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WEST CHICAGO PROJECT

Health and Safety Plan

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HEALTH AND SAFETY PLAN

Kerr-McGee Residential Areas Site

West Chicago, Illinois

Submitted to:

U.S. EPA Region V

Office of Superfund

April 10, 1995

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4/11/95
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TABLE OF CONTENTS

1. SCOPE OF PLAN 1-1

2. SAFETY MANAGEMENT 2-1
    2.1 Project Health and Safety Coordinator 2-1

3. PERSONNEL RESPONSIBILITIES 3-1

4. HAZARD ASSESSMENT 4-1
    4.1 Principal Contaminants (Known or Suspected) 4-1
    4.2 Physical Hazards 4-1
        4.2.1 Heat Stress 4-2
        4.2.2 Cold Stress 4-2
        4.2.3 Electrical Hazards 4-3
        4.2.4 Noise Hazard 4-4
        4.2.5 Overt Chemical Exposure 4-4
        4.2.6 Adverse Weather Conditions 4-4
    4.3 Medical Evaluation and Surveillance Program 4-4
        4.3.1 Dosimetry/Personnel Monitoring 4-5
        4.3.2 Requirement for Dosimetry 4-5
        4.3.3 Bioassay 4-5
        4.3.4 Emergency Medical Treatment 4-6
    4.4 Accident And Incident Reporting 4-7

5. TRAINING 5-1
    5.1 Project- and Site-Specific Training 5-1
    5.2 Visitor Orientation 5-1
    5.3 Safety "Tailgate" Meetings 5-1
    5.4 First Aid 5-2
    5.5 Safe Work Permit 5-2

6. COMMUNICATIONS 6-1
    6.1 General Communications 6-1
    6.2 Radios 6-1
    6.3 Emergency Warning 6-1
    6.4 Hand Signals 6-1
    6.5 Site Security 6-2

Table of Contents (Continued)

7. PERSONNEL EXPOSURE AND AIR QUALITY MONITORING 7-1
7.1 Air Quality (Dust) 7-1
7.2 Airborne Radioactivity Monitoring 7-1
7.3 Internal Monitoring 7-2
7.4 External Radiation Monitoring 7-2
7.5 Radiological Surveys 7-2
7.6 Contamination Monitoring 7-3
7.7 Action Levels 7-3

8. PERSONNEL PROTECTIVE EQUIPMENT 8-1

9. CONTAMINATION REDUCTION PROCEDURES 9-1
9.1 Equipment 9-1
9.2 Personnel 9-1
9.3 Contamination Prevention 9-2
9.4 Disposal Procedures 9-2

10. GENERAL WORK PRECAUTIONS 10-1
10.1 Kerr-McGee Safety Handbook 10-1
10.2 Personnel 10-1
10.3 Operational Precautions 10-2

11. SANITARY FACILITIES 11-1
11.1 Potable Water 11-1
11.2 Toilet Facilities 11-1
11.3 Washing Areas 11-1

12. FIRE CONTROL EQUIPMENT 12-1

13. CONFINED SPACE PROGRAM 13-1
13.1 Purpose 13-1
13.2 Responsibilities 13-1
13.2.1 Project Health and Safety Coordinator 13-1
13.2.2 Offsites Manager 13-1
13.2.3 Field Team Leader 13-2
13.2.4 Personnel 13-2

Table of Contents (Continued)

13.3 Definition Of A Confined Space 13-2
13.4 Confined Space Entry Procedures 13-3
13.4.1 Entry Permit Required 13-3
13.4.2 Pre-Entry Testing for Potential Hazards 13-3
13.4.3 Rescue Procedures 13-5
13.5 Training 13-5
13.6 Safe Work Practices 13-5

14. ELECTRICAL LOCKOUT/TAGOUT 14-1

APPENDIX A - KERR-MCGEE MEDICAL EVALUATION PROGRAM

APPENDIX B - KERR-MCGEE RESPIRATORY PROTECTION PROGRAM

APPENDIX C - KERR-MCGEE SAFETY HANDBOOK

LIST OF TABLES

TABLE 7.1 ACTION LEVELS AS DETERMINED BY RADIOACTIVITY

LIST OF FIGURES

FIGURE 4.1 ACCIDENT/EXPOSURE INVESTIGATION REPORT

FIGURE 5.1 SAFETY MEETING REPORT

FIGURE 5.2 SAFE WORK PERMIT

FIGURE 13.1CONFINED SPACE ENTRY PERMIT

EMERGENCY PHONE NUMBERS

IN THE EVENT OF AN EMERGENCY DIAL: 911

AMBULANCE SERVICE 911

FIRE DEPARTMENT 911

EMERGENCY RESCUE SERVICE 911

POLICE DEPARTMENT 911

NATIONAL RESPONSE CENTER 1-800-424-8802

CHEMTREC 1-800-424-9300

POISON CONTROL CENTER 1-800-732-2200

TYLER MEDICAL SERVICES ..... (708) 584-2070

ILLINOIS DEPARTMENT OF NUCLEAR SAFETY (IDNS) EMERGENCY NUMBER ..... (217) 785-0600

KERR-McGEE WEST CHICAGO SECURITY OFFICER ..... (708) 293-6361

ILLINOIS EMERGENCY MANAGEMENT ..... (217) 782-7860

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY (IEPA) ..... (217) 782-7860 OR

