as required will be tagged for repair.

6.7 Warning Signal

When diving from surfaces other than vessels in areas capable of supporting marine traffic, a rigid replica of the international code flag "A," at least one meter in height, shall be displayed at the dive location in a manner which allows all-around visibility.

7.0 Procedures During Diving Operations

7.1 General

The Project Diving Supervisor will ensure that UXO Diving Specialists comply with the contents of this SOP to include Appendices, local instructions, and the following requirements prior to each dive operation, unless otherwise specified. The normal depth limit for SCUBA is 130 fsw. All SCUBA divers will observe no-decompression dive limits. A recompression chamber is required on scene for dives, which exceed 100 fsw.

Additional Requirements:

- A Diving Supervisor will be on the scene for all diving operations.
- A life jacket will be worn on all SCUBA dives. The "buddy" system will be used for all SCUBA dives. The only exception to this policy will be when a diver is surface tended by a safety line.
- Prior to the beginning of any diving operation, the location of the nearest recompression chamber will be ascertained and arrangements made for its use in case of an emergency. A recompression chamber shall be immediately available if, in the opinion of the Diving

Supervisor, the depth of the dive and/or working conditions are such as to require it.

- The Diving Supervisor shall ensure that adequate communications (radio or telephone) are established and maintained for emergency assistance. When, in the opinion of the on-scene Diving Supervisor, adequate communications do not exist, diving operations will be secured.
- A portable oxygen (O2) resuscitator shall be present and in proper working order prior to the commencement of any diving operation.
- A means for emergency diver recall will be devised by the Project Diving Supervisor. It must be a distinct, sure method and every diver must be made aware of the system being used. Only Navy approved line pull and hand signals will be employed during diving operations.
- A standby diver will be utilized on all diving operations. He shall be dressed to the point that immediate action can be taken in case of an emergency. OSHA interpretation states that tanks, weight belts, mask or fins need not be worn while standing by. Gear must be ready for immediate donning i.e. harnesses adjusted, regulators attached and air on etc.
- Only standard, Navy-approved diving equipment shall be used on dives conducted by ECC personnel.

The following shall be provided for water entry and exit:

- A diver will never dive without first determining the decompression schedule for the expected depth and bottom time. (See Dive tables in the Navy Diving Manual, Reference 2). Divers will not exceed the limits established by the Diving Supervisor; except in case of emergency as determined by the Diving Supervisor. Dives requiring decompression will be absolutely avoided. Decompression, repetitive, and no-decompression tables (as appropriate) shall be at the dive location. A depth-time profile shall be maintained for each diver during the dive including decompression.

- Pneumatic powered hand-held tools are authorized for use by UXO Diving Specialists in conjunction with underwater operations.

- Water washout or airlift device may be used by UXO Diving Specialists for excavation.

- Electrically powered hand-held underwater camera equipment, hand held locators, communications and underwater lights are the only electrical hand-held equipment authorized for use underwater by UXO Diving Specialists without prior approval.

- Hand-held power tools and equipment shall be de-energized before being placed into or retrieved from the water.

- Hand-held power tools shall not be supplied with power from the dive location until requested by the diver.

- Personnel involved in diving operations should not hesitate to ditch, abandon or destroy gear or equipment if, at any time, such action would, in the divers mind, be the proper course of action for his own safety or the safety of others.

7.2 Termination of Dive

The working interval of a dive shall be terminated when:

- A diver requests termination.
- A diver fails to respond correctly to communications or signals from a dive team member.
- Communications are lost and cannot be quickly re-established between the diver and a dive team member at the dive locations, and between the designated person-in-charge and the person controlling the vessel in live boating operations.
- A diver begins to use diver-carried reserve breathing or the dive location reserve breathing air.

8.0 Diving Emergencies

8.1 Emergencies

In every diving operation, the possibility of an accident occurring must be considered. The need for a prompt, decisive plan of action in an emergency is essential for the safety of all diving personnel. The Diving Supervisor shall mentally formulate courses of action to follow for possible emergencies that could occur prior to and during diving operations. In all emergency situations, **REMAIN CALM**. Use your judgment, experience and available equipment and information carefully, when in doubt, seek assistance quickly.

8.2 Missing Diver

Action is to be taken in the following order:

- Initiate diver recall.
- Mark the last known position of the diver with a buoy to establish a reference point about which searches may be centered. (Lower clump slowly to the bottom)
- Request emergency medical help. Report situation to ECC.
- Conduct an orderly and thorough circle line search expanding outward from the marker buoy.

- Ensure that any diver recovered from the water in an unconscious state is given prompt, effective treatment.

9.0 Post Dive Procedures

The Project Diving Supervisor shall comply with the following requirements, which are applicable after each diving operation, unless otherwise specified.

9.1 Precautions

Check the physical condition of each diver and take the following action:

- Instruct each diver to report any physical problems or adverse physiological effects including symptoms of decompression sickness.
- Advise each diver of the location of a recompression chamber, which is ready for use.
- Alert each diver to the potential hazards of flying after diving.

9.2 Record of Dive

The following information shall be recorded by the Diving Supervisor and maintained for each diving operation in permanent project files.

- Names of dive team members including designated person-in-charge.
- Date, time, and location.
- Diving modes used.
- General nature of work performed and remarks.
- Approximate underwater and surface conditions (visibility, water temperature, and current
- Maximum depth and bottom time for each diver.

9.3 No Decompression Requirement

Divers involved in diving operations shall not be authorized to make any dives to a depth outside the no-decompression limit without prior approval of the Project Diving Supervisor. For each dive outside the no-decompression limits, deeper than 100 fsw, the following additional information shall be recorded and maintained:

- Depth-time profiles.
- Decompression table designation (including modification).
- Elapsed time since last pressure exposure if less than 24 hours

For each dive in which decompression sickness is suspected or symptoms are evident, the following

additional information shall be recorded and maintained:

- Description of decompression sickness symptoms (including depth and time of onset).
- Description and results of treatment.

9.4 Decompression Procedure Assessment

The Project Diving Supervisor shall:

- Investigate and evaluate each incident of decompression sickness based on the recorded information, consideration of the past performance of decompression table used and individual susceptibility.
- Take appropriate corrective action to reduce the probability of recurrence of decompression sickness.
- Prepare a written evaluation of the decompression procedure assessment, including any corrective action taken, within 45 days of the incident of decompression sickness. Written evaluations shall be retained by ECC for a period of five years and then forwarded to OSHA.

10.0 Scuba Diving

10.1 General

SCUBA diving shall **NOT** be conducted under the following conditions:

- Against currents exceeding one knot unless line-tended.
- In enclosed or confined spaces.
- Dives requiring decompression stops.
- To depths deeper than 100 fsw, without prior approval.

10.2 Procedures

A standby diver shall be available while a diver is in the water. A diver shall be line-tended from the surface, or accompanied by another diver in the water in continuous visual contact during the diving operation. A diver-carried reserve breathing air supply shall be provided for each diver consisting of one of the following:

- A manual reserve (J valve).
- An independent reserve cylinder with a separate regulator or connected to the underwater

breathing apparatus.

The valve of the reserve breathing gas supply shall be in the closed position prior to the dive.

10.3 Buoyancy Control

- A dry suit or other buoyancy changing equipment not directly connected to a helmet or mask shall be equipped with an exhaust valve.
- When used for SCUBA diving, a buoyancy compensator shall have an emergency inflation source separate from the breathing air supply.
- An inflatable flotation device capable of maintaining the diver at the surface in a face-up position, having a manually activated inflation source independent of the breathing supply, an oral inflation device and an exhaust valve shall be used for SCUBA diving.

10.4 Weight Belts

- Divers shall be equipped with an approved weight belt or assembly capable of quick release. The weight belt will be worn over any harnesses so that quick release is not encumbered.

10.5 Other Equipment

- A cylinder pressure gauge capable of being monitored by the diver during the dive shall be worn by each SCUBA diver.
- A time keeping device shall be available at each dive location.

11.0 Search Methods

Two search methods will be used. They are:

11.1 Jack-tar

This is the primary search method used to cover large areas. The jack-tar will normally employ two clumps connected to the surface by lines and buoys. The two clumps are connected by a third line, which runs along the bottom. Divers follow this line during the search. Depending on the severity of the current and the equipment carried by the diver(s) the jack-tar may be used cross current or parallel to the current. The diver(s) enter the water and follow the buoy line to the clump. The diver(s) follow the bottom line to the other clump. Upon reaching the clump the diver(s) move the clump, raising the line clear of the bottom while keeping taunt, and reposition it in the direction of search;

The diver(s) reverse course and return to the first clump repeating the above procedures. This method gives an overlap that ensures totally coverage. Diver(s) location is known by USBL diver positioning system.

11.2 Circle Line

This search method is used to located items underwater when the item can be pin pointed on the surface. A single clump attached to a buoy line is lowered to the bottom. A second line of a specified length is attached to the clump. The divers use this line to circle around the clump at increasing or decreasing radii while searching. This method can be utilized to reacquire single targets previously electronically positioned.

12.0 Record Keeping Requirements

12.1 Recording and Reporting

The SSHO will record and report occupational injuries and illnesses

12.2 Availability of Records

ECC shall make available for inspection and copying any record or document required by Reference 1. Upon request of any employee, former employee or authorized representative, ECC shall make available for inspection and copying any record or document required by Reference 1, which pertains to the individual employee or former employee.

Records and documents required shall be retained by ECC for the following period:

Dive team member medical records
(physician's reports) - 5 years.
Safe Practices Manual - current document only.
Depth-time profile - until completion of the recording of dive, or until completion of decompression procedure assessment where there has been an incident of decompression sickness.
Recording of dive - 1 year, except 5 years where there has been an incident of decompression sickness.
Decompression procedure assessment evaluations -years.
Equipment inspections and testing records - current entry or tag, or until equipment is withdrawn from service.

Records of hospitalization - 5 years.
After the expiration of the retention period of any record required for 5 years ECC shall forward such records to the National Institute for Occupational Safety and Health, Department of Health and Human Services.

GENERAL PLANNING CHECKLIST

1. STEPS IN PLANNING DIVING OPERATIONS

a. Analyze the mission for safety.

Advanced planning is the greatest single safety precaution that can be taken. The following points must be considered individually and in depth:

(1) Objective definition
(2) Environmental conditions
(3) Emergency assistance (Recompression chamber and medical assistance)
(4) Route familiarization for all personnel
(5) Relevant instructions

b. Pin-point potential hazards.

c. Natural hazards.

(1) Atmospheric
_____ Extreme exposure of personnel to elements
_____ adverse exposure of equipment and supplies to elements
_____ Delays or disruption caused by weather

(2) Surface
_____ Sea sickness
_____ Water entry and exit
_____ Handling of heavy equipment in rough seas
_____ Maintaining location in tides and current
_____ Ice, flotsam, kelp, petroleum disrupting operations
_____ Delays or disruption caused by sea state

(3) Underwater and Bottom
_____ Depth exceeds diving limits or limits of available equipment (see paragraph 9.4)
_____ Exposure to cold temperatures
_____ Bottom obstructions
_____ Dangerous bottom conditions (mud, drop-offs, sewer outfalls, etc.)

(4) "On-site" Hazards
_____ Local marine traffic
_____ High powered, active sonar
_____ Other conflicting marine operations
_____ Radiation contamination
_____ Pollution

(5) Mission Hazards
_____ Decompression sickness
_____ Communications problems
_____ Drowning
_____ Other trauma (injuries)

(6) Other Hazards
_____ Entrapment
_____ Entanglement
_____ Pollution, toxic
_____ Explosives or other ordnance
_____ Shifting or "working" of object

d. Minimize hazards and plan for emergencies.

(1) Diving Personnel
(a) _____ Assign a complete and properly qualified Diving Team
(b) _____ Assign the right man to the right task
(c) _____ Verify that each member of the Diving Team is properly trained and qualified for the equipment and depths involved.
(d) _____ Determine that each man is physically fit to dive, paying attention to:
_____ General condition
_____ Last record of medical exam
_____ Ears and sinuses
_____ Severe cold or flu
_____ Use of stimulants or intoxicants
_____ Fatigue
(e) _____ Determine each man's emotional fitness to dive (as far as possible):
_____ Motivation (willingness)
_____ Stability

(2) Diving Equipment

(a) _____ Verify that the type of diving gear chosen (and diving technique) is adequate for the mission and particular task

(b) _____ Verify that the type of equipment and diving technique is proper for the depth involved

(c) _____ Verify that all equipment has been tested and approved

(d) _____ Determine that all necessary support equipment and tools are readily available and are the best for accomplishing the job efficiently and safely

(e) _____ Determine that all related support equipment such as winches, boats, cranes, floats, etc., are operable, safe, and under the control of trained personnel

(f) _____ Check that all diving equipment has been properly maintained with appropriate records, and is in full operating condition

(3) Provide for Emergency Equipment

(a) _____ Obtain suitable communications equipment with sufficient capability to reach "outside help". Check all communications for proper functioning

(b) _____ Verify that a recompression chamber is ready for use, or notify the nearest command having one that its use may be required within a given time frame

(c) _____ Verify that a First Aid Kit is near at hand, and is completely stocked

(d) _____ If oxygen will be used as standby first aid, verify that the tank is full, properly pressurized, and that all masks, valves and other accessories are fully operable

(e) _____ If a resuscitator will be used, check the apparatus for function

(f) _____ Check that all fire-fighting equipment is readily available and in full operating condition

(g) _____ Verify that Emergency transportation is either standing by, or on immediate call

(4) Establish Emergency Procedures

(a) _____ Know how to obtain medical assistance immediately

(b) _____ Assign specific tasks to the Diving Team and support personnel for different emergencies

(c) _____ Develop and post the emergency assistance checklist, and ensure that all personnel are familiar with it

(d) _____ Verify that a copy of the U. S. Navy Decompression Tables is available and up-to-date

(e) _____ Be sure that all divers, boat crews, and other support personnel understand all diver hand signals

(f) _____ Pre-determine distress signals and call-signs with all members of the diving team, boat crews, and other activities

(g) _____ Be sure that all divers have removed anything from their mouths which might choke them during a dive (gum, dentures, tobacco)

(h) _____ Thoroughly drill and train all personnel in Emergency Procedures,
with particular attention to cross-training. Drills should include:
Emergency Recompression
Fire
First Aid
Rapid Dressing
Embolism
Restoration of Breathing
Drowning
Electric Shock
Entrapment

e. Establish Safe Diving Operational Procedures.

(1) _____ Determine that all other means of accomplishing the mission have been considered before deciding to use divers.

(2) _____ Be sure that contingency planning has been conducted.

(3) _____ Carefully state the goals of each mission, and develop a flexible plan of operations.

(4) _____ Completely brief the Diving Team and support personnel.

(5) _____ Designate a properly qualified Diving Supervisor to be in charge of the mission.

(6) _____ Designate a timekeeper and verify that he understands his duties and responsibilities.

(7) _____ Determine the exact depth at the job-site through the use of a lead line or fathometer.

(8) _____ Verify the existence of an adequate supply of compressed air available for all planned diving operations plus an adequate reserve

for emergencies.

(9) _____ Be sure that operations or action on the part of the Diving Team, support personnel, boat crews, technicians, winch/crane operators, etc., do not start without the knowledge and direct command of the Diving Supervisor.