..... (217) 782-3637

1. SCOPE OF PLAN

The following Health and Safety Plan (HASP) will be utilized and modified as necessary in order to minimize and prevent exposures to hazardous substances and conditions related to all Excavation and Restoration Phase activities of the Kerr-McGee Residential Areas Site (Kerr-McGee Residential Areas Site). All personnel assigned to this project will be required to review thoroughly the contents of the HASP and to strictly adhere to the policies and procedures listed herein. This health and saftey plan is for use only by Kerr-McGee, its designated contractors and consultants, and Kerr-McGee approved site visitors. U.S. EPA, IDNS, and other agencies are not considered visitors and will be required to conform to their own Health and Safety Plans.

2. SAFETY MANAGEMENT

The following safety management structure will be utilized for the implementation, administration, and monitoring of the HASP.

2.1 PROJECT HEALTH AND SAFETY COORDINATOR

The Project Health and Safety Coordinator (HSC) shall assume overall responsibility for the HASP. The HSC shall monitor and maintain quality assurance of the HASP until project completion. Principal duties of the HSC include:

- Review of project background data,
- Approve all HASP modifications,
- Administer and enforce the HASP,
- Evaluate the adequacy of personnel protective equipment (PPE) to be used by site personnel,
- Conduct required on-site training except tail-gate safety meetings that will be conducted by the Field Team Leaders,
- Brief visitors to the work site, and
- Administer personnel and ambient air monitoring procedures.

The HSC has the authority to stop work in the event conditions develop which pose an unreasonable risk to site personnel or residents.

3. PERSONNEL RESPONSIBILITIES

The HSC will administer and supervise the HASP at the work site level. He will monitor all operations and will be the primary on-site contact for health and safety issues, and will have full authority to stop operations if conditions are judged to be hazardous to on-site personnel or the public.

The HSC will brief all site personnel on the contents of the HASP. Personnel will be required to review the HASP, and have the opportunity to ask questions about the planned work or hazards. The Field Team Leader will conduct tailgate safety meetings to familiarize the site personnel with site conditions, boundaries, and physical hazards. Site personnel will conduct their assigned tasks in accordance with the HASP at all times.

If at any time site personnel observe unsafe conditions, faulty equipment or other conditions which could jeopardize personnel health and safety, they are required to immediately report their observations to the HSC.

4. HAZARD ASSESSMENT

The following represents potential hazards associated with this project.

4.1 PRINCIPAL CONTAMINANTS (KNOWN OR SUSPECTED)

- Thorium
- Uranium
- Radium
- Radon

The contaminants are present in the soil at low concentrations. All primary routes of entry to the body will be considered.

ROUTE	ENTRY MADE VIA:
Inhalation:	Airborne dust containing heavy metal radionuclides.
Ingestion:	Airborne dust containing heavy metal radionuclides/contaminants.
	Improper or poor personal hygiene practices.
Eye and Skin:	Direct contact with contaminants.
	Improper or poor personal hygiene practices.
	Airborne dust containing heavy metal/radionuclide contaminant.
	Cuts and abrasions.
Direct Exposure:	Penetrating gamma radiation in air and soil.

4.2 PHYSICAL HAZARDS

Before field activities begin, the HSC will conduct a site reconnaissance to identify any real or potential hazards created from site activities. Physical hazards inherent to construction activities and power-operated equipment may exist.

4.2.1 Heat Stress

Field activities in hot climates create a potential for heat stress. The warning symptoms of heat stress include fatigue; loss of strength; reduced accuracy, comprehension and retention; and reduced alertness and mental capacity. To prevent heat stress, personnel shall receive adequate water supplies and electrolyte replacement fluids, and maintain scheduled work/rest periods.

The Field Team Leader or designee shall continuously visually monitor personnel to note for signs of heat stress. In addition, field personnel will be instructed to observe for symptoms of heat stress and methods on how to control it. One or more of the following control measures can be used to help control heat stress.

- Provision of adequate liquids to replace lost body fluids. Employees must replace water and salt lost from sweating. Employees must be encouraged to drink more than the amount required to satisfy thirst. Thirst satisfaction is not an accurate indicator of adequate salt and fluid replacement. Replacement fluids can be commercial mixes such as Gatorade.

- Establishment of a work regimen that will provide adequate rest periods for cooling down. This may require additional shifts of workers.

- Cooling devices such as vortex tubes or cooling vests can be worn beneath protective garments.

- Breaks should be taken in a cool rest area (77° is best).

- Employees shall remove impermeable protective garments during rest periods.

- Employees shall not be assigned other tasks during rest periods.

- All employees shall be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress.

4.2.2 Cold Stress

If the field activities occur during a period when temperatures average below freezing, the following guidelines will be followed.

Persons working outdoors in temperatures at or below freezing may suffer from cold exposure. During prolonged outdoor periods with inadequate clothing, effects of cold exposure may even occur at temperatures well above freezing. Cold exposure may cause severe injury by freezing exposed body surfaces (frostbite) or result in profound generalized cooling, possibly causing death. Areas of the body which have high

surface area-to-volume ratios such as fingers, toes and ears are the most susceptible to frostbite.

Two factors influence the development of a cold injury: ambient temperature and the velocity of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. For instance, 10° F with a wind of 15 miles per hour (mph) is equivalent in chilling effect to still air at -18°F.

As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is perspiration-soaked.

Local injury resulting from cold is included in the generic term "frostbite". There are several degrees of damage. Frostbite of the extremities can be categorized into:

- Frost nip or incipient frostbite:. Characterized by suddenly blanching or whitening of skin.
- Superficial frostbite: Skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- Deep frostbite: Tissues are cold, pale, and solid; extremely serious injury.

Prevention of frostbite is vital. Keep the extremities warm. Wear insulated clothing as part of one's protective gear during extremely cold conditions. Check for symptoms of frostbite at every break. The onset is painless and gradual--you may never know you have been injured until it is too late.

To administer first aid for frostbite, bring the victim indoors and rewarm the areas quickly in water 95° and 100°F. Give individual a warm drink--not coffee, tea, or alcohol. The victim should not smoke. Keep the frozen parts in warm water or covered with warm clothes for 30 minutes, even though the tissue will be very painful as it thaws; then elevate the injured area and protect it from injury. Do not allow blisters to be broken. Use sterile, soft, dry material to cover the injured areas. Keep victim warm and get immediate medical care.

4.2.3 Electrical Hazards

Overhead power lines, downed electrical wires, buried cables and improper use of electrical extension cords can pose a danger of shock or electrocution. All site personnel should immediately report any condition that could result in a potential electrical hazard.

Each Field Team Leader will notify site personnel during the safety meetings of the locations of known underground cables and utilities.

4.2.4 Noise Hazard

Operation of equipment may present a noise hazard to workers. Site personnel will utilize hearing protection when noise levels are determined to be in excess of 1910.95 requirements.

4.2.5 Overt Chemical Exposure

Typical response procedures include:

SKIN CONTACT: Use copious amounts of soap and water. Wash/rinse affected area thoroughly, then provide appropriate medical attention. Eye wash will be provided on-site at the work zone and support zone as appropriate. If affected, eyes should be rinsed for 15 minutes.

INHALATION: Move to fresh air and transport to hospital. Decontaminate as other actions permit.

INGESTION: Transport to emergency medical facility. Decontaminate as permitted by other requirements.

PUNCTURE WOUND OR LACERATIONS: Transport to emergency medical facility. Field Team Leader will provide MSDS to medical personnel as requested. Decontaminate as permitted by other requirements.

4.2.6 Adverse Weather Conditions

In the event of adverse weather conditions, the Field Team Leader will determine if work can continue without endangering the health and safety of field workers. Some items to be considered before determining if work should continue are:

- Potential for heat stress and heat-related injuries.
- Potential for cold stress and cold-related injuries.
- Treacherous weather-related working conditions.
- Limited visibility.
- Potential for electrical storms or high winds.

4.3 MEDICAL EVALUATION AND SURVEILLANCE PROGRAM

All field project personnel shall receive a medical evaluation in accordance with 29 CFR 1910.120 and Appendix A. Personnel who receive a medical evaluation will be notified

by the medical contractor as to the outcome of their evaluation. This will be in the form of a confidential report addressed to the individual and will contain a breakdown of the clinical findings. In addition, it will indicate any areas of concern which would justify further medical consultation by the individual's personal physician. In the event that the areas of concern are of a severe nature, a follow-up notification will be made to the individual by the medical consultant to answer any questions the employee may have.

4.3.1 Dosimetry/Personnel Monitoring

All project personnel shall participate in a dosimetry program administered by the HSC. (The dosimetry program shall comply with 32 IAC 340, i.e. dosimeters shall be processed by a dosimetry processor accredited by the National Voluntary Laboratory Accreditation Program.) The HSC shall maintain records of all radiation exposures incurred by field personnel including all contractors. These records will be maintained in an up-to-date manner to comply with the requirements of 32 IAC 340.4010. The HSC shall review the results of personal exposure monitoring to determine compliance with exposure limit requirements.

4.3.2 Requirement for Dosimetry

Personal dosimetry is required for anyone who enters a radiologically controlled area in which he/she may receive in one calendar year a dose in excess of 10% of the limits in 32 IAC 340. Any person who works in a radiation area will be required to have a personal dosimeter. As a matter of policy, all individuals shall be required to use a dosimeter (either self-reading type, film badge or Thermoluminescence Detector (TLD)) whenever they enter the Exclusion Zone.