(10) _____ All efforts must be made through proper planning, briefings, training, organization and other preparations to minimize "bottom-time". Remember in all cases, water depth and the condition of the diver (especially fatigue) rather than amount of work to be done shall govern the diver's bottom time.

(11) _____ Decompression tables shall be on hand, be up-to-date, and be used in all planning and scheduling of diving operations.

(12) _____ Instruct all divers and support personnel not to cut any lines until that action is approved by the Diving Supervisor.

(13) _____ Be sure that the ship, boat, or diving craft is securely moored and in position to permit the safest and most efficient operation (except in the case of emergency and critical ship repairs).

(14) _____ Verify that, when using surface-supplied techniques, that the ship, boat, or diving craft is in at least a two-point moor.

(15) _____ Ensure that, when conducting SCUBA operations, the boat can be quickly cast off and moved to a diver in distress.

(16) _____ Ensure that each diver checks his own equipment in addition to checks made by tenders, technicians, or other support personnel.

(17) _____ Designate a standby diver for all surface-supplied operations, and check that the standby diver is dressed and ready to enter the water if needed.

(18) _____ Assign buddy divers for all SCUBA operations.

(19) _____ All efforts should be made to prevent divers from being fouled on the bottom. If work is to be conducted inside a wreck or similar underwater structure, designate a team of divers to accomplish the task. One diver will enter the wreck, the other shall tend his lines from the point of entry.

(20) _____ When using explosives, take appropriate measures to ensure that no charge will be fired while divers are in the water.

(21) _____ Brief all divers on the planned decompression schedules for each particular dive. Check provisions made for decompressing diver.

(22) _____ Verify that the ship, boat or diving craft is displaying the proper signals, flags, or lights to indicate diving operations are in progress.

(23) _____ Ensure that proper protection against harmful marine life has been

provided. If marksmen are used to protect against sharks, verify that they do not have automatic weapons.

(24) _____ Check that the quality of diver's air supply is periodically and thoroughly tested to ensure purity.

(25) _____ Thoroughly brief the boat crew using the Diving Boat Operations Checklist.

(26) _____ Verify that proper safety and operational equipment is aboard small diving boats or craft.

f. Notify proper parties that dive operations are ready to commence.

(1) Area personnel to be notified if applicable.
- (a) _____ Port Operations
- (b) _____ Commanding Officer of ship or submarine
- (c) _____ Ships Officer of the Deck/Day
- (d) _____ Ships Diving Officer
- (e) _____ Commanding Officer of ships alongside

(2) Notify ship's bridge to ensure that ship's personnel do not:
- (a) _____ Turn propeller or thrusters
- (b) _____ Get underway
- (c) _____ Drop heavy items overboard
- (d) _____ Shift the moor
- (e) _____ Operate rudder or control mechanisms
- (f) _____ Activate sea discharge or suctions

(3) Notify Submarine Duty Officer, to ensure that submarine personnel will not: (see Attachment D)
- (a) _____ Activate sea discharge or suction
- (b) _____ Operate bow or stern-planes or rudder
- (c) _____ Operate vents or torpedo shutters
- (d) _____ Operate active sonar or other electronics
- (e) _____ Turn propellers

(4) Notify other interested parties:
- (a) _____ Local Dock master, military or civilian
- (b) _____ Command Duty Officers
- (c) _____ Officers in Tactical Command

(d) _____ Cognizant Navy Organizations

(e) _____ U. S. Coast Guard (if broadcast warning to civilians is required).

(f) _____ Army Corps of Engineers (if applicable)

(5) _____ If deemed necessary by the Project Diving Supervisor, notify emergency facilities having recompression chambers, as well as sources of Emergency Transportation that Diving Operations are under way and their assistance may be needed.

DIVING SUPERVISOR CHECKLIST

This checklist will be completed each diving day by the Project Diving Supervisor.

Diving Supervisor (Name)_____

2. Alternate Diving Supervisor (Name)_____

3. Location of Diving Operations (Site)_____

4. Purpose of Dive_____

5. Notify Local Dockmaster_____

6. Notify Duty Recompression Chamber (If applicable)_____

7. Weather_____

8.Conditions_____

Sea State_____

Wind Direction_____

High Tide_____

Visibility_____

Current_____

Sunset_____

Wind Speed_____

Low Tide_____

9. Ensure that equipment listed below is readily available at diving site:

a.Depth Gauges (Each Diver)_____

b.Bottle Gauges_____

c.Stop Watch_____

d.Compass_____

e.Recall Device_____

f.Pencils and Paper_____

g.Flares_____

h.Diving Manual_____

i.Rough Dive Log_____

j.CO^2 Cartridges_____

k.Charts of Area_____

l.Watches (each Diver)_____

m.First Aid Kit_____

_____
Diving Supervisor

DIVING SUPERVISOR'S CHECKLIST FOR DIVING BOAT OPERATIONS

All personnel involved in the operation of diving boats, launches, barges, floats, and other types of secondary small craft shall be briefed and must understand the following safety precautions.

1. Inspect the specified boat or craft and determine its suitability for the intended mission and operating environment; ensure that:
   _____ Boat (craft) is sound, and seaworthy.
   _____ Power plant is running well and fully tested.
   _____ Required safety and running equipment is onboard and in workable condition.
   _____ Proper gear for diving operation is onboard and operational.
   _____ The assigned boat crew is fully qualified to operate that particular craft.

2. Know the details of the Emergency Assistance Checklist. Make sure it is completely filled out for small craft operations, with a legible copy placed onboard.

3. Inspect all communications gear, radios, CB units, underwater communications, power sources, walkie-talkies and ensure that they have been fully tested and are operational.

4. Determine that all non-powered communication equipment (flags, sounds signals, flares, etc.) are onboard, are complete and are operational.

5. Know all pre-determined signals, proper call signs, etc.

6. Know all routine and emergency signals (for divers).

7. Determine that adequate and safe mooring equipment is onboard and personnel are familiar with proper mooring techniques.

8. Know who is in charge of the boat and responsible for giving orders to "Stop" and "Start". Orders to commence boat operations that affect divers are given only by the Diving Supervisor.

9. Before getting underway, check with the Diving Supervisor for:
   _____ An "all aboard" head count
   _____ His approval that all diving equipment lines, safety equipment, etc., are onboard.

10. Plans for various Boat Handling Procedures during Diving Operations to include:
    _____ Dropping off of divers (On small drop off both sides

_____ Picking up divers
_____ Towing divers
_____ Getting underway in an emergency have anchors lines attached to buoys
_____ Positioning boat in a: 2 point moor 4 point moor
_____ Handling of divers lines during descent, ascent, hanging-off, raising or lowering tools and gear drop-off/pick-up.
_____ Setting/retrieving of buoy markers
_____ Moving or towing of platforms, rafts, rubber boats, search sleds, etc.

11. Ensure that stowage of diving supplies and gear does not block access to:

_____ Fire Extinguishers
_____ Life Preservers
_____ Ground tackle
_____ Engine spaces
_____ Communication gear
_____ Bilge pump or switch
_____ Boat hook
_____ Heaving line
_____ Emergency Lights
_____ Flares
_____ First Aid Kit
_____ Diving platform

12. Know these general safety precautions that apply to Boat Operations:

_____ Place all intakes for the diving air compressor upwind of engine or auxiliary power plant exhausts
_____ Ensure safety of the boat
_____ Handling gasoline, or other dangerous material
_____ Shoring and handling of heavy equipment
_____ Securing gear for heavy weather
_____ Cutting or other operations involving fire
_____ When divers are in the water:
(1) Do not change moor if attached to divers
(2) Do not set anchors
(3) Do not drop heavy items overboard
(4) **NEVER START ENGINES WHEN DIVERS ARE ALONGSIDE OR DIRECTLY UNDER BOAT**

13. The Diving Supervisor shall ensure that the below listed equipment is ready and available for each Diving Boat Operation:

_____ Boat Tool Box
_____ Binoculars
_____ SCUBA Bottles

_____ Standby Bottle
_____ Water Jug
_____ First Aid Kit
_____ Portable O2 Resuscitator
_____ Tools required for job
_____ Bullhorn
_____ Circle Line/Snaphooks
_____ Anchors & lines
_____ Descent Line & Clumps
_____ Radio_____ Frequency
_____ Diving flags
_____ U/W Dive lights
_____ Ladder
_____ Outboard Motor oil
_____ Emergency motor
_____ Gas Cans
_____ Paddles
_____ Marker Buoy & Line

14. The Diving Supervisor shall ensure that the information contained in a through d below is recorded in the Diving Log:
    a. Time Departed Pier _____
    b. Time Commenced Dive _____
    c. Time Completed Dive _____
    d. Time Returned Pier _____
    e. Notify Local Dockmaster Upon Completion _____(if appropriate)

EMERGENCY ASSISTANCE CHECKLIST

This enclosure will be filled out with the appropriate information prior at the start of any diving operation conducted by **ECC** personnel.

RECOMPRESSION CHAMBER

LOCATION

CONTACT

RESPONSE TIME

FIRST AID KIT

LOCATION

CONTACT

RESPONSE TIME

AIR TRANSPORTATION

LOCATION

CONTACT

RESPONSE TIME

LAND TRANSPORTATION

LOCATION

CONTACT

RESPONSE TIME

SEA TRANSPORTATION

LOCATION

CONTACT

RESPONSE TIME

DIVING UNITS

LOCATION

CONTACT

RESPONSE TIME

HOSPITALS

LOCATION

CONTACT

LOCATION

CONTACT

RESPONSE TIME

RESPONSE TIME

DIVING MEDICAL OFFICER

_____
LOCATION

_____
CONTACT

_____
RESPONSE TIME

The following organizations are qualified to answer questions and give advice 24 hours a day on diving related medical problems. These organizations also maintain active hyperbaric chambers:

Closest hyperbaric chamber

b. U. S. Navy Experimental Diving Unit (EDU) telephone commercial 904-234-4351 or autovon 436-4351.

c. Divers Alert Network (D.A.N.)
Duke University, Durham, North Carolina telephone
commercial 919-684-8111 or 919-684-2948.

PERSONAL DIVE EQUIPMENT

SCUBA

1. Wet suit, if required
2. Booties/coral shoes
3. Gloves
4. Hood
5. Fins
6. Spare Fin Straps
7. Face mask
8. Spare Mask Strap
9. Buddy line
10. Weight belt
11. Work gloves
12. Whistle
13. Life Jacket - weigh CO2 cylinders (report status to the Diving Supervisor)
14. Regulator
15. Knife
16. Gauge - SCUBA bottles (report psig to the Diving Supervisor)
17. Protective clothing
18. Depth Gauge
19. Wristwatch

APPROVED LINE PULL SIGNALS

LINE PULL SIGNALS - Line Pull Signals should be distinct pulls on the line which are strong enough to be felt by the diver but not strong enough to pull the diver away from the work. Acknowledgment consists of replying with the same signal. If a signal is not acknowledged, the signal should be re-sent. Continued absence of confirmation must be assumed to mean one of three things:

The line is fouled.
Too much slack.
Diver in Trouble.

If communication is lost, the Diving Supervisor will take immediate steps to identify the problem.

From Tender to Diver:

1 Pull	"Are you Alright?" When diver is descending, one pull means "STOP".
2 Pulls	"Going down" During ascent, 2 Pulls means "You have come up too far, go back down until we stop you"
3 Pulls	"Standby to come up"
4 Pulls	"Come up"
2-1 Pulls	"I understand" or "Answer the telephone"
3-2 Pulls	"Ventilate"
4-3 Pulls	"Circulate"

From Diver to Tender:

1 Pull	"I am Alright" When diver is descending, one pull means "STOP" or "I am on the bottom"
2 Pulls	"Lower" or "Give me Slack"
3 Pulls	"Take up my slack"
4 Pulls	"Haul me up"
2-1 Pulls	"I understand" or "Answer the telephone"
3-2 Pulls	"More Air"
4-3 Pulls	"Less Air"

Special Signals from the Diver:

1-2-3 Pulls	"Send me a square mark"
5 Pulls	"Send me a line"
2-1-2 Pulls	"Send me a slate"

Searching Signals - Without Circling Line:

7 Pulls	"Same"
1 Pull	"Same"
2 Pulls	"Move away from the weight"
3 Pulls	"Face the weight and go right"
4 Pulls	"Face the weight and go left"

Emergency Signals from the Diver:

2-2-2 Pulls	"I am fouled and need the assistance of another diver"
3-3-3 Pulls	"I am fouled but can clear myself"
4-4-4 Pulls	"Haul me up immediately"

All Emergency Signals will be answered as given, EXCEPT 4-4-4.

DIVE LOG SHEET ___ OF___

DATE:_____ LOCATION_____

DIVE SUPERVISOR:
MODE:
DIVE #

S B DIVER						

REMARKS:_____
DIVE #

S B DIVER						

REMARKS:_____ **DIVE #**

S B DIVER						

REMARKS:
DIVE #_____

First Aid for Injuries Requiring Immediate Transport to a Chamber Facility

AIR EMBOLISM

Recognition - Usually occurs during or immediately after surfacing

Symptoms (one or more of the following)

- Disorientation
- Chest Pain
- Paralysis or Weakness
- Dizziness
- Blurred Vision
- Personality Change

Signs (one or more of the following)

- Bloody froth from nose or mouth
- Paralysis or Weakness
- Unconsciousness
- Convulsions
- Stopped Breathing
- Apparent Death

Early Management

- CPR, if required
- Open airway, prevent aspiration, incubate if trained person available
- Give O^2, remove only to open airway or if convulsion ensue
- If conscious, give nonalcoholic liquids
- Place in horizontal, neutral position
- Restrain convulsing person loosely and resume O^2 as soon as airway is open
- Protect from excessive cold, heat, water, or fumes
- Contact David Grant Medical Center, Travis AFB, CA for transport, send diver=s profile with the diver, and send all diving equipment for examination or have it examined locally

DECOMPRESSION SICKNESS

Recognition - Symptoms usually appear 15 minutes to 12 hours after surfacing

Signs

- Blotchy Rash
- Paralysis or weakness anywhere in the body
- Coughing Spasms
- Staggering or instability
- Unconsciousness
- Personality change

Symptoms

Tired Feeling
Itching
Pain, arms, legs or trunk
Dizziness
Numbness, tingling or paralysis
Chest compression or shortness of breath
Anything unusual after the dive

Early Management
Stabilize patient the same way as for Air Embolism
Contact David Grant Medical Center, Travis AFB, CA for transport, send diver=s profile with the diver, and send all diving equipment for examination or have it examined locally
Immediate oxygen breathing, continue even if person improves markedly

First Aid for Injuries Requiring Transport to a Hospital Facility

PNEUMOTHORAX

Symptoms
Pains in the chest
Shortness of breath

Signs
Shallow Rapid Breathing
Cyanosis (blue skin, lips, fingernails)
Possible crackling under the skin of the neck
Possible mediastinal shift (heart sounds not in the usual place)

Treatment
Call for help and immediate transport

MEDIASTINAL EMPHYSEMA (Lung over pressure accident)

Recognition - Always associated with pneumothorax
Symptoms
Pain in the chest (beneath the breastbone)
Faintness
Shortness of breath