4.3.3 Bioassay

Bioassay is the determination of the types and amounts of radioactive materials which are inside the body. By analyzing the rate of deposition, the rate of excretion, and any other available information regarding placement in the body, internal exposures from radioactive materials can be estimated.

Determination for bioassay will be made by the Field Team Leader in conjunction with the requirements of the Kerr-McGee Radiation Manual. The following are requirements of bioassay.

> Preliminary Bioassay: Bioassay performed before a person starts work in controlled areas is not necessary on a routine basis for the Excavation and Restoration Phase. Workers who have had previous significant exposure to uranium or thorium daughters may require preliminary bioassay. Requirements for preliminary bioassay are determined on a case-by-case basis by the HSC. Evaluation of occupational exposure history as recorded on form KLA.002 (available in the Kerr-McGee Radiation Manual) will be made to determine the need for preliminary bioassay.

Routine Bioassay: Routine bioassay for workers on the Excavation and Restoration Phase will be required infrequently, if at all. The principal nuclides for bioassay purposes are Ra-228 and Th-232.

Airborne materials are the most likely to be taken into the body, and routine bioassay will be determined on a case-by-case basis from the amount of airborne exposure an individual has had. Airborne radioactivity levels will be determined by air samples.

Routine bioassay will be required if an individual works in airborne radioactivity areas such that he or she is exposed to 2080 DAC hours or more in a calendar year as a result of chronic inhalation exposure and/or a series of small acute exposures to airborne thorium. The preferred bioassay method in this case is in-vivo (lung) counting using procedures with a minimum sensitivity of 6 to 8 mg of Th (nat.) for persons with a typical chest wall thickness.

DAC hours are calculated using the appropriate Derived Air Concentration listed in Table I, Column I, Appendix A of 32 IAC 340. Exposure to the DAC in air for one hour is equal to one DAC-hour. Exposure to two times the DAC for one-half hour is also one DAC-hour. These figures assume that no respiratory protective equipment is worn by the individual.

Non-Routine Bioassay: Bioassay may be required in unusual or accidental circumstances including accidental ingestion of a quantity of materials, possible injection from being wounded by a highly contaminated object, or accidental inhalation of concentrated materials released by opening a tank or other closed system. Nasal swabs, sputum samples and direct monitoring will help show the need for bioassay. Non-routine bioassay is conducted for unusual acute inhalation exposures exceeding 2080 DAC hours. Fecal analysis is used to verify the exposure severity. Such verification will require follow-up in-vivo examination.

4.3.4 Emergency Medical Treatment

Emergency first aid should be administered on-site as appropriate. The individual should be decontaminated if possible, depending on the severity of the injury, and transported to the nearest medical facility if needed. Treatment of the injury is of primary concern and decontamination a secondary concern. Levels of radioactive contamination at the Site could be acutely hazardous if decontamination is not undertaken during an emergency situation. The Field Team Leader will complete the appropriate incident report, if warranted. See Section 4.4, Accident and Incident Reporting.

At each emergency first-aid station, a first-aid kit will be available for on-site emergency first aid.

Provisions for emergency medical treatment shall be integrated with the following guidelines:

- At least two individuals qualified to render first aid and Cardiopulminary Resuscitation (CPR) will be assigned to each shift and each work site.
- Emergency first aid stations in the immediate work vicinity.
- Conspicuously posted phone numbers and procedures for contacting ambulance services, fire department, police, and medical facilities.
- Maps and directions to medical facilities.

4.4 ACCIDENT AND INCIDENT REPORTING

All accidents, injuries, or incidents will be reported to the HSC. This accident/incident will be reported as soon as possible to the employee's supervisor. An Accident/Incident Form will be completed by the Field Team Leader, and a copy will be forwarded to the Offsites Project Manager. A copy of the form is shown as Figure 4.1.

Figure 4.1

Accident/Exposure Investigation Report (Page 1 of 3)

Accident/Exposure Investigation Report

Company			**Date**
Investigation Team			
Employee's Name & ID			
Sex **Age** **Job Description**			
Department & Location			
Accident Date & Time			
Date & Time Accident Reported to Supervisor			
Nature of Incident			
Nature of Injury			
Referred to Medical Facility/Doctor		**Yes**	**No**
Employee Returned to Work	**Yes**	**Date/Time**	**No**
Injured Employee Interview/Statement—Attached			
Witnesses			
Witnesses Interviews/Statements—Attached			
Photographs of Site—Attached			
Diagrams of Site—Attached			
Equipment Records—Attached—Reviewed		**Yes**	**No**
Accident/Exposure Incident Description			

Make additional copies of this form as needed. (form provided courtesy of Safety Publications of California © 1990)

Figure 4.1

Accident/Exposure Investigation Report (Page 2 of 3)