Signs
Obvious difficulty breathing
Brassy change in voice

Treatment

Oxygen (O^2)
Transport to medical facility for evaluation
Should be seen by physician and observed for 24 hours
No chamber recompression needed unless associated with air embolism or DCS

DROWNING - NEAR DROWNING

Recognition

Unconsciousness
Lack of respirations
Cyanosis (blue skin, lips, fingernails)

Management

Try to identify the time the victim was last seen breathing
Start CPR, removal of gear and in water transport to the boat or shore
Immediate call for help and transport to facility
Assess ABC=s airway, breathing and circulation
Clear airway
Chest compression if no carotid pulse felt
Continue rescue breathing begun in the water
Oxygen
Consider the possibility of concurrent hypothermia (low body core temperature)
Call for help (911) and immediate transport

OXYGEN TOXICITY (WITH CONVULSIONS)

Signs

Decreased or loss of consciousness; followed by
Convulsions

Symptoms

Nausea
Dizziness
Ringing in the ears
Abnormal Vision
Confusion

Prevention

Avoidance of gases with high O^2 concentrations (as in Nitrox at inappropriate depth)
Avoid CO^2 retention which can precipitate O^2 convulsions at any depth
If convulsions occur at depth, be prepared to treat near drowning and/or air embolism
TREATMENT - Call for help and immediate transport

SEVERE TRAUMA OR LARGE PREDATOR INJURY (Head Injury, Limb Injury due to falls, Equipment Crush, Prop Injuries)

- Call for help and immediate transport
- Open Airway
- Treat for shock on site and stabilize before evacuation
- Face up neutral position
- Direct pressure over bleeding wounds
- CPR if no pulse or respiration
- Keep warm
- Be mindful of the possibility of neck injury
- O^2 if any question of hypoxemia (Low oxygen in the blood)
- Splint limb injuries
- Call for help and immediate transport

SUSPECTED HEART ATTACK OR STROKE

- Call for help and immediate transport
- Treat for shock
- CPR if no pulse or respirations
- Keep warm
- Oxygen
- Call for help and immediate transport

SEVERE ALLERGIC REACTION

- Remove any remnant of allergen (i.e., jellyfish tentacles, foreign material)
- Wash out wounds of injury with alcohol, vinegar, or sea water
- Call for help and immediate transport
- Treat for shock
- CPR if no pulse or respiration
- Keep warm
- Oxygen
- Pain Relief, if available
- Transport to medical facility for evaluation

STINGING FISHES (Stingrays, Scorpionfish)

- Immobilize
- Remove spine and debride (scrub the wound)
- Irrigate wound
- Soak in hot water (thermolabile toxin) 50° C, for 30-90 minutes
- Call for help and immediate transport
- Treat for shock, hydrate

HYPOTHERMIA

Keep core temperature above 95° F
Keep airway open
Immobilize
Wrap in blankets, preferably next to another person
Basic life support, CPR, if needed
Warm liquids, if alert, unless very cold - then avoid due to possibility of ventricular tachycardia (rapid, useless fluttering of the heart)
Avoid O^2 due to the cooling effect, unless the O^2 is humidified and warm
Call for help and immediate transport

HYPERTHERMIA (Heat Exhaustion due to excessive fluid loss)

Remove from source of heat
Lower temperature (cool compresses at arterial points and head)
Keep calm
Keep airway open
Give salt (1 tsp/8 oz. water)
If stable, transport to medical facility for evaluation
Call for help and immediate transport if unstable

HEAT STROKE

Remove all clothing
Cover with cool wet sheet
Place in air-conditioned area
Oxygen
Cold packs to neck, scalp, groin and armpits
Treat convulsions if they occur
Call for help and immediate transport

First Aid for Injuries That Can Be Treated On Board

NITROGEN NARCOSIS

<u>Signs</u>

Inappropriate behavior at depth
Ignoring hand signals and instructions
Stupor or coma

<u>Symptoms</u>

Inflexible thinking and attitude
< Decrease or loss of judgement

- < False sense of security
- < Lack of concern for safety
- < Inability to think through problems
- < Panic

Near unconsciousness or loss of consciousness at depth

Treatment

Ascend until free of symptoms
Surface with controlled ascent
Transport to medical facility for evaluation

CARBON DIOXIDE POISONING

Symptoms

Rapid breathing
Feeling of suffocation or shortness of breath
Headache, nausea, dizziness
Rapid heartbeat
Confusion and unclear thinking

Signs

Slowed responses
Muscle irritability (twitching)
Loss of consciousness

Treatment

Remove the cause (over-exertion, equipment failure, rebreathers, etc.)
Stop and rest during early symptoms to avoid loss of consciousness
Surface, Transport to medical facility for evaluation

EAR DISORDERS

Middle Ear Barotrauma

Keep quiet and calm
Without dcs or rupture of the round or oval windows, give
Benadryl 25 mg po
Transport to medical facility for evaluation
Discontinue diving until cleared by EMT

Inner Ear Barotrauma

Recognize round or oval window damage (loss balance, ataxia, timitus, deafness)
Keep head up and affected ear elevated
Discourage straining
Transport to medical facility for evaluation

EMT evaluation, no more diving until cleared by EMT

SEA SICKNESS

The best medications have been found to be AMeclizine@, ABonine,@ Dramamine and Trans-derm Scope. There are pharmacists who will make your Ascope@ patches.
Keep your eyes on the horizon
Stay on deck
Keep yourself well hydrated with non-alcoholic beverages
Try antacid tablets or lemon drops
If diving, try to be the first diver in from a heaving boat

Hazardous Marine Life Injuries Not Requiring Immediate Transport

CORAL AND BARNACLE CUTS

Stop bleeding
Clean well with a brush, soap and water
Alcohol or vinegar flush
Scrub and debride foreign particles
Bed rest, elevation, antibiotics for severe cuts
Be aware of danger of anaerobic infection and clostridial infection
Transport to medical facility for evaluation

COELENTERATE INJURY (fire coral, hydroids, jellyfish, sea wasps, sea anemones)

Injury all caused by nematocysts
Flush with alcohol or vinegar or dilute household ammonia (1:3 water)
Flush with saline or sea water, no fresh water
Meat tenderizer
Transport to medical facility for evaluation
Be aware of possible severe systemic reactions

ECHINODERMS (Sea Urchins)

The small black dots may not be the tips of the spines but dye and will eventually be absorbed by the body
Hot water for 30 minutes
Do not beat or pound the part to Acrush@ the spines
Transport to medical facility for evaluation

33.0 DRIVER FLEET SAFETY PROGRAM

RESERVED. Currently being revised. Please contact ECC's the Property/Facility Manager for more information.

34.0 BIOLOGICAL HAZARDS

1.0 Purpose

Due to the nature of ECC's work activities, potential biological hazards may exist during work operations. It is important that ECC employees recognize and understand the potential hazards and implement preventative control measures at all times.

2.0 Rodents

Avoid contact with rodents because they frequently are hosts for Hanta Virus and to fleas which carry typhus and the plague. Avoid contact with or inhaling dust associated with rodent feces. Cleanup shall be conducted using a respirator with HEPA cartridges, gloves, and a Clorox solution to wet down the fecal material. Dispose of fecal material or dead rodents in a sealed bag for disposal.

3.0 Snakes

In the United States, there are approximately 120 species of snakes, about 20 of which are poisonous. The venomous species include all the rattlesnakes , among which are the Western diamondback, the Eastern diamondback, the prairie, timber, red, Pacific, Mojave, black-tailed, and sidewinder rattlesnakes. Other snakes which are venomous are the water moccasin, the copperhead, and the corel snake.

Employees should inspect all areas before conducting work activities, especially in dark and damp areas. In the event of a snake bite, the victim should remain calm and be transported to the nearest medical facility ASAP. The objectives of first aid for snake bites are to reduce the circulation of blood through the bite area, to delay absorption of venom, to prevent aggravation of the local wound, and to sustain respiration.

4.0 Warm Blooded Animals

Warm blooded animals such as dogs, cats, rats, and prairie dogs, can transmit rabies and tetanus. Rabies can be transmitted when the saliva from an infected animal contacts an open wound or normal body opening, such as the mouth or eye. All animals are assumed to be potentially dangerous.

5.0 Tick-borne Diseases

Tick-borne diseases represent a significant health risk in many parts of the world. Ticks are

documented vectors of virus and bacteria for diseases such as Lyme disease. Personnel shall take precautionary measures by wearing proper clothing, use of repellants, use of good work practices, and recognizing symptoms early. Individuals that develop a rash or experience other early symptoms (i.e., fatigue, headache, muscle aches, neck stiffness, fever, and swollen glands) of Lyme disease should promptly see a physician for treatment.

6.0 Minor Bites and Stings

Use cold applications and soothing lotions, such as calamine.

35.0 BLOOD BORNE PATHOGEN EXPOSURE CONTROL PLAN

1.0 Policy

ECC's Blood borne Pathogen Exposure Control Plan is prepared in accordance with federal and California regulations (29 CFR 1910.1030 and CCR, 5193 respectively). Blood borne pathogens include the hepatitis B Virus and the HIV Virus believed to cause Acquired Immune Deficiency Syndrome (AIDS).

2.0 Purpose

Employees in the following job classifications may have occupational exposure to blood borne pathogens as a result of performing CPR/first aid or miscellaneous services for fellow employees.

- Program Managers;
- Corporate H&S Manager;
- Field Chemists;
- Project Managers;
- Quality Control Officers/SSHOs;
- Project Engineers;
- Heavy Equipment Operators; and
- Environmental Technicians.

3.0 Work Practices to Minimize Exposure

3.1 Performing CPR/First Aid

The skin is a natural protective shield against virus, bacteria and other germs, including blood borne pathogens, but if the skin is broken by a small cut or sore germs can enter the body.

When performing CPR, the following personal protective equipment shall be used to protect the rescuer from exposure:

- A pair of latex or rubber gloves; and
- A CPR mouth shield.

When performing first aid where there is potential for contact with blood products, the following personal protective equipment shall be worn:

- A pair of latex or rubber gloves; and

- A tyvek suit if there is a splash or splatter hazard or possibility of blood coming into contact with clothing.

Immediately after performing CPR/First Aid, wash all exposed skin surfaces with soap and water. Flush mucous membranes with water if any such areas have been exposed.

3.2 Cleaning Spills of Blood

When blood is spilled on surfaces, assume that it is infected. When differentiation between body fluid types is difficult, all body fluids shall be considered potentially infectious. If it is not possible to clean the blood immediately, block off the area and warn others not to touch it. Blood spill shall be cleaned as soon as feasible.

When cleaning blood, wear rubber gloves and use a disinfectant solution. If it is anticipated that clothing and shoes may come into contact with the blood, wear a tyvek suit and booties. Make the disinfecting solution by mixing one cup of liquid chlorine bleach in nine cups of water. (Important! This solution must be made fresh just prior to its use and discarded each day.) Perform work in such a manner as to minimize splashing, spraying, splattering, and generation of droplets of liquid. Employees shall wash their hands and arms with soap and water after removing gloves.

3.3 Disposal of Waste

Disposable non-sharp products contaminated with blood shall be double-bagged in plastic bags and labeled. The label shall include the date and time of the incident, a description of the bags contents, and the word "Bio hazard" in bold print. As soon as feasible, these materials shall be placed in red bio safety bags and relabeled. Contact the Corporate Health & Safety Manager to determine current disposal requirements. Non-disposable products shall be disinfected.

Sharp materials shall be placed in puncture-resistant containers and labeled as described above. As soon as feasible, these materials shall be placed in red-orange bio safety sharp containers and relabeled.

3.4 Availability of Personal Protective Equipment

Kits containing CPR mouth shields, latex gloves, and an antimicrobial hand wipe are placed near or in all ECC office first-aid kits.

3.5 Incident Reporting

First aid incidents involving the presence of blood or other potentially infectious material shall be

reported to the Corporate Health & Safety Specialist before the end of the work shift during which the first aid incident occurred. The report must include the following information:

- Names of all first aid providers who rendered assistance, regardless of whether personal protective equipment was used, and must describe the first aid incident, including time and date; and

- The description must include a determination of whether or not, in addition to the presence blood or other potentially infectious material, an exposure incident, as defined below, occurred.

The Corporate Health and Safety Manager or Project SSHO shall prepare an accident report which includes the above information.

3.6 Hepatitis B Series Vaccination

If an employee renders assistance in any situation involving the presence of blood or other potentially infectious materials, regardless of whether or not a specific exposure incident occurs, the hepatitis B vaccination will be made available to the employee as soon as possible but in no event later than 24 hours after the incident. The vaccination is made available at no charge and is given at three intervals. The vaccination shall take place at a company approved clinic. Employees who decline the vaccination must sign a declination form.

3.7 Post-Exposure Evaluation and Follow-up

An exposure incident means a specific eye, mouth, other mucous membrane, non-intact skin, or parental contact with blood or other potentially infectious materials that results from the performance of an employee's duties.

Following a report of an exposure incident, ECC shall make immediately available to the exposed employee a confidential medical evaluation and follow-up which includes the following elements:

- Documentation of the route of exposure and the circumstances under which the exposure incident occurred.

- Identification and documentation of the source individual, unless ECC can establish that identification is infeasible or prohibited by state or local law. The source individual's blood shall be tested as soon as feasible and after consent is obtained to determine hepatitis B virus (HBV) and HIV infection. If consent is not obtained, ECC shall establish that legally required consent cannot be obtained. When the

source individual's consent is not required by law, the source individual's blood, if available, shall be made available to the exposed employee, and the employee shall be informed of applicable laws and regulations concerning disclosure of the identity and infectious status of the source individual.

- Collection and testing of blood for HBV and HIV status. The exposed employee's blood shall be collected as soon as feasible and tested after consent is obtained. If the employee consents to baseline blood collection, but does not give consent at the time for HIV serologic testing, the sample shall be preserved for at least 90 days. If within 90 days of the exposure incident, the employee elects to have the baseline sample tested, such testing shall be done as soon as feasible.

- Post-exposure prophylaxis, when medically indicated, as recommended by the U.S. Public Health Service.

- Counseling.

- Evaluation of reported illnesses.

- A copy of the evaluating health care professional's written opinion within 15 days of the completion of the evaluation.

3.8 Information and Testing

Blood borne pathogen training shall be provided as part of new employee orientation training and on an annual basis. Training is provided at no cost to employees and during working hours. The information included in the training is in accordance with state of California and Federal regulations (8 CCR - 5193 and 29 CFR 1910.1030 respectively).

3.9 OSHA Record Keeping

The Corporate Health and Safety Manager shall establish and maintain an accurate record for each employee with occupational exposure. The record shall include:

- The employee's name;
- Dates of any hepatitis B vaccinations administered and any medical records relative to the employee's ability to receive vaccination;
- A copy of all results of examinations, medical testing and follow-up procedures;
- A copy of the health care professional's written opinion as described above; and
- A copy of the information provided to the health care professional in the event that

an employee has been involved in an exposure incident:

- Copy of the Blood borne Pathogen Standard;
- Description of the exposed employee's duties as they relate to the exposure incident;
- Documentation of the route(s) of exposure and circumstances under which exposure occurred;
- Results of the source of individual's blood testing, if available; and
- Medical records relevant to the appropriate treatment of the employee including vaccination status.

3.10 Training Records

The Corporate Health and Safety Manager and Project SSHO respectively shall maintain the following training records:

- The dates of the training sessions;
- The contents or a summary of the training session;
- The names and qualifications of persons conducting the training; and
- The names and job titles of all persons attending the training session.

ENVIRONMENTAL CHEMICAL CORPORATION
Hepatitis B Vaccine Declination

I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with the hepatitis B vaccine, at no charge to myself. However, I decline hepatitis B vaccination. I understand that by declining this vaccine, I continue to be at risk of acquiring hepatitis B, a serious disease.

Name:_____

Signature:_____

Date:_____

36.0 DRUG AND ALCOHOL PROGRAM

1.0 Policy

ECC prohibits the use, sale, dispersal, possession, or manufacture of illegal drugs, narcotics or alcoholic beverages on it premises. This prohibition also covers all legal or prescription drugs which impair an employee's ability to perform his/her job safely or properly.

2.0 Purpose

2.1 Drug Free Workplace Policy Statement

Employees will be subjected to disciplinary action, up to and including dismissal, for bringing illegal, non-prescribed drugs and narcotics or alcoholic beverages to work; being under the influence of such substances while working; using such substances while working; or dispensing, distributing, or illegally manufacturing or selling such substances on ECC premises or work sites. Employees, their possessions, and ECC issued equipment and containers under their control are subject to search and surveillance at all times while on ECC premises or while conducting ECC business.

Employees may be required to take a test at any time to determine the presence of drugs, narcotics, or alcohol, unless such tests are prohibited by law. Employees convicted of any criminal drug violation occurring in the work place must report such conviction to Human Resources within five days, who will then take appropriate actions as required by law.

Employee judged to be under the influence of drugs, narcotics, or alcohol will be required to leave the premises. Employees who must use prescribed drugs or narcotics during work should report this fact to their Supervisor, and provide acceptable medical documentation. A determination will then be made as to whether the employee should be able to perform his/her job safely and properly.

Employees experiencing problems resulting from drug, narcotic, or alcohol abuse or dependency are encouraged to seek rehabilitation, counseling, and/or other help.

3.0 Pre-Employment Drug Screening

Pre-employment drug screening shall be required for all ECC full-time and project employees. ECC shall test for the following drugs: ethanol (alcohol), amphetamines, barbiturates, benzodiazepines, cocaine metabolites, methadone, opiate metabolites, phencyclidine (PCP) and marijuana metabolites (THC). All tests results are kept confidential at all times by the Human Resource Department and the Corporate Health & Safety Manager.

37.0 OSHA RECORD KEEPING PROGRAM

1.0 Policy

ECC's OSHA Record Keeping Program is prepared in accordance with 29 CFR 1904 "Recording and Reporting Occupational Injuries and Illnesses.

2.0 Purpose

Results of record keeping under the Occupational Safety and Health Act (OSHA) are used to compile factual information about accidents that have happened. These records provide ECC with a way to evaluate the success of their safety and health activities, and identify high risk areas of their businesses to which attention should be directed. Employers with 11 or more employees in specific industries must keep the OSHA records. Environmental consulting firms that have employees handling hazardous waste must comply with OSHA record keeping requirements. ECC's Corporate Health & Safety Manager and ECC's SSHOs will be responsible in completing and maintaining OSHA record keeping requirements.

3.0 Description of the Forms

The two forms ECC uses for OSHA record keeping are the OSHA 200 and OSHA 101 forms. The OSHA 200 form is used to record injuries and illnesses for a calendar year. Information requested includes company name, establishment name, address; and details of injuries and illnesses, such as employee's name, occupation, department, description of injury or illness, extent of and outcome of injury, type, extent and outcome of illness, and injuries and illnesses with and without "lost workdays."

The OSHA 101 form is used to record additional information. This supplementary record describes how the accident or illness exposure occurred, lists the objects or substances involved, and indicates the nature of the body affected.

To satisfy this requirement, records like Workers Compensation, insurance, or other reports that contain all of the items on the OSHA 101 form can be used instead of the OSHA 101 form.

4.0 Type of Accidents Covered

The OSHA 200 and OSHA 101 forms have to be filled out only in the following circumstances:

Illness or death has occurred, or an injury has occurred that involves medical treatment (other than first aid) or loss of consciousness, restriction of work or motion, or transfer to another job (note:

when an illness occurs, it can be recorded without further investigation. In cases of injury, further investigation must be done to determine whether it required medical attention, or involved a loss of consciousness, restriction of work or motion, or transfer to another job.

New entries need not be made for the recurrence of symptoms from previous cases. Only accidents that are work related must be recorded. The work environment could be the employers premises or outside the employers premises if employees are engaged in work related activities, or places where employees are present due to the nature of their job or as a condition of their employment. Employees who travel on company business will be considered to be engaged in work related activities unless noted otherwise.

5.0 OSHA Reporting

Employers are required to report within 8 hours to the nearest OSHA area office any incident or accident which results in a fatality or hospitalization of three or more employees as required by 29 CFR 1904.8 (a).

6.0 Postings

A copy of the totals and specified information for the year must be posted at each establishment in the place or places where notices to employees are posted customarily. This copy must be posted no later than February 1 of the following year. If there were no injuries or illnesses during the year, zeros must be entered in the spaces for totals and the form posted. The person responsible for the annual summary totals must attest that the totals are true and complete by signing at the bottom of the form.

7.0 Definitions and Applications

Hospitalization - Hospitalization is defined by OSHA as "to be sent to a hospital, or to go to a hospital or equivalent medical facility, regardless of the treatment provided or the length of stay." This means if three or more employees are sent to a hospital due to an incident or accident, the employer must report to OSHA, even if workers were sent merely as a precautionary measure.

Injury versus Illness - An injury is caused by instantaneous events in the work environment. Cases resulting from anything other than instantaneous events are considered illness. Some conditions may be classified as either an injury or an illness (but not both) depending upon the nature of the event that produced the condition. For example, a loss of hearing resulting from an explosion is classified as an injury. The same condition arising from exposure to industrial noise over a period of time would be classified as an occupational illness.

Lost Workdays - Lost workdays is a term broken down for definition by OSHA into days away from work and days of restricted work activity. In these situations, the ill employee is affected to such an extent that days must be taken off from the job for either medical treatment or recuperation or the employee is unable to perform his/her normal duties during a normal work shift.

Medical Treatment - Medical treatment is classified as treatment other than first aid. First aid is defined as one-time treatment and subsequent observation of minor scratches, cuts, burns, and splinters, which do not ordinarily require medical care. Even if first aid is given by a physician or registered professional, it should not be recorded.

The following classifications list certain procedures as either medical treatment or first aid treatment.

8.0 Medical Treatment

The following are generally considered medical treatment. Work-related injuries for which this type of treatment was provided or should have been provided are almost always recordable:

- Treatment of *infection*
- Application of *antiseptics during second or subsequent visit* to medical personnel
- Treatment of *second or third degree burn(s)*
- Application of *sutures* (stitches)
- Application of *butterfly adhesive dressing(s) or steri-strip(s)* in lieu of sutures
- Removal of *foreign bodies embedded in eye*
- Removal of *foreign bodies from wound*; if procedure is *complicated* because of depth of embedment, size, or location
- Use of *prescription medications* (except a single dose administered on first visit for minor injury or discomfort)
- Use of hot or cold *soaking therapy* during second or subsequent visit to medical personnel
- Application of hot or cold *compress(es) during second or subsequent visit* to medical personnel

- *Cutting away dead skin* (surgical debridement)
- Application of *heat therapy during second or subsequent visit* to medical personnel
- Use of *whirlpool bath therapy during second or subsequent visit* to medical personnel
- *Positive x-ray diagnosis* (fractures, broken bones, etc.)
- *Admission to a hospital* or equivalent medical facility *for treatment*

9.0 First Aid Treatment

The following are generally considered first aid treatment (e.g., one-time treatment and subsequent observation of minor injuries) and should not be recorded if the work-related injury does not involve loss of consciousness, restriction of work or motion, or transfer to another job:

- Application of *antiseptics during first visit to medical personnel*
- Treatment of *first degree burn(s)*
- Application of *bandage(s)* during any visit to medical personnel
- Use of *elastic bandage(s) during first visit* to medical personnel
- Removal of *foreign bodies not embedded in eye* if only irrigation is required
- Removal of *foreign bodies from wound*; if procedure is *uncomplicated*, and is, for example, by tweezers or other simple technique
- Use of *nonprescription medications and administration of single dose of prescription medication* on first visit for minor injury or discomfort
- *Soaking therapy* on initial visit to medical personnel or removal of bandages by soaking
- Application of hot or cold *compress(es) during first visit* to medical personnel
- Application of *ointments* to abrasions to prevent drying to cracking
- Application of *heat therapy during first visit* to medical personnel

- Use of *whirlpool bath therapy during first visit* to medical personnel
- *Negative x-ray diagnosis*
- *Observation* of injury during visit to medical personnel.

The following procedure, by itself, is not considered medical treatment:

• Administration of *Tetanus shot(s) or booster(s).* However, these shots are often given in conjunction with more serious injuries; consequently, injuries requiring these shots may be recordable for other reasons.

10.0 Maintenance of Records

The following information gives the length of time each record has to be maintained in the office under OSHA guidelines.

• Medical Records	Duration of employment plus 30 years
• Exposure Records	Duration of employment plus 30 years
• Training Records	5 years
• OSHA 200 Logs	5 years
• ECC Accident Reports	5 years
• Workers' Comp. Forms	5 years
• Site Safety Plans	5 years
• IIPP Documentation	5 years
• Tailgate Safety Meet. Forms	5 years

38.0 EMPLOYEE SAFETY INCENTIVE PROGRAM
"Worker Involvement Now - W. I. N."

1.0 Subject

Safety Incentive Program *"Worker Involvement Now - W.I.N."*

2.0 Target Participants

Environmental Chemical Corporation (ECC) provides a safety incentive program to all project employees working at an ECC project site. A project employee is defined as an non-exempt, hourly employee hired for the duration of the project.

3.0 Background

The purpose of implementing ECC's Safety Incentive Program (*Worker Involvement Now - W. I. N.*) is to increase employees' *safety awareness*, *motivate employees to work safely*, and *reward employees for their results.*

Cash bonuses from a safety incentive program shall be estimated into a project's cost. Costs for bonuses shall be calculated by the number of project employees times 50 or 100 (depending on the duration of the project).

- $50.00 per employee for projects 6 months or less.
- $100.00 per employee for projects over 6 months.

4.0 Objective

The objective in ECC's *"W.I.N." Program* is to motivate employees to work safely resulting in zero lost time accidents, which in turn provides three benefits:

(a) Better safety for each employee;
(b) Decreased costs associated with job-related accidents;
(c) Enhancing ECC's position as a high quality contractor for our government clients.

5.0 Implementation

The *W.I.N. Program* shall be measured by the accumulation of a pre-determined level of points awarded to each *employee* on the basis of objectives shown in *Table 1*. <u>*Important*</u> - Management

should measure the objective criteria (points) on a frequent basis, otherwise individuals will lose focus and interest in the program.

Positive reinforcers include the following: "no lost time accidents" (per work week) +5 points, and "no OSHA recordable injuries/illnesses" (per work week) +3 points. Project employees will be striving for a performance level of *excellence*, defined by obtaining 95% or more of the achievable points at the end of the project. Should the employee reach his/her goal, a cash bonus shall be awarded to each participating employee.

Table 1.

W.I.N. POINT SCHEDULE	
Positive Reinforcers	**Points**
No lost time accident (per week)	+5
No OSHA Recordable Injury/Illness (per week)	+3

6.0 Example Project

Project: *Travis AFB - UST Removal*
Duration: *2 months (8 weeks)*
Project Employees: 4
Project Cost (safety incentive program): *$200.00 ($50.00 per employee for projects 6 months or less x 4 employees = $200.00) will be the maximum cost for the project's safety incentive program awards. Project employees need to have at least 95% (60.8 points) to receive an award for the Travis AFB project.*

NAME	*week 1*	*week 2*	*week 3*	*week 4*	*week 5*	*week 6*	*week 7*	*week 8*	*Total Achievable Points*
Achievable Pts.	*+ 8*	*+ 8*	*+ 8*	*+ 8*	*+ 8*	*+ 8*	*+ 8*	*+ 8*	*+ 64 = 100%*
Smith, J.	*+ 8*	*+ 5*	*+ 8*	*+ 8*	*+ 5*	*+ 8*	*+ 8*	*+ 8*	*+ 58 = 90.6 %*
Thomas, B.	*+ 8*	*+ 8*	*+ 8*	*+ 8*	*+8*	*+ 8*	*+ 8*	*+ 0*	*+ 56 = 87.5%*
Walker, G.	*+ 8*	*+ 8*	*+ 8*	*+ 5*	*+ 8*	*+ 8*	*+ 8*	*+ 8*	*+ 61 = 95.3%*

NAME	*week 1*	*week 2*	*week 3*	*week 4*	*week 5*	*week 6*	*week 7*	*week 8*	*Total Achievable Points*
Wilson, D	*+ 8*	*+ 8*	*+ 8*	*+ 8*	*+ 8*	*+ 8*	*+ 8*	*+ 8*	*+ 64 = 100%*

Smith, J. had 58 points or 90.6% of achievable points - NO REWARD
Thomas, B. had 56 points or 87.5% of achievable points - NO REWARD
Walker, G. had 61 points or 95.3% of achievable points - REWARD
Wilson, D. had 64 points or 100% of achievable points - REWARD

Mr. Dean K. Osaki, C.S.P., C.H.S.T., shall be responsible for the development and implementation of ECC's Safety Incentive Program at ECC project sites. Mr. Osaki is authorized to make changes to the program as needed.

39.0 Hand and Power Tools Safety Program

1.0 Policy

ECC's Hand and Power Tools Safety Program is prepared in accordance with 29 CFR 1910 Subpart P - *Hand and Portable Powered Tools and Other Hand-Held Equipment* (1910.241 to 1910.244); and 29 CFR 1926 Subpart I - *Tools - Hand and Power* (1926.300 to 1926.307).

2.0 Purpose

The purpose of ECC's Hand and Power Tool Safety Program is to reduce the likelihood of injuries and accidents caused by improper handling.

3.0 Safe Operating Requirements

All hand tools shall be kept in good repair and used only for the purpose intended. Defective tools shall be acceptably repaired or removed from service. Tools shall not be thrown from one level to another, and when used overhead, shall be secured or placed in holders when not in actual use. All electrical tools shall be of the approved double or triple insulated type or grounded. Hand and portable power tools and equipment shall be guarded IAW 29 CFR 1910.243. Training on the use of hand tools/electrical tools shall be conducted by a competent person. Only trained/qualified employees shall operate tools.

4.0 Hand Arm Vibration (HAVs) - Reynaud's Syndrome

Power tools designed to have minimal vibrations will be more comfortable to use and less likely to result in hand arm vibration (HAVS) also known as Reynaud's syndrome. Hand-arm vibration is caused by the use of vibrating hand-held tools. The nature of these tools involves vibration (a rapid back-and-forth type of motion) which is transmitted from the tool to the hands and arms of the person holding the tool. HAVS causes numbness and blanching of the hands, and can progress to complete disability if the worker is not removed from exposure.