Accident/Exposure Investigation Report

Accident Description

Date & Time **Location**

Employees Involved

Preventive Action Recommendations

Corrective Actions Completed	Manager Responsible	Date Completed

—Employee Lost Time—Temporary Help—Cleanup—Repair—Discussion—

Accident Cost Analysis	Investigation	Compliance	Total Cost
Medical			
Production Loss			

Report Prepared By **Date Completed**

Safety Committee Review **Yes** **No**

Corrective Action **Date Started**

Safety Communication Notice Prepared **Date**

Safety Director Signature

Make additional copies of this form as needed. (form provided courtesy of Safety Publications of California © 1990)

Figure 4.1

Accident/Exposure Investigation Report (Page 3 of 3)

Accident/Exposure Investigation Report

Accident Description

Date & Time **Location**

Employees Involved

Employee Interview/Statement—Injured Employee—Witness

Employee Name

Interviewed By

Accident Diagram/Photographs

Make additional copies of this form as needed. (form provided courtesy of Safety Publications of California © 1990)

5. TRAINING

All site personnel shall be trained and certified in accordance with 29 CFR 1910.120 and Kerr-McGee's Medical Evaluation Program (Appendix A).

5.1 PROJECT- AND SITE-SPECIFIC TRAINING

Prior to project start-up, all assigned personnel shall receive an initial project- and site-specific training session. This training shall include, but not be limited to, the following areas:

- Review of the Health and Safety Plan;
- Review of applicable radiological and physical hazards;
- PPE levels to be used by site personnel;
- Site security control;
- Emergency response and evacuation procedures;
- Project communication;
- Required decontamination procedures;
- Prohibited on-site activities;
- Instructions to workers in accordance with 10 CFR 1912; and
- US NRC Regulatory Guide 8.13 and Declared Pregnant Woman Policies (Females).

5.2 VISITOR ORIENTATION

All non-essential personnel and visitors will be briefed on the HASP requirements and 10 CFR 1912 requirements prior to entry. In addition, female visitors will be instructed regarding US NRC Regulatory Guide 8.13 and Declared Pregnant Woman Policies.

5.3 SAFETY "TAILGATE" MEETINGS

Before the start of work each day, the Field Team Leader will assemble the site personnel for a brief safety meeting. The purpose of these meetings will be to discuss project status, problem areas, conditions, safety concerns, PPE levels and to reiterate

HASP requirements. The Field Team Leader will complete a Safety Meeting Report (Figure 5.1) to indicate the contents of the meeting and the attendees.

5.4 FIRST AID

At least two (2) individuals, trained and qualified to administer first aid and CPR in accordance with American Red Cross requirements, will be assigned to each work site.

5.5 SAFE WORK PERMIT

Site workers in special work conditions such as confined space, hot work, trenching, or other physical hazards, must be skilled at such work and trained to recognize these as special work conditions. Confined space is defined by OSHA 1910.146. Section 13 of this HASP contains further information on the confined space program to be followed.

Figure 5.2 shows the Safe Work Permit to be completed by the HSC and signed by workers for special work conditions.

Figure 5.1

Safety Meeting Report (KM-4438-A, front side)

SAFETY MEETING REPORT KM-4438-A

DATE

DIVISION | DEPARTMENT/PLANT | DURATION OF MEETING ☐ A.M. ☐ P.M. ☐ A.M. ☐ P.M.

NUMBER PRESENT | NUMBER ABSENT | MEETING CONDUCTED BY | DID MEETING INCLUDE REQUIRED TRAINING? ☐ YES (DESCRIBE BELOW*) ☐ NO

*** SUPERVISOR'S PRESENTATION**

DISCUSSION OF SAFE/UNSAFE WORK PRACTICES, MATERIALS, JOB PRECAUTIONS, HAZARDS, EQUIPMENT FAMILIARIZATION, ETC.

EMPLOYEE FEEDBACK

COMMENTS, QUESTIONS, COMPLAINTS, ETC.

SUPERVISOR'S CORRECTIVE ACTION PLAN

KNOWN PLANS FOR CORRECTION, PARTS ON ORDER, ITEMS TO BE DISCUSSED WITH DEPT. HEAD, AND CORRECTION OF ITEMS PREVIOUSLY SUBMITTED

DEPARTMENT HEAD COMMENTS

RESOLUTION OF QUESTIONS, ITEMS OR ISSUES RAISED IN MEETING OR WITH SUPERVISOR

SUPERVISOR | DEPARTMENT HEAD

FACILITY MANAGER

Have employees attending sign on reverse side.
Forward a copy to the local Safety Department.

Figure 5.1

Safety Meeting Report (KM-4438-A, reverse side)

TO BE SIGNED BY ALL EMPLOYEES ATTENDING MEETING

I have received and understand the information and/or training indicated on the reverse side.

SIGNATURE	DATE	SIGNATURE	DATE

LIST ALL EMPLOYEES ABSENT FROM MEETING

Figure 5.2

Safe Work Permit (KM-2565-1-B, upper section of front side)

SAFE WORK PERMIT KM-2565-1-B

SHADED AREAS MUST BE COMPLETED.

COMPLETED PERMIT MUST BE POSTED AT THE ENTRY OR WORK SITE.

PLANT/DEPARTMENT	ISSUED BY	DATE	TIME (FROM) ☐ A.M. ☐ P.M. (TO) ☐ A.M. ☐ P.M.
ACCEPTED BY		COMPANY/DEPARTMENT/CONTRACTOR	
RESPONSIBILITY TRANSFERRED TO (NAME)		CO-SIGNATURE (IF REQUIRED)	
LIST ALL WORKERS OR ATTACH ROSTER (OVER)		IS WORK AREA OSHA PSM REGULATED? ☐ Yes ☐ No	

AN ALERT, GAS RELEASE, EVACUATION, INTERRUPTION OF 8 HOURS OR MORE OR CHANGE IN WORKING CONDITIONS SUSPENDS THIS PERMIT. (Permit must be reissued or reauthorized)

SECTION 1 — GENERAL AREA WORK PERMIT

1. WORK LIMITED TO THE FOLLOWING: (DESCRIPTION & AREA/EQUIPMENT)

2. ON-SITE INSPECTION CONDUCTED/ALL LOCKS OR TAGS ATTACHED, IF REQUIRED/ENVIRONMENTAL IMPACT OF JOB CONSIDERED — PERMIT ISSUER INITIALS — PERMIT RECEIVER INITIALS

3. SPECIAL HAZARDS TO PROTECT AGAINST ☐ NONE MSDS AVAILABLE ☐ YES ☐ NO ☐ N/A

CHEMICALS (NAME)

☐ Flammable ☐ Noise ☐ Hot Water/Steam ☐ Thermal Burn ☐ Falls ☐ Pinch Pts./Srp. Edges
☐ Toxic ☐ Corrosive ☐ Heat Stress ☐ Elect./High Vltg. Line ☐ Asbestos ☐ Other _____
☐ Skin Contact ☐ Reactive ☐ High Pressure ☐ Inert Atmosphere ☐ Radiation _____

ENERGY TYPE(S): ☐ Electrical _____ volts ☐ Hydraulic/Pneumatic _____ psig ☐ Other (magnitude) _____

4. SAFETY EQUIPMENT (OTHER THAN AREA REQUIREMENTS) ☐ NONE

☐ Rain Suit ☐ Gloves ☐ Face Shield ☐ Ground Fault Circuit Int. ☐ Air Pack (SCBA) ☐ Fire Resistant Clothing
☐ Chemical Suit ☐ Hearing Protection ☐ Hood ☐ Barricades/Warning Signs ☐ Supplied Air ☐ Long Sleeves
☐ Rubber Boots ☐ Chemical Goggles ☐ Fall Restraint Device ☐ Communications Eqpt.(list) ☐ Respirator ☐ Other _____

5. THE PERSON RECEIVING THE PERMIT VERIFIES THAT ALL WORKERS :

A. Have been through the Plant Safety Orientation	☐ Yes	F. Know emergency alarms, evacuation, assembly points	☐ Yes
B. Understand Applicable HAZCOM requirements	☐ Yes	G. Know the Procedures for Safe Job Completion	☐ Yes
C. Have discussed hazards of the job and area	☐ Yes	H. Have inspected all tools/equipment/scaffolding	☐ Yes
D. Know the location/use of safety showers/eye wash stations	☐ Yes	I. Understand the Housekeeping Requirements	☐ Yes
E. Know the location of the phone or intercom	☐ Yes	PERMIT RECEIVER INITIALS	

6. POTENTIALLY AFFECTED AREA PERSONNEL AND WORKERS NOTIFIED OF WORK TO BE DONE ☐ YES ☐ N/A

7. THE FOLLOWING RESPONSIBILITIES HAVE BEEN COMMUNICATED TO THE PERSON RECEIVING THIS PERMIT:
☐ Conditions For Work Stoppage ☐ Performing The Work Safely ☐ Completion Of Section 8 And Permit Return
☐ Crew Accountability ☐ Reporting Changes That Affect Job Safety

SECTION 2 — AIR TESTS

PRIOR TO ENTRY OR HOT WORK — ☐ DOES NOT APPLY

TEST IN ORDER INDICATED

1. Oxygen meter test performed	☐ Yes ☐ N/A	READING $\%O_2$	RANGE 19.5-23.5% O_2	TESTED BY	LOCATION OF TEST	TIME ☐ A.M. ☐ P.M.
2. Combustible gases and vapors test	☐ Yes ☐ N/A	READING % LEL	MAXIMUM 10% LEL	TESTED BY	LOCATION OF TEST	TIME ☐ A.M. ☐ P.M.
3. Tests for toxics (Substance)	☐ Yes ☐ N/A	READING ☐ PPM_3 ☐ mg/M	PEL/TLV ☐ PPM_3 ☐ mg/M	TESTED BY	LOCATION OF TEST	TIME ☐ A.M. ☐ P.M.