The harmful health effects of vibrating tools are related to the length of time that a worker has been using vibrating tools and to the frequency of the vibration. The longer a person uses a vibrating tool, and the faster the tool vibrates, the greater the risk of health effects. Temporary tingling or numbness during or soon after use of a vibrating hand tool is not considered to be HAVS; however, tingling and numbness in the fingers lasting more than an hour after finishing work may indicate early stages of HAVS.

Many of the symptoms of vibration syndrome will disappear shortly after a worker stops using the types of tools with transmit vibration to the hands and arms. Fatigue and muscular pain in the arms and shoulders will generally disappear. In the early stages, if a worker stops using vibrating tools, HAVS will not get any worse and may get slightly better. It is important to provide pads and gloves for relief from the vibration; administrative controls — such as work rotation and more frequent rest breaks, and the use of the correct tool.

5.0 Safety Inspection Checklist

The following list of questions should be considered during an inspection of portable electric tools. Inspections are recommended prior to the use of equipment.

5.1 General

- Low voltage or battery powered equipment used in tanks and wet areas?
- Tools well maintained?
- Motors in good condition?
- Approved tools used in explosive atmospheres?
- Tools left where they cannot fall?

5.2 Cords

- Insulation and plugs unbroken?
- Cords protected against trucks and oil?
- Cords not in aisles?

5.3 Grounding

- Ground wire fastener in safe condition?
- 3-wire plug extension cord (if a 3-wire tool)?
- Ground wire used?
- Defects or minor shocks reported?
- Ground fault circuit interrupter used?

5.4 Guarding

- Guards used on grinders and saws?
- Moveable guards operate freely?
- Eye or face protection worn?

5.5 Pneumatic Tools/ Compressed Air

Pneumatic tools and hoses shall be handled in accordance with OSHA 29 CFRs 1910 and 1926. Compressed air used for cleaning purposes shall not exceed 30 psi when the nozzle end is obstructed or dead ended, and then only with personal protective equipment. Compressed air shall not be used to blow dirt from hands, face or clothing. Training on the use of pneumatic tools/ compressed air shall be conducted by a competent person. Only trained/qualified employees shall operate tools.

5.6 Power Tools

Power tools can cause severe injuries to personnel if used improperly. All power tools shall be used in accordance with manufacturer's recommendations and only for the purpose for which they are designed.

5.7 Chain Saws

- Chain saw operators shall follow manufacturer's operating instructions and shall carefully inspect the saws prior to use.
- The saws shall be kept in sound mechanical conditions with all guards, mufflers, spark arresters, handles, etc., properly installed and adjusted.
- The chain saw should not be fueled while running or when the engine is hot or near and open flame. In addition, chain saws should not be operated with ten (10) feet of a fuel container.
- The operators shall hold the chain saw with both hands during all cutting operations.
- Operators will wear personal protective equipment as described below. Eye, ear, hand, foot (safety shoes), and leg protection are required as a minimum.
- Chain saws must never be used to cut above the operators' shoulder height.
- Before starting to cut, the operator must be sure of footing and must clear away fallen trees, brush, or other materials that might interfere with cutting operations.
- The idle speed of the saw shall be adjusted so that the chain does not move when the engine is idling.
- The operator will shut off the saw when carrying it over slippery surfaces, through

heavy brush, and when adjacent to personnel.

- All chain saw operators shall be trained by a "Competent Person" before using a chain saw.

- All chain saws used on the job should have an automatic chain brake or kickback device.

40.0 BACK INJURY PREVENTION PROGRAM

1.0 Purpose

The purpose of ECC's Back Injury Prevention Program (BIPP) is to identify existing or potential back exposure hazards in the work environment; identify and evaluate risk factors causing the problems; design and implement control (i.e., engineering and administrative) measures; and to monitor/evaluate the effectiveness of the control measures being implemented.

2.0 Back Injuries

The National Institute of Occupational Health (NIOSH) has reported that back disorders account for 27% of all nonfatal injuries and illnesses involving days away from work.

An injured back affects your ability to move your limbs, your hips, your neck, and head. Injuries to the back can be very debilitating, causing a lot of pain/discomfort and time away from work. Severe back disorders/injuries may require physical therapy or even surgery.

2.1 Common Causes of Back Injuries

Some of the common causes of back injuries in the work environment include the following:

- Heavy lifting
- Twisting and lifting
- Bending and over exerting/awkward positions
- Lifting objects with odd shapes
- Reaching and lifting
- Sitting or standing too long in one position
- Slips due to improper footing

2.2 Things Which May Increase the Risk of Back Injury

- Poor physical condition
- Poor posture
- Extra weight
- Stress (tense muscles)
- Overdoing it

2.3 Control Measures to Prevent Back Injuries

- Work at a reasonable pace (don't rush!)
- Stretch first before lifting an object
- Rest your back (take frequent breaks) during long lifting activities
- When possible, push objects — don't pull
- Avoid twisting at the waist
- Get help lifting awkward, heavy objects
- Use carts and hand trucks
- Try to work in a safe zone between your shoulders and waist
- Lift correctly

2.4 Employee Monitoring

It is important to closely monitor workers during heavy lifting or any strenuous back activities. Any weight lifting limitations with the worker should be discussed prior to work activities.

3.0 Correct Lifting and Reaching Procedures

One of the basic ergonomic principles when attempting to lift objects is to minimize the moments (force) on the spine. The following are "correct lifting and reaching procedures" which should be implemented by employees:

- Don't bend over an object you are lifting. Bend your knees, squatting in front of the object to reach it.
- Lift the object slowly and carefully, using your leg and arm muscles to lift, not pulling with your back.
- Keep your head up and look straight ahead while making the lift
- While lifting, keep the object as close to your body as possible
- Keep abdominal muscles tight wile making the lift
- Use the same techniques when you put the object down
- If the object is too big or too heavy to lift using these techniques, use mechanical assistance or get someone else to help.

When reaching for objects:

- Do not reach for an object unless you're strong enough to lift it
- Use a step ladder to reach objects above the shoulder height
- Avoid awkward stretches while reaching. This can stress your back and cause you to lose

your balance

4.0 Employee Protective Equipment (Back Support Belts)

There is some controversy about the use of back support belts in order to control low back injuries to workers who don't have an existing injury. According to the report by the National Safety Council (NSC), available scientific data does not completely support nor condemn the use of back belts to control low back injuries. One thing that is agreed upon is that back support belts should NEVER be a substitute for a comprehensive Back Injury Prevention Program. Many companies have developed their own "back belt policy".

The following guidelines shall apply to ECC employees who use back support belts (company or personally owned) during work operations at ECC project/office sites.

ECC BACK SUPPORT BELT POLICY

- Proper training of the back support belt shall be conducted by the Project Manager or Safety Officer to the employee(s) prior to work activities
- Inspection of the back support belt shall be conducted by the employee before each use. Any defects in the belt shall be reported to the PM or Safety Officer
- Back support belts shall be correctly worn by the employee at all times
- The back support belt shall not be used for any other purpose (i.e., harness) except for its intended use.

When wearing a back support belt, please be aware that you may experience a false sense of security by wearing the belt. There is a temptation to lift loads one wouldn't otherwise lift. Please remember, the belt does NOT provide additional strength — it only supports the back.

41.0 Lead Remediation Operating Procedures

1.0 Policy

Federal standards applicable to lead in construction consist of the following:

• 29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
• 29 CFR 1910.134	Respiratory Protection
• 29 CFR 1910.141	Sanitation
• 29 CFR 1910.145	Specifications for Accident Prevention, Signs, and Tags
• 29 CFR 1926.59	Hazard Communication
• 29 CFR 1926.62	Lead
• 40 CFR 61	National Emission Standards for Hazardous Air Pollutants
• 40 CFR 261	Resource Conservation and Recovery Act
• 40 CFR 262	RCRA Standards Applicable to Generators
• 49 CFR 171-180	Transportation

2.0 Purpose

The scope of ECC's Lead Remediation Standard Operating Procedures is to ensure a safe and healthy work environment for ECC's employees involved in Lead Remediation in accordance with Federal lead in construction standards.

3.0 Program Administrator

ECC's designated Project Manager (competent person) is responsible for the implementation and enforcement of these standard operating procedures. In addition, the competent person shall be adequately trained and is responsible for the planning, training, and inspection of lead remediation projects performed in the field.

4.0 Methods of Compliance

With this program, ECC establishes various methods of compliance, e.g. exposure monitoring, engineering controls, work practices, and administrative controls to minimize employee exposure below the OSHA's Permissible Exposure Limit (PEL) of 50 micrograms/meter cubed (ug/m^3). It is ECC's intent that no employee be exposed above this PEL.

4.1 Initial Exposure Assessment

An initial exposure assessment is performed by an ECC Lead-competent person prior to starting any lead removal project where employee exposure to lead may be at or above the Lead Action level of 30 ug/m^3, and/or when performing any of the Lead construction trigger tasks as described in section 4.3.

4.1.1 Conducting An Initial Exposure Assessment

The primary basis of the initial exposure assessment is employee exposure monitoring performed at the beginning of each project as well as any relevant information, such as, field observations, or calculations which would indicate employee exposure to lead, previous measurements of airborne lead, and employee complaints of symptoms which may be attributable to exposure to lead.

Alternately, an initial exposure assessment may also be obtained using historical data (except when performing trigger tasks) which includes air monitoring data collected within the last 12 months of work operations conducted under workplace conditions closely resembling the processes, type of material, control methods, work practices, and environmental conditions used and prevailing in the employer's current operations.

The initial exposure assessment shall be performed on the first day of lead remediation work and shall be representative of a full shift including at least on sample for each job classification in each work area either for each shift or for the shift with the highest exposure to lead.

4.1.2 OSHA Trigger Tasks

OSHA categorizes lead-related work into low, medium, and high exposures tasks. OSHA assumes, unless proven otherwise, that employees will be exposure to certain concentrations of lead while performing these trigger tasks.

- Lowest Exposure Trigger Tasks--assumes > 50 to ≤ 500 ug/m^3
  - where lead coatings or paint or present
    --manual demolition of structures
    --manual scraping
    --manual sanding
    --heat gun applications
    --power tool cleaning with dust collection systems
  - spray painting with lead
  - any other tasks where the employer has reason to believe employees may be exposed over the PEL.

- Medium Exposure Trigger Tasks--assumes >500 to ≤ 2500 ug/m^3;
  - use of lead-containing mortar
  - where lead coatings or paint are present
    --lead burning
    --rivet busting
    --power tool cleaning without dust collection systems
    --cleanup of dry expendable abrasives
    --abrasive blasting enclosure movement and removal

- Highest Exposure Trigger Tasks--assumes > 2500 ug/m^3
  - where lead coatings or paint are present
    --abrasive blasting
    --welding
    --cutting
    --torch burning

4.1.3 Worker Protection During Initial Exposure Assessment

For the duration of the initial exposure assessment, ECC shall establish and maintain the following worker protection provisions:

- Appropriate personal protective equipment--At a minimum, Level C PPE (hard hat, steel toe boots, full body coverall with integral hood and booties, eye protection, and half face Air Purifying Respirator) shall be donned by all employees within the exclusion zone EZ. When performing initial exposure assessments for an OSHA trigger task, use respiratory equipment as required in Table 3.1;
- Post warning signs and barrier tape to restrictive access to authorized personnel;
- Maintain hand washing facilities outside the exclusion zone;
- Maintain change rooms or area outside the contamination reduction zone (CRZ) where employees can change into/out of work clothes;
- Maintain clean eating facilities outside the support zone;
- Conduct biological monitoring;
- Provide awareness training.

Table 4-1 Respiratory Protection for Lead Aerosols

Trigger Task	Airborne Lead Concentration	Required Respiratory
Lowest Exposure Trigger Tasks	Not > 500 ug/m^3 (up to 10 x PEL).....	half-mask air purifying w/HEPA* filters, or half-mask supplied air in negative pressure mode
	Not > 2500 ug/m^3 (up to 25 x PEL).....	loose fitting or helmet PAPR** with HEPA filters, or supplied air in continuous-supply mode
Medium Exposure Trigger Tasks	Not > 2500 ug/m^3 (up to 50 x PEL).....	full-face piece air purifying with HEPA filters, or full face piece supplies air in demand mode, or half-mask supplied air in continuous-flow mode, or SCBA*** in demand mode.
Highest Exposure Trigger Tasks	Not > 50,000 ug/m^3 (up to 1,000 x PEL).....	half-mask supplied air in positive-pressure mode
	Not > 100,000 ug/m^3 (up to 2000 x PEL).....	full-face piece supplied air in positive-pressure mode
	> 100,000 ug/m^3 (>2,000 x PEL).....	full-face piece SCBA in positive pressure mode

* HEPA = High Efficiency Particulate Air that is 99.97% effective against particles 0.3 m or larger.
** PAPR= powered air-purifying respirator
*** SCBA=self contained breathing apparatus

4.2 Written Compliance Program

Prior to the start of any lead remediation job where exposures to lead may exceed the PEL, ECC shall establish and implement a written compliance program to include the following:

- A description of each work activity in which lead may be emitted; e.g. equipment used, material involved, controls in place, crew size, employee job responsibilities, operating procedures and maintenance practices;
- A description of the specific means ECC will employ to achieve compliance with Federal, State, and local regulations;
- A description of the technology considered in meeting the PEL;
- Air monitoring data that documents the source of lead emissions, if applicable;
- A detailed schedule for implementation of the program, including documentation such as copies of purchase orders for equipment, construction contract, etc.;
- A work plan which incorporates the approved work practices described herein;
- An administrative control schedule, if applicable;
- A description regarding disclosure procedures and communications to other contractors on multi-contractor sites;
- and any other relevant information.

- provide for regular and frequent inspection of job sites, work areas, materials, and equipment to made by competent person;

- program shall be on site at all times and available to employee, employee representative, or regulatory personnel, etc.
- Written programs shall be updated every 6 months to reflect the current status of the program.

4.3 Engineering Controls

Engineering controls shall be used whenever possible especially when lead work occurs indoors. Example of engineering controls:

- Containment barriers (plastic, wood, etc.) to control spread of lead contaminated materials outside the exclusion zone;
- Negative air machines equipped with HEPA filters to clean and move exclusion zone;

4.4 Work Practices

Proper work practices are key in controlling the release of unnecessary airborne lead during removal actions . Acceptable work practices include, but are not limited to the following:

- Ensure that lead contaminated materials are wet when disturbed;
- Ensure that lead contaminated materials are kept separate from other wastes or construction materials; cover with plastic to minimize spreading or cross contamination of the lead waste;
- Containerize as soon as possible. Where feasible, minimize excessive accumulation of lead waste;
- Use HEPA vacuums and wet wiping methods to clean up lead containing dust and debris (interior work);
- Ongoing cleanup and orderly work area;
- Ensure proper decontamination techniques

4.5 Prohibitive Work Practices

- high-speed abrasive disc saws that are not equipped with point of cut ventilator or enclosures with HEPA filtered exhaust air;
- compressed air without HEPA filter assist;
- dry sweeping, shoveling, or other dry clean up of dust and debris without HEPA

assistance;

- Allowing removed lead waste (indoor) to accumulate (and become dry) anywhere in the work area.

4.6 Administrative Controls

ECC's administrative controls program is implemented to reduce employee's TWA exposure to lead and includes the following:

- Job rotation schedule;
- Name of each affected employee;
- Duration and exposure levels at each job or work station where each affected employee is located; and
- Any other information which may be useful in assessing the reliability of administrative controls to reduce exposure to lead

4.7 Industrial Hygiene Practices

The following standard hygiene practices apply in areas where employees are exposed at or above the PEL, are performing one of the Trigger Tasks described in 4.3, or conducting initial exposure assessment monitoring. These standards at a minimum, shall consist of a delineated work area (exclusion zone--EZ) area, change rooms (support zone--SZ), decontamination booths or sinks (showers if feasible) (contaminant reduction zone--CRZ), and eating facilities.

4.7.1 Decontamination Procedures

Decontamination procedures are carried out in the CRZ. Showers shall be utilized where feasible. In lieu of showers, ECC shall establish wash stations in the CRZ where employees can decontaminate themselves prior to entering the SZ. An adequate supply of cleansing agents and cloth towels shall be on hand for decontamination purposes. All contaminated PPE is doffed in the CRZ prior to entering the SZ.

4.7.2 Change Rooms

In the change rooms (located in the SZ), employees change into/out of their street clothes. The change rooms are equipped with separate facilities for PPE/equipment and employee's street clothes. At no time shall there be any contaminated piece of PPE or equipment/material in the clean room. Eating in the change room is prohibitive.

4.7.3 Eating Facilities

ECC shall provide lunch room or eating areas for all employees involved with lead abatement. All eating areas shall be separate from the exclusion zone (including the support zone) and free of lead contamination.

4.8 Personal Protective Work Clothing

The following personal protective work clothes shall be donned by all ECC employees and other authorized personnel prior to entering the lead EZ (work area) when: conducting the initial exposure assessment; where employees are exposed at or above the PEL; and where employees are exposed to lead compounds prone to cause eye and skin irritation:

- Full body coverall with integral head covering and booties;
- Steel tow boots;
- Hart hat;
- Eye protection;
- Work gloves.

For lead activities not included in the OSHA trigger tasks, historical air monitoring data can be used to determine the respiratory protection required.

4.9 Respiratory Protection

Respiratory protection is required at all time in the EZ during the initial exposure assessment; where employees are exposed at or above the PEL; and where employees are exposed to lead compounds prone to cause eye and skin irritation. The required respiratory protection during the initial exposure assessment will depend on the type of work being performed relative to the OSHA trigger task classification. Results of the initial exposure monitoring (and subsequent exposure monitoring events) will dictate the type of respirator equipment required to continue the remediation.

For lead activities not included on the OSHA trigger tasks list, historical air monitoring data (section 3.1.1) can be used to generate the initial exposure assessment and the required respiratory protection required.

4.10 Air Monitoring Strategies

The OSHA PEL for lead dust is 50 ug/m^3 and an action level of 30 ug/m^3. It is ECC's intent that no employee or authorized visitor to a exclusion zone be exposed to an airborne lead dust concentration of 50 ug/m^3 as determined as an eight hour time weighted average. Representative personal and

environmental air samples for lead dust are collected by a competent person(s). Lead air samples are analyzed an approved laboratory using NIOSH method 7082. Personal sampling pumps are affixed to the employees waist with the appropriate cassette secured at the employees breathing zone. Personal air samples are designed to continuously run for the duration of the sampling period (8 hours) stopping only at lunch, rest breaks, or for emergency situations where employee(s) must exit the work area. The competent person calculates the amount of air flow received through the cassette using a calibrated rotameter. All air monitoring documentation is recorded on ECC's air monitoring form(s).

For interior remediation projects, both representative air samples shall be collected inside and outside the work area monitor effectiveness of job's engineering controls and work practices. The pumps, tripod stands, and cassettes are set up at different locations including: at the outside entrance to the CRZ, at the pressure deferential unit exhaust (outside work area) if applicable, and in inside the work area. For exterior work, ECC shall collect representative samples at the CRZ and downwind of the work area.

4.10.1 Initial Exposure Monitoring

To be performed at the beginning of a lead-remediation project. Personal exposure monitoring shall be conducted on the first day of lead remediation work and shall be, at a minimum, representative of a full shift including at least one sample for each job classification in each work area either for each shift or for the shift with the highest exposure to lead.

4.10.2 Frequency/Termination of Personal Exposure Monitoring

For employee exposure at or above the Lead Action level but below the Lead PEL, ECC shall perform personal exposure monitoring as described above (1st para) at least every six (6) months until at least two consecutive air monitoring results, collected at least 7 days apart, are below the action level at which time air monitoring may be terminated for that employee.

For employee exposure above the Lead PEL, ECC shall perform personal air monitoring as described above on a quarterly basis until at least two consecutive air monitoring results, collected at least 7 days apart, are below the PEL but at or above the AL. ECC shall then continue personal exposure monitoring at least every six months until at least two consecutive air monitoring results, collected at least 7 days apart, are below the action level at which time air monitoring may be terminated for that employee.

4.10.3 Additional Exposure Assessments

Additional exposure assessments shall be performed whenever the following may result in an

employee exposure to lead at or above the AL or at or above the PEL:

- if there has been a change in equipment, process, or control;
- a new task is being performed;
- a new employee

4.10.4 Negative Exposure Assessments

A negative exposure occurs when no air monitoring results collected during the initial exposure assessment are at or above the lead AL. This negative exposure assessment determination shall be documented in writing and include the date of determination, sample locations of the air monitoring event, laboratory results, and name and social security numbers of employees involved in lead remediation work.

4.10.5 Notification of Exposure Monitoring Results

ECC shall notify, in writing, affected employees 5 days after completion of the exposure assessment or air monitoring event. In the event that employee exposure is at or above the PEL, ECC shall inform affected employee of results and describe to the employee the corrective actions to be taken by the employer/employee to reduce employee exposure below that level.

4.11 Record Keeping

ECC shall retain complete and accurate medical records of its employees for the length of employment plus 30 years.

4.11.1 Exposure Monitoring Records

All employee exposure monitoring results shall be maintained by ECC for 30 years plus length of employment. Records shall include, at a minimum, the following information:

- Name, social security numbers, job classification (and of those whose exposure the sample represents), date, sample numbers, duration of test(s), results, rational to determine representative sampling strategy;
- Description of sampling and laboratory methodology and evidence sample result reliability;
- Type of respirators used during sampling event;
- Any environmental variables present during the sampling event which could affect employee exposure to lead.

4.11.2 Medical Surveillance Records

Medical surveillance records shall be maintained for each employee subject to surveillance monitoring. Employee medical surveillance records shall include, at a minimum, the following information:

- Employee name, social security number, job classification and description of duties, copies of physician's written opinions, if any, results of exposure monitoring collected on or for employee and copies of results submitted to employee's physician, employee complaints relative to exposure to lead;
- Copies of medical examinations, work history, etc.;
- Description of lab procedures and copies of standards and/or guidance documents used to interpret test results;
- Biological monitoring results;
- Medical removal from work records to include name, social security number, date of removal, date of return to work (former job classification), description of how the medical removal procedure was accomplished, exact reason for the medical removal.

4.11.3 Transfer of Records

Whenever ECC ceases to operate in lead remediation, and if there is no successor to receive and retain the records for the prescribed period, ECC will notify the EPA Administrator at least 90 days prior to disposal and upon request, shall transmit them to the administrator.

4.11.4 Availability of Records

The contents of the records of the medical examination shall be made available to the EPA, the Assistant Secretary of Labor for Occupational Safety and Health, to the Director of NIOSH, to authorized physicians and medical consultants, and upon request by the employee, to his or her physician. Any physician who conducts a medical examination required as per 29 CFR 1926.62, where applicable. shall furnish to ECC all the information specifically required by this section, and any other medical information related to occupational exposure to lead.

5.0 Employee Training

The following are the minimal Fed OSHA training requirements for lead-related work. Many States have their own lead standards which will be more stringent than Fed OSHA. The FedOSHA standard applies where States have not enacted lead in construction standards.

5.1 General Training Requirements

ECC's general training requirements for Lead-related construction work can be found in 29 CFR 1926.59--Hazard Communication or Employee Right to Know (RTK) standard. ECC's employee RTK program has been established and maintained and serves as an employee awareness program for each job site. The RTK program is comprised of four elements: general employee information about the chemicals expected to be encountered on the job site; a Material Safety Data Sheet binder of all chemicals on the job site; a warning label/sign system for hazardous chemicals on the job site; and employee training requirements about the RTK program.

5.2 Lead in Construction Training Requirements

In accordance with 29 CFR 1926.62, ECC's requires all employees who may be exposed to lead at or above the AL on any day, or who may be subject to exposure to a lead compound which can cause eye and skin irritation, to be trained for lead remediation. The frequency of the training is annually for any employee exposed at or above the AL for any day. The contents of the training are as follows:

- Knowledge and understanding of the FedOSHA standard and its appendices;
- Availability of the FedOSHA standard;
- Training on the specific nature of lead remediation operations which could result in a lead exposure at or above the AL;
- Training on respirators--their purpose, use, fitting, care, and limitations;
- Training on the ECC's medical surveillance program;
- Knowledge and understanding of the adverse health affects from the excessive exposure to lead;
- Training on the implementation of the proper work practices, engineering controls, ECC's compliance program (section 3.2) related to lead remediation;

6.0 Medical Monitoring

6.1 Initial Medical Surveillance

Available to any ECC employee occupationally exposed on any day to lead at or above the action level (30 ug/m3). Initial medical monitoring consists of analysis of biological monitoring in the form of blood sampling and analysis for lead and zinc protoporphyrin levels. Frequency of biological testing is as follows:

- initial employee exposure to lead;
- where last blood sampling and analysis indicated a blood lead level at or above 40

ug/dl, at least every two months. This frequency shall continue until two consecutive blood samples and analyses indicate a blood lead level below 40 ug/dl; and

- for each employee who is removed from exposure to lead due to an elevated blood lead level at least monthly during the removal period

6.2 Medical Surveillance Program

Employees exposed to lead above the Action Level for more than 30 days in any consecutive 12 month period must participate in ECC medical surveillance program which consists of routine biological monitoring and medical examinations (described below).

The frequency of biological monitoring is follows:

- initial employee exposure to lead;
- at least every 2 months for the first 6 months and every 6 months thereafter;
- where last blood sampling and analysis indicated a blood lead level at or above 40 ug/dl, at least every two months. This frequency shall continue until two consecutive blood samples and analyses indicate a blood lead level below 40 ug/dl; and
- for each employee who is removed from exposure to lead due to an elevated blood lead level at least monthly during the removal period

Medical surveillance examination

Lead related medical exams shall be provided, at no cost to employees and shall:

- Conducted annually for employees who had a BLL at or above 40 ug/dl during the preceding 12 month period,
- For employees who report signs or symptoms related to lead poisoning; desires medical advise regarding the effects of lead exposure on the employee's ability to produce a healthy child, is pregnant, or has difficulty breathing while wearing a respirator;
- Given to any employee, as medically appropriate, who has been removed from his/her usual job involving exposure to lead

The examination shall consist, at a minimum:

- Detailed work history
- History and physical exam, with particular attention to gums, teeth, hematologic, gastrointestinal, renal, cardiovascular, neurological systems;
- Blood pressure measurements;
- Blood sample and analysis for BLL, ZPP, hemoglobin and hematocrit determination,

res cell indices;

- Examination of peripheral smear morphology;
- Blood urea nitrogen;
- Serum creatinine;
- Urinalysis with microscopic examination;
- Pregnancy or male fertility evaluation, if requested by the employee; and
- Any other test deemed necessary by the physician.

6.3 Employee Medical Removal and Return

An employee may be removed from lead-related work due to 1) An elevated blood level, and 2) a final medical determination issued by an examining physician. An elevated blood level is defined as an employee having a blood lead level of 50 ug/dl or greater for two consecutive blood tests. A medical determination is a medical finding, determination, and/or opinion of the examining physician that employee has a medical condition that places him/her at an increased risk of material impairment to health form exposure to lead.

Condition of return for elevated blood lead level employees occurs when ever two consecutive blood sampling analysis indicate a blood lead level of 40 ug/dl or less. Return to work for employees removed due to a medical determination occurs when the employee no longer has a medical condition as determined by the examining physician.

6.4 Medical Removal Protection Benefits

ECC provides benefits to employees that are removed from lead related work due to a medical removal incident. As long as the job the employee was removed from continues, ECC shall maintain employee's total normal earnings, seniority, and other employee rights and benefits of the employee up to 18 months.

7.0 Characterization, Storage, Transportation, and Disposal of Lead Waste

7.1 Characterization of Lead Waste

Lead waste is classified as either a hazardous or non-hazardous waste or solid depending on the lead compound's leachability characteristics. Any lead waste that exhibits a waste toxicity characteristics threshold of 5 ppm (mg/l) via the Toxicity Characteristic Leaching Procedure (TCLP) is considered a "Listed" (D008) RCRA hazardous waste. Any lead waste which passes the TCLP analysis, i.e., has leach ability characteristics of less than 5 ppm is a non hazardous waste.

At each job site, ECC shall establish and manage a site specific waste segregation/minimization plan

to reduce the generation of hazardous lead wastes. The plan shall include:

- Description on avoiding the mixing of hazardous and non-hazardous wastes--during the remediation of lead-based paint components, segregation of lead-based paint housing components, e.g., painted window and door components from loose lead-based paint chips will can reduce the amount of RCRA waste generated because painted components are usually pass the TCLP while paint chips will fail TCLP. Nevertheless, confirmation sampling shall be conducted for each waste stream prior to transportation and disposal;
- Recycling plan for components painted with lead-based paint--RCRA Part B-permitted lead smelter when appropriate--recycling of lead-based painted I-beams;
- Description on the use analytical data and/or historical data to segregate out hazardous and non-hazardous waste streams

7.2 Temporary Storage and Labeling Requirements

Where applicable, all lead generated waste to be stored prior to transportation will be contained in leak-tight DOT approved containers. Each container holding RCRA lead waste must have the yellow and black hazardous waste label as illustrated below. If at any time during the storage lead containing waste a leak, tear, rip, or hole appears in the waste container, personnel shall immediately seal the leakage off and decontaminate the exposed area using HEPA vacuuming and/or wet methods. The affected waste container shall be discarded into a properly labeled waste container.

Lead-Based Paint Disposal Container Labeling (Yellow and Black Label)

HAZARDOUS
WASTE
IF FOUND, CONTACT THE NEAREST POLICE SAFETY
AUTHORITY OR THE U.S. ENVIRONMENTAL
GENERATOR INFORMATION;
NAME----------
ADDRESS----------
CITY----------STATE----------
EPA/MANIFEST
ID NO./DOCUMENT NO.----------
ACCUMULATION
START DATE----------
HAZARDOUS WASTE, SOLID, N.O.S.

NA Number.....
D.O.T. PROPER SHIPPING NAME AND UN NO. WITH
HANDLE WITH CARE

The generation start date is the day when the container is used to store the lead waste. Containers in storage should be positioned in so that label is clearly visible.