SECTION 3 — OBSERVATION & RESCUE

☐ DOES NOT APPLY

1. ☐ Yes ☐ N/A	Continuous monitoring for _____ (SUBSTANCE)	TESTED BY	TIME (FROM) ☐ A.M. ☐ P.M.	TIME (TO) ☐ A.M. ☐ P.M.	
☐ Yes ☐ N/A	Periodic tests for _____ (SUBSTANCE)	TESTED BY	TIME (FROM) ☐ A.M. ☐ P.M.	TIME (TO) ☐ A.M. ☐ P.M.	
☐ Duration of work ☐ Personal	☐ Area ☐ Other _____				
2. ☐ Yes ☐ N/A	Fire/safety/confined space attendants	DESIGNATED PERSON(S)	HOW TO CONTACT		
3. ☐ Yes ☐ N/A	Backup rescuer(s)	DESIGNATED PERSON(S)	HOW TO CONTACT		
4. ☐ Yes ☐ N/A	Special rescue service/ equipment required	LOCATION OF SPECIAL EQUIPMENT	RESCUE SERVICE PHONE NUMBER		

Figure 5.2

Safe Work Permit (KM-2565-1-B, lower section of front side)

SECTION 4 — HOT WORK ☐ DOES NOT APPLY

	YES	N/A		YES	N/A
1. Fire Extinguisher (Type) _____ Is it full?			8. Ground lead attached to work		
2. Survey area for combustibles and openings, holes, trenches, etc.			9. Prevention of heat exposure to gasket, seals, liners		
3. Combustible materials removed or protected			10. Other work in area which should be stopped		
4. Heat/spark control - tarps, covers, water, etc.			11. Material present which emits vapor when heated		
5. Precaution taken for hidden combustibles			12. Radiant heat transfer considered		
6. Purge gas used. Type _____			13. Equipment operating or contains original contents		
7. Adjacent areas safe/sewers protected			14. Ducts or conveyors plugged or protected		

SECTION 5 — ENERGY LOCKED/TAGGED ☐ DOES NOT APPLY

	YES	NO	N/A		YES	NO	N/A
1. Line positively identified				9. Are all automatic valves secured in a safe position?			
2. Line/equip. drained/depressured, piping properly supported				10. Electrical panel switches locked, tagged and tested			
3. Line/equipment cleaned and purged				11. Field switches tested			
4. Blinds and/or block and bleed in place				12. Fuses removed/switches open			
5. Lock(s) required (list lockout points)				13. Are belts/couplings removed?			
6. Splash guards considered				14. Are rotating parts blocked?			
7. Adjacent area safe. (If limited, describe below)				COMMENTS			
8. Area roped/taped off							

SECTION 6 — CONFINED SPACE ☐ DOES NOT APPLY

	YES	NO	N/A		YES	NO	N/A
1. Confined space entry required?				5. Have authorized entrants signed opposite side of this form?			
2. Space to be entered _____				6. Have designated attendants signed opposite side of this form?			
3. Purpose of entry _____							
4. Is space a permit-entry space? If "YES", complete opposite column				7. Have all necessary hazard control measures been taken?			
				8. Has all required equipment been provided?			

SECTION 7 — TRENCHING/EXCAVATION ☐ DOES NOT APPLY

	YES	NO	N/A		YES	NO	N/A
1. Has the area been inspected for underground power lines or product lines?				4. Have precautions been taken if the trench/excavation develops into a confined space?			
2. Does the trench require shoring/bracing/support?				5. Have overhead power/product lines been removed or identified?			
3. Has the soil been evaluated for stability?				6. Will leaking water or rain water affect the stability of the trench/excavation?			

SECTION 8 — Questions to be Completed on Permit Expiration or Job Completion

WORKER CLOSEOUT SIGNATURE

TIME ☐ A.M. ☐ P.M.

	YES	NO	N/A		YES	NO	N/A
1. Has the job been completed?				5. Have safety devices been reinstalled?			
2. Has the area been cleaned of work material?				6. Has hot work area been surveyed for smoldering materials?			
3. Have department personnel been informed job is done?				7. Special precautions, concerns or remarks?			
4. Have all locks and/or tags been removed?				COMMENTS			

Figure 5.2

Safe Work Permit (KM-2565-1-B, reduction of reverse side)

OBSERVERS, WATCHERS, RESCUERS

I have been instructed as a confined space attendant, fire/safety watcher or backup rescuer and understand my duties.

SIGNATURE	DATE	SIGNATURE	DATE

PERSONS AUTHORIZED TO PERFORM WORK AND/OR TO ENTER CONFINED SPACE

I have been instructed in and am aware of the possible hazards and conditions I may encounter in this entry/work.

SIGNATURE	TIME IN	TIME OUT	DATE	SIGNATURE	TIME IN	TIME OUT	DATE

COMMENTS

AUDIT PURPOSE ONLY

NAME	TITLE	DEPARTMENT	DATE

CONCERNS

CORRECTIVE ACTION

COMPLETED BY

NAME	TITLE	DEPARTMENT	DATE	COMMENTS

6. COMMUNICATIONS

6.1 GENERAL COMMUNICATIONS

The Field Team Leader will have available at the work site area the means for telephone communications, or an equivalent means of communication, for summoning emergency assistance from the fire/ambulance and police departments in the event they are required. The telephone will also act as a direct link to technical personnel for information pertaining to all phases of the project.

6.2 RADIOS

Short-range walkie talkies will be made available to designated personnel working at the work site.

6.3 EMERGENCY WARNING

In the event of an emergency condition, the Field Team Leader will notify project personnel verbally if all are within immediate hearing and via a bull horn if the site area is large. The Field Team Leader will also notify residents or visitors present within the area. Site personnel will immediately proceed to a predesignated assembly area as designated by the Field Team Leader during the daily safety meeting. Personnel will remain in the designated area until further instructions are received by the Field Team Leader.

All communication equipment will be tested at the beginning of each day to verify operational integrity.

6.4 HAND SIGNALS

Hand signals will be used by field teams in conjunction with the buddy system. Hand signals shall be familiar to the entire field team before operations commence and should be reviewed during site-specific training.

Signal	Meaning
Hand gripping throat	Out of air; can't breathe
Grip partner's wrist	Leave area immediately; no debate
Hands on top of head	Need assistance
Thumbs up	OK; I'm all right; I understand
Thumbs down	No; negative

6.5 SITE SECURITY

Only authorized site personnel will be permitted on the work site in accordance with the requirements of the Site Security Plan (Appendix E to the Work Plan) and this HASP visitors and other non-essential personnel may enter the work area only upon authorization by the Field Team Leader. This restricted access will ensure that the Field Team Leader can communicate with each person authorized to enter the work area.

7. PERSONNEL EXPOSURE AND AIR QUALITY MONITORING

7.1 AIR QUALITY (DUST)

Due to the nature of the principal contaminants associated with the project, dust suppression will be important as a means of minimizing exposure levels and off-site migration of contaminants. A GCA Miniram direct reading monitor will be used to continually evaluate airborne particulate and the effectiveness of dust control measures. Readings will be taken both upwind and downwind of operational areas. If at any time downwind readings show a significant increase from the corresponding upwind readings, operations will be halted and dust control measures re-evaluated and/or implemented. Determination of a significant increase will be based on best judgement and will not be based on a percentage change. For example, a general increasing trend may indicate the need to re-evaluate and/or implement dust control measures.

All readings obtained will be recorded by the Field Team Leader in a field log throughout the life of the project. This log will serve as a quality control document showing daily ambient air quality and dust suppression effectiveness. This instrument may be used to determine real time worker exposure and ambient air quality. The Field Team Leader will routinely monitor the project area with the Miniram to obtain mg/m^3 dust readings. The OSHA personal exposure limit (PEL) for nuisance dust is 15 mg/m^3.

7.2 AIRBORNE RADIOACTIVITY MONITORING

Monitoring for airborne radioactivity exposure is as important as monitoring for external radiation exposure. Monitoring for airborne radioactivity exposure requires the following elements:

- Air sampling for radioactive particulates,
- Recordkeeping regarding personnel work locations and time in location, and
- Respiratory protective equipment records regarding devices used by workers in airborne radioactivity areas.

By closely monitoring these three elements, a continuous record of personnel exposure to airborne radioactivity is maintained.

Lapel samplers worn for personnel air monitoring can be utilized for airborne radioactivity monitoring. Air filters shall be analyzed on a daily basis to determine potential contributions to dose from radionuclides. It is expected that naturally occurring radon and thorium daughters will interfere with analyses. Additional

evaluation of samples shall be performed when determined necessary based upon elevated results. Such analyses shall be performed after allowing time for decay of some interfering radionuclides.

Downwind monitoring of the work area for radioactive particulate activity also will be performed. High volume air samplers shall run continuously during operations and be evaluated on a daily basis for gross alpha activity. Comparisons will be made to 32 IAC 340 Appendix A to ensure that adequate radiological controls are in place for workers and the general public. As low as reasonably achievable (ALARA) concepts will be utilized when considering protective measures to ensure that internal exposures are minimized, while also considering the effects of such protective measures with respect to external exposures. Controls on the work site such as wetting of soils and procedural changes, will be employed prior to the prescription of respiratory protective equipment.

Time decay of interfering nuclides generally refers to radon-222 decay and daughters but may also include thoron decay. The specific times for decay of samples is best addressed in procedures rather than in the health and safety plan. Air samples will be decayed a minimum of 4 hours to allow for counting without interference from radon-222 and its daughters. Thoron (Rn-220), if present if significant amounts, will require decay for up to 4 days to allow for decay of it's Pb-212 daughter (10.6 hour half life).

7.3 INTERNAL MONITORING

Internal monitoring to determine intakes of radioactive material will be performed as needed based upon