7.3 Transportation Of Lead Waste

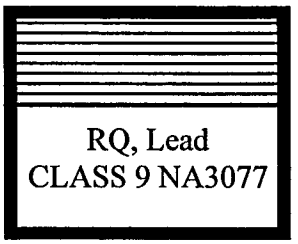
Transportation of the lead waste will be either as hazardous or non-hazardous depending on the determination of the lead waste. Hazardous RCRA waste will be transported by a licensed hazardous waste hauler (to be named later) while the non-RCRA waste will be transported using a licensed hauler with a non-hazardous waste manifest to a Class II or III disposal facility.

A hazardous waste manifest shall accompany all hazardous waste shipments (unless the waste is generated by a conditionally exempt, small-quantity generator [<100kg or 25gal./mon]) . The manifest is the tracks the waste from the generator to the disposal site. All manifest shall be filled out completely and accurately as per 40 CFR Part 262.20 through 262.22. If a copy of the manifest is not received by the generator within 35 days, the generator shall call the transporter or land disposal facility to determine the status of the manifest. If after 45 days the manifest has not been received by the generator, an exception report shall be submitted to the EPA Regional Administrator. All copies of manifest shall be retained by ECC for at least 10 years. The proper shipping name for lead waste:

Hazardous Waste Solid, N.O.S. D008 Div. 9 NA 3077 Packing Group III

DOT placards shall display the following:

(Diamond placard with Black zebra stripe on top half)



7.4 Disposal of Lead Waste

The waste materials will be transported to the approved landfill(s) according to the lead

concentrations (mentioned above) as determined by the TCLP analytical results . In the event that RCRA waste has been profiled, the RCRA waste is solidified prior to disposal in the hazardous waste landfill (to named later) while the Non-RCRA waste will landfilled in either Class II or II landfill.

The Land Disposal Restriction (LDR) Ban Notification requires all RCRA waste to meet certain restrictions prior to land disposal. The waste must be treated using a particular treatment method or, the waste must be treated to meet specific numerical values (5 ppm) before land disposal. Lead hazardous waste must be stabilized, undergo physical extraction, chemical extraction, thermal extraction, destruction, or immobilization prior to land disposal. Normally, the hazardous waste management facility will fill out the LDR form. The LDR Ban Notification shall be retained by ECC for a period of 10 years.

42.0 Disciplinary Procedure

All employees are expected to comply with professional standards of behavior and performance. Any deviation from these standards must be corrected and will be subject to discipline. While ECC reserves the right to discipline and /or terminate employees at its sole discretion, when justified, the following procedure may apply: The supervisor will:

1. Meet with the employee to discuss the matter;
2. Inform the employee of the nature of the problem and the action necessary to correct it; and
3. Prepare a memorandum for the supervisor's own records indicating that the meeting has taken place. This memorandum should include the signatures of the supervisor and the employee, and a copy will be placed in the employee's personnel file.

If there is a second occurrence, the supervisor may hold another meeting with the employee and:

1. Issue a written reprimand to the employee;
2. Warn the employee that a third incident will result in more severe disciplinary action; and
3. Prepare and forward to HR a written report describing the first and second incidents and summarizing the action taken during the meeting with the employee. This report should include the signatures of the employee and the supervisor.

A warning period may be invoked by a supervisor when a serious problem arises regarding job performance or conduct. This period normally does not exceed ninety (90) days. This period is intended to notify the employee of a specific problem, recommend corrective action, and to give the employee a reasonable period of time in which to make the desired corrections. If there are additional occurrences, the supervisor may:

1. Issue a written reprimand or warning;
2. Suspend the employee without pay for up to five working days; or
3. Suspend the employee indefinitely and recommend termination.

After taking action under this policy, the supervisor will prepare and forward to HR a written report describing the occurrences, indicating the timing between the occurrences, and summarizing the action taken or recommended and its justification. In cases involving serious misconduct, such as a violation of law, these procedures may be disregarded. The supervisor has the right to suspend the employee immediately and/or recommend termination of the employee. If a supervisor recommends that an employee be terminated, an investigation of the situation will be conducted. The employee is allowed a hearing before management reaches a decision. At any investigatory interview conducted for the purpose of determining the facts involved in suspected violation of rules and regulations, the following procedures apply:

1. Prior to the interview, the employee who is suspected of violating ECC rules or regulations must be informed of the purpose for the interview.

2. The employee may have a co-worker present at the interview, if the employee's interview covers issues affecting other employees.

Employees suspended from work will not receive or accrue any benefits during the suspension. Employees who believe they have been disciplined too severely or without good cause are encouraged to utilize the grievance procedure. A period of one year during which an employee experiences no disciplinary problems will nullify any previous violations or incidents for purposes of implementing the disciplinary procedures contained in this policy. Any documentation of employee warnings or hearings should be kept in that employee's personnel file and should be consulted prior to any disciplinary action. All new employees will be informed of these rules and procedures.

ATTACHMENTS

ACCIDENT INVESTIGATION REPORT

Employee's Name_____ **Job No.**_____

Date of Accident_____ **Project/Office**_____

Accident description (what happened):_____

Cause of accident (e.g., poor visibility, backing up without a guide, etc.):_____

Corrective action to be taken: _____

In the event of a work-related death, or the in-patient hospitalization of one or more persons, ECC shall require a drug screening test for the individual(s) directly involved in the accident. 29 CFR 1904.8 requires the employer to notify the nearest OSHA office within 8 hours of a work-related fatality or the hospitalization of three or more employees.

Completed by: SSHO:_____ Date:_____

Signature:_____

Reviewed by: Project/Program Manager_____ Date:_____

Signature:_____ Date:_____

ENVIRONMENTAL CHEMICAL CORPORATION
VISITOR INFORMATION FORM

You are entering a hazardous waste site. Overexposure to the toxic substances here can cause damage to internal organs and, in cases of extreme exposure, death. Heavy equipment operation and other inherently dangerous work is underway. You will remain with your designated escort at all times and follow his/her instructions for your safety and the safety of others. You must also wear all protective clothing and equipment issued. Minimum protective equipment will be Level D protection (hard hat, steel toed boots, and safety glasses). Equipment issued must be returned prior to leaving the site.

VISITORS CERTIFICATION

I acknowledge that I have been advised of the dangers present at this hazardous waste site facility. I agree to immediately follow all direction(s) given by my escort on site. I also certify that I do relieve ECC, the U.S. Government, the applicable state which the project site is located, their officers, employees, and agents of all liability of all consequences raising from and related to the potential hazards associated with entry to this site.

NAME	SIGNATURE

ENVIRONMENTAL CHEMICAL CORPORATION

HEALTH AND SAFETY PLAN
COMPLIANCE AGREEMENT

I,_____ have received a copy of the Site Specific Safety and Health Plan for the _____ project. I have received information and training on the contents of the plan including operations to be performed, site hazards, safety requirements, use of personal protective clothing and equipment, monitoring requirements, site control and decontamination procedures and actions to take in the event of a site emergency.

I have reviewed the plan, understand its requirements, and agree to comply with all of its provisions. I understand that failure to comply with these requirements could result in disciplinary action.

_____	_____
Signature	Position
_____	_____
Employer	Date

TAILGATE SAFETY MEETING

Conducted by_____ Date_____

Site_____ Project #_____

Type of Work_____

Identify PPE and Level of Protection: A B C D_____

_____

Hospital/Clinic: _____

Address: _____

Phone: _____

ATTENDEES

Name (printed) Signature

_____

_____

_____

_____

_____

_____

List physical, chemical and equipment hazards for today's work and preventive measures to be taken to minimize the hazard.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Attachment 4

Appendix C to 1910.134:OSHA Respirator Medical Evaluation Questionnaire (Mandatory)

To the employer: Answers to questions in Section 1, and to question 9 in Section 2 of Part A, do not require a medical examination.

To the employee:

Can you read (circle one): Yes No

Your employer must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, your employer or supervisor must not look at or review your answers, and your employer must tell you how to deliver or send this questionnaire to the health care professional who will review it.

Part A. Section 1. (Mandatory) The following information must be provided by every employee who has been selected to use any type of respirator (please print).

1. Today's date:_____

2. Your name:_____

3. Your age (to nearest year):_____

4. Sex (circle one): Male Female

5. Your height: _____ ft. _____ in.

6. Your weight: _____ lbs.

7. Your job title:_____

8. A phone number where you can be reached by the health care professional who reviews this questionnaire

(include the Area Code): _____

9. The best time to phone you at this number: _____

10. Has your employer told you how to contact the health care professional who will review this questionnaire (circle one): ..... Yes No

11. Check the type of respirator you will use (you can check more than one category):
a. _____ N, R, or P disposable respirator (filter-mask, non-cartridge type only).
b. _____ Other type (for example, half- or full-facepiece type, powered-air purifying, supplied-air, self-contained breathing apparatus).

12. Have you worn a respirator (circle one): ..... Yes No

If "yes," what type(s):_____

_____

Part A. Section 2. (Mandatory) Questions 1 through 9 below must be answered by every employee who has been selected to use any type of respirator (please circle "yes" or "no").

1. Do you currently smoke tobacco, or have you smoked tobacco in the last month: ..... Yes No

2. Have you ever had any of the following conditions?
   a. Seizures (fits): ..... Yes No
   b. Diabetes (sugar disease): ..... Yes No
   c. Allergic reactions that interfere with your breathing: ..... Yes No
   d. Claustrophobia (fear of closed-in places): ..... Yes No
   e. Trouble smelling odors (except when you had a cold): ..... Yes No

3. Have you ever had any of the following pulmonary or lung problems?
   a. Asbestosis: ..... Yes No
   b. Asthma: ..... Yes No
   c. Chronic bronchitis: ..... Yes No
   d. Emphysema: ..... Yes No
   e. Pneumonia: ..... Yes No
   f. Tuberculosis: ..... Yes No
   g. Silicosis: ..... Yes No
   h. Pneumothorax (collapsed lung): ..... Yes No
   i. Lung cancer: ..... Yes No
   j. Broken ribs: ..... Yes No
   k. Any chest injuries or surgeries: ..... Yes No
   l. Any other lung problem that you've been told about: ..... Yes No

4. Do you currently have any of the following symptoms of pulmonary or lung illness?
   a. Shortness of breath: ..... Yes No
   b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline: Yes No
   c. Shortness of breath when walking with other people at an ordinary pace on level ground: .. Yes No
   d. Have to stop for breath when walking at your own pace on level ground: ..... Yes No
   e. Shortness of breath when washing or dressing yourself: ..... Yes No
   f. Shortness of breath that interferes with your job: ..... Yes No
   g. Coughing that produces phlegm (thick sputum): ..... Yes No
   h. Coughing that wakes you early in the morning: ..... Yes No
   i. Coughing that occurs mostly when you are lying down: ..... Yes No
   j. Coughing up blood in the last month: ..... Yes No
   k. Wheezing: ..... Yes No
   l. Wheezing that interferes with your job: ..... Yes No
   m. Chest pain when you breathe deeply: ..... Yes No
   n. Any other symptoms that you think may be related to lung problems: ..... Yes No

5. Have you ever had any of the following cardiovascular or heart problems?
   a. Heart attack: ..... Yes No
   b. Stroke: ..... Yes No
   c. Angina: ..... Yes No
   d. Heart failure: ..... Yes No
   e. Swelling in your legs or feet (not caused by walking): ..... Yes No
   f. Heart arrhythmia (heart beating irregularly): ..... Yes No
   g. High blood pressure: ..... Yes No
   h. Any other heart problem that you've been told about: ..... Yes No

6. Have you ever had any of the following cardiovascular or heart symptoms?
   a. Frequent pain or tightness in your chest: ..... Yes No
   b. Pain or tightness in your chest during physical activity: ..... Yes No
   c. Pain or tightness in your chest that interferes with your job: ..... Yes No
   d. In the past two years, have you noticed your heart skipping or missing a beat: ..... Yes No
   e. Heartburn or indigestion that is not related to eating: ..... Yes No
   f. Any other symptoms that you think may be related to heart or circulation problems: ..... Yes No

7. Do you currently take medication for any of the following problems?
   a. Breathing or lung problems: ..... Yes No
   b. Heart trouble: ..... Yes No
   c. Blood pressure: ..... Yes No
   d. Seizures (fits): ..... Yes No

8. Has your wearing a respirator caused any of the following problems? (If you've never used a respirator, check the following space __ and go to question 9:)
   a. Eye irritation: ..... Yes No
   b. Skin allergies or rashes: ..... Yes No
   c. Anxiety that occurs only when you use the respirator: ..... Yes No
   d. Unusual weakness or fatigue: ..... Yes No
   e. Any other problem that interferes with your use of a respirator: ..... Yes No

9. Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire: ..... Yes No

Questions 10 to 15 below must be answered by every employee who has been selected to use either a full-facepiece respirator or a self-contained breathing apparatus (SCBA). For employees who have been selected to use other types of respirators, answering these questions is voluntary.

10. Have you ever lost vision in either eye (temporarily or permanently): ..... Yes No

11. Do you currently have any of the following vision problems?
   a. Wear contact lenses: ..... Yes No
   b. Wear glasses: ..... Yes No
   c. Color blind: ..... Yes No
   d. Any other eye or vision problem: ..... Yes No

12. Have you ever had an injury to your ears, including a broken ear drum: ..... Yes No

13. Do you currently have any of the following hearing problems?
   a. Difficulty hearing: ..... Yes No
   b. Wear a hearing aid: ..... Yes No
   c. Any other hearing or ear problem: ..... Yes No

14. Have you ever had a back injury: ..... Yes No

15. Do you currently have any of the following musculoskeletal problems?
   a. Weakness in any of your arms, hands, legs, or feet: ..... Yes No
   b. Back pain: ..... Yes No
   c. Difficulty fully moving your arms and legs: ..... Yes No
   d. Pain or stiffness when you lean forward or backward at the waist: ..... Yes No
   e. Difficulty fully moving your head up or down: ..... Yes No
   f. Difficulty fully moving your head side to side: ..... Yes No
   g. Difficulty bending at your knees: ..... Yes No
   h. Difficulty squatting to the ground: ..... Yes No

i. Difficulty climbing a flight of stairs or a ladder carrying more than 25 lbs: ..... Yes No
j. Any other muscle or skeletal problem that interferes with using a respirator: ..... Yes No

Part B Any of the following questions, and other questions not listed, may be added to the questionnaire at the discretion of the health care professional who will review the questionnaire.

1. In your present job, are you working at high altitudes (over 5,000 feet) or in a place that has lower than normal amounts of oxygen: ..... Yes No
If "yes," do you have feelings of dizziness, shortness of breath, pounding in your chest, or other symptoms when you're working under these conditions: ..... Yes No

2. At work or at home, have you ever been exposed to hazardous solvents, hazardous airborne chemicals (e.g., gases, fumes, or dust), or have you come into skin contact with hazardous chemicals: ..... Yes No

If "yes," name the chemicals if you know them:_____

_____

_____

3. Have you ever worked with any of the materials, or under any of the conditions, listed below:
a. Asbestos: ..... Yes No
b. Silica (e.g., in sandblasting): ..... Yes No
c. Tungsten/cobalt (e.g., grinding or welding this material): ..... Yes No
d. Beryllium: ..... Yes No
e. Aluminum: ..... Yes No
f. Coal (for example, mining): ..... Yes No
g. Iron: ..... Yes No
h. Tin: ..... Yes No
i. Dusty environments: ..... Yes No
j. Any other hazardous exposures: ..... Yes No

If "yes," describe these exposures:_____

_____

_____

4. List any second jobs or side businesses you have:_____

_____

5. List your previous occupations:_____

_____

6. List your current and previous hobbies:_____

_____

7. Have you been in the military services? ..... Yes No
If "yes," were you exposed to biological or chemical agents (either in training or combat): ..... Yes No

8. Have you ever worked on a HAZMAT team? ..... Yes No

9. Other than medications for breathing and lung problems, heart trouble, blood pressure, and seizures mentioned earlier in this questionnaire, are you taking any other medications for any reason (including over-the-counter medications): ..... Yes No

If "yes," name the medications if you know them:_____

10. Will you be using any of the following items with your respirator(s)?
   a. HEPA Filters: ..... Yes No
   b. Canisters (for example, gas masks): ..... Yes No
   c. Cartridges: ..... Yes No

11. How often are you expected to use the respirator(s) (circle "yes" or "no" for all answers that apply to you)?:
   a. Escape only (no rescue): ..... Yes No
   b. Emergency rescue only: ..... Yes No
   c. Less than 5 hours per week: ..... Yes No
   d. Less than 2 hours per day: ..... Yes No
   e. 2 to 4 hours per day: ..... Yes No
   f. Over 4 hours per day: ..... Yes No

12. During the period you are using the respirator(s), is your work effort:

   a. Light (less than 200 kcal per hour): ..... Yes No

If "yes," how long does this period last during the average shift:_____hrs._____mins.
Examples of a light work effort are sitting while writing, typing, drafting, or performing light assembly work; or standing while operating a drill press (1-3 lbs.) or controlling machines.

   b. Moderate (200 to 350 kcal per hour): ..... Yes No

If "yes," how long does this period last during the average shift:_____hrs._____mins.
Examples of moderate work effort are sitting while nailing or filing; driving a truck or bus in urban traffic; standing while drilling, nailing, performing assembly work, or transferring a moderate load (about 35 lbs.) at trunk level; walking on a level surface about 2 mph or down a 5-degree grade about 3 mph; or pushing a wheelbarrow with a heavy load (about 100 lbs.) on a level surface.

   c. Heavy (above 350 kcal per hour): ..... Yes No

If "yes," how long does this period last during the average shift:_____hrs._____mins.
Examples of heavy work are lifting a heavy load (about 50 lbs.) from the floor to your waist or shoulder; working on a loading dock; shoveling; standing while bricklaying or chipping castings; walking up an 8-degree grade about 2 mph; climbing stairs with a heavy load (about 50 lbs.).

13. Will you be wearing protective clothing and or equipment (other than the respirator) when you're using your respirator: ..... Yes No

If "yes," describe this protective clothing and or equipment:_____

_____

14. Will you be working under hot conditions (temperature exceeding 77 deg. F): ..... Yes No

15. Will you be working under humid conditions: ..... Yes No

16. Describe the work you'll be doing while you're using your respirator(s):

_____

_____

17. Describe any special or hazardous conditions you might encounter when you're using your respirator(s) (for example, confined spaces, life-threatening gases):

_____

_____

18. Provide the following information, if you know it, for each toxic substance that you'll be exposed to when you're using your respirator(s):

Name of the first toxic substance:_____

Estimated maximum exposure level per shift:_____

Duration of exposure per shift_____

Name of the second toxic substance:_____

Estimated maximum exposure level per shift:_____

Duration of exposure per shift:_____

Name of the third toxic substance:_____

Estimated maximum exposure level per shift:_____

Duration of exposure per shift:_____

The name of any other toxic substances that you'll be exposed to while using your respirator:

_____

_____

_____

19. Describe any special responsibilities you'll have while using your respirator(s) that may affect the safety and well-being of others (for example, rescue, security):

_____

_____

SAFETY INSPECTION CHECK LIST FOR CONSTRUCTION EQUIPMENT

(Including Cranes, Derricks, and Hoisting Equipment)

PROJECT	CONTRACTOR	CONTRACT NO.
TYPE AND MAKE OF EQUIPMENT	MODEL	SERIAL NO.

Before any machinery or mechanized equipment is placed in use, it shall be inspected and tested by a competent mechanic and certified to be in good operating condition. Records of tests and inspections shall be maintained as part of the active contract file at Project or Resident Office. Check list set forth herein requires the application of EM 385-1-1, Safety and Health Requirements Manual, 1 Oct 87. The appropriate EM paragraph to be applied is listed at the end of each testing requirement.

CHECK LIST	Yes	No	Not Appl
1. ARE ADEQUATE AND SERVICEABLE FIRE EXTINGUISHERS PROVIDED? (13.A.01)			
2. ARE ALL WIRE ROPE CABLES IN GOOD CONDITION? (17.C.01)			
3. ARE WIRE ROPE, SOCKETS, SPLICES, THIMBLES AND CLIPS ADEQUATE AND PROPERLY APPLIED? (17.C.09)			
4. ARE HOOKS, SAFETY HOOKS, SHACKLES, RINGS, ETC., IN GOOD CONDITION? (17.A.02, 17.A.05)			
5. ARE NECESSARY PLATFORMS, FOOTWALKS, ETC., PROVIDED? (18.B.08)			
6. ARE ACCESS STEPS, PLATFORMS, ETC., PROVIDED WITH NON-SLIP SURFACES? (18.B.08, 19.A.14, (26.B.03)			
7. IS OPERATOR PROTECTED AGAINST THE ELEMENTS, FALLING OR FLYING OBJECTS, SWINGING LOADS, AND SIMILAR HAZARDS? (18.B.18, 19.A.13, 18.B.17, 18.B.19, 18.B.21)			
8. ARE ALL GLASSES IN OPERATOR'S COMPARTMENT SAFETY GLASS AND IN GOOD REPAIR? (19.A.15, 19.A.16, 18.B.18)			
9. IS SUITABLE ACCESS PROVIDED TO LUBRICATION POINTS? (18.A.18)			
10. DO ALL MODIFICATIONS, EXTENSIONS, REPLACEMENT PARTS, AND/OR REPAIRS TO EQUIPMENT MAINTAIN THE SAME FACTOR OF SAFETY AS ORIGINAL DESIGNED EQUIPMENT? (18.A.33, 18.C.04)			
11. ARE DRUMS FOR LOAD LINES EQUIPPED WITH AT LEAST ONE POSITIVE HOLDING DEVICE, APPLIED DIRECTLY TO THE MOTOR SHAFT OR SOME PART OF THE TRAIN GEAR? (18.C.06)			
12. IS THERE SUFFICIENT CABLE TO ALLOW TWO FULL WRAPS OF CABLE ON DRUMS AT ALL WORKING POSITIONS? (18.C.07)			
13. ARE ADEQUATE HEADLIGHTS, TAIL-LIGHTS AND TURN SIGNALS PROVIDED AND ARE THEY IN PROPER OPERATING CONDITION? (19.A.06, 18.A.15)			
14. ARE ALL APPROVED BRAKES ON WHEELED EQUIPMENT AND IN GOOD OPERATING CONDITION? (18.A.21, 18.A.22, 19.A.07, 19.A.08)			
15. DO WINDSHIELDS HAVE WIPERS IN PROPER OPERATING CONDITION? (19.A.10, 18.A.29)			
16. ARE REAR VIEW MIRRORS PROVIDED? (19.A.12)			
17. ARE OPERATING LEVERS EQUIPPED WITH LATCH OR OTHER DEVICES TO PREVENT ACCIDENTAL STARTING? (19.A.21)			

CHECK LIST	Yes	No	Not Appl
18. IS ENGINE EQUIPPED WITH POWER-OPERATED STARTING DEVICE IN OPERATIVE CONDITION? (19.A.24)			
19. DO ALL PRESSURE VESSELS HAVE VALID INSPECTION CERTIFICATES? (21.A.01, 21.B.01, 21.C.01, 21.D.01)			
20. ARE REVERSE SIGNAL ALARMS ON EQUIPMENT? (18.B.01)			
21. ARE BELTS, GEARS, SHAFTS, ELECTRICAL CONTACTS, ETC., ADEQUATELY GUARDED? (18.B.03, 16.A.04)			
22. ARE ALL HOT PIPES AND SURFACES SUITABLY GUARDED? (18.B.04)			
23. ARE FUEL TANKS LOCATED SO THAT SPILLS OR OVERFLOWS WILL NOT COME IN CONTACT WITH ENGINE OR EXHAUST? (18.B.05)			
24. ARE EXHAUSTS AND DISCHARGES SO DIRECTED AS NOT TO ENDANGER WORKMEN OR OBSTRUCT VIEW OF OPERATOR? (18.B.06)			
25. ARE GUARDS IN PLACE ON EQUIPMENT WITH DROP TYPE SKIP PANS? (18.B.07)			
26. ARE ADEQUATE SEATS PROVIDED FOR ALL RIDERS? (18.A.07, 19.C.01, 19.C.02)			
27. ARE TIRES IN SERVICEABLE CONDITION? ARE TESTING/INSPECTIONS DOCUMENTED? (18.A.01, 19.A.03)			
28. ARE STEERING LINKAGE AND TIE ROD IN GOOD OPERATING CONDITION? ARE TESTING/INSPECTIONS DOCUMENTED? (18.A.01)			
29. ARE DUMP BODIES PROVIDED WITH HOLDING DEVICE OR OTHER SUITABLE DEVICE FOR LOCKING BODY IN RAISED POSITION? (19.A.20)			
30. ARE TAILGATE DUMPING DEVICES SO ARRANGED THAT OPERATOR WILL BE IN THE CLEAR WHILE DUMPING LOADS? (19.A.22)			
31. ARE TRIP-HANDLES PROVIDED ON TAILGATES TO FACILITATE HANDLING? (19.A.22)			
32. IS AIR HOSE FREE FROM LEAKS OR DEFECTS? (16.A.07)			
33. ARE SAFETY LASHINGS FOR QUICK MAKE-UP TYPE CONNECTIONS PROVIDED? (16.E.03, 12.A.18)			
34. IS ACCEPTABLE SPARK ARRESTOR INSTALLED AND WORKING? (18.B.06, 12.C.03)			
35. DO HEATING DEVICES COMPLY WITH REFERENCES? (06.B, 12.D)			
36. DOES WELDING EQUIPMENT COMPLY WITH CODE REQUIREMENTS? (14.A.01, 14.A.02, 14.A.03, 15.A.04)			
37. IS EQUIPMENT ADEQUATELY GROUNDED? (14.C.02, 14.C.03, 15.A.08)			
38. DO ELECTRICAL COMPONENTS COMPLY WITH CODE? (15.A.01)			
39. ARE REQUIRED PRESSURE, TEMPERATURE OR RELIEF GAGES AND VALVES INSTALLED AND OPERABLE? (21.A.10, 21.A.11, 08.B.05)			
40. ARE APPROVED SEAT BELTS AND ROLL-OVER PROTECTION PROVIDED? (18.B.16, 18.B.20)			
41. IS RECOMMENDED PREVENTIVE MAINTENANCE BEING FOLLOWED? (18.A.03)			

CHECK LIST	Yes	No	Not Appl
42. DO HELICOPTER CRANES MEET CONSTRUCTION REQUIREMENTS? (18.Q.01, 18.Q.04, 18.Q.10)			
43. DO HYDRAULIC JACKS MEET SPECIAL SAFETY CONDITIONS? (18.R)			
44. IS CONCRETE EQUIPMENT FITTED WITH ADEQUATE SAFETY DEVICES? (18.O.02, 18.O.03, 18.O.05, (18.O.07, 18.O.08)			
45. ARE ELEVATING AND ROTATING WORK PLATFORMS IN CONFORMANCE WITH ANSI A92.2? (18.N.01)			
46. DO CONVEYORS, CABLEWAYS, AND RELATED EQUIPMENT CONFORM TO ANSI B20.01? (18.K.01)			
47. ARE PILE DRIVERS EQUIPPED WITH ALL APPROPRIATE SAFETY DEVICES? (18.J)			
48. DO MATERIAL HOISTS CONFORM TO ANSI A10.5? (18.I)			
49. DO PASSENGER ELEVATORS CONFORM TO ANSI A10.4? DO TEMPORARY HOISTS IN ACCORDANCE TO ANSI A10.22? (18.H.01)			
50. DO HAND AND POWER TOOLS COMPLY WITH APPLICABLE ANSI STANDARDS? (SEC 16)			
The following six questions apply to Cranes and Hoisting Equipment only and need not be answered for other construction equipment.			
51. IS HIGH VOLTAGE SIGN POSTED? (15.E.08, 18.C.02)			
52. IS EQUIPMENT FITTED WITH POSITIVE STOPS FOR ROTATION WHEN NEAR POWER LINES? (15.E.09)			
53. IS THERE ANY VISIBLE EVIDENCE OF DAMAGE TO BOOM? (18.A.01, 18.C.01)			
54. IS THE BOOM POSITION INDICATOR OPERATING AND VISIBLE TO OPERATOR? (18.O.04, 18.C.13, 18.E.08, 18.F.03, 18.G.04)			
55. HAVE ALL OPERATORS HAD A CURRENT PHYSICAL EXAMINATION? (05.A.01, 05.B.03)			
56. IS BRAKING EQUIPMENT CAPABLE OF EFFECTIVELY BRAKING, LOWERING AND SAFELY HOLDING A LOAD OF AT LEAST THE FULL RATED LOAD AS REQUIRED? (18.C.08)			

REMARKS:

CERTIFICATION: *I hereby certify that this item of equipment is in good operating condition and that it meets all above requirements except as noted under remarks.*

SIGNATURE OF COMPETENT MECHANIC — DATE

SIGNATURE OF SUPERINTENDENT/QUALITY CONTROL ENGINEER — DATE

ENVIRONMENTAL CHEMICAL CORPORATION
REFERENCES

American Conference of Governmental Industrial Hygienists, Threshold Limit Values for Chemical Substances and Physical Agents in the Workroom Environment with Intended Changes, P.O. Box 1937, Cincinnati, Ohio 45201 (latest edition).

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Annual Report on Carcinogens, National Toxicity Program, Department of Health and Human Services, Public Health Service.

IARC Monograph on the Evaluation of the Carcinogenic Risk of Chemicals to Man.

National Research Council, Prudent Practices for Handling Hazardous Chemicals in Laboratories, National Academy Press, Washington, D.C., 1981.

OSHA Standard, Air Contaminants - Permissible Exposure Limits, Title 29 Code of Federal Regulations, Part 1910.1000, March 1, 1989.

OSHA Standard, Occupational Exposures to Hazardous Chemicals in Laboratories; Final Rule Title 29, Code of Federal Regulations Part 1910.1450 (1990).

OSHA Regulations 29 CFR 1910 (General Industry Safety Orders) and 29 CFR 1926 (Construction Safety Orders).

OSHA Regulations 40 CFR Part 260, 262, 263 (Environmental Protection Agency).

OSHA Regulations 49 CFR Part 170-173 (Department of Transportation).

U.S. Army Corps of Engineers "Safety and Health Manual", EM 385-1-1, September '96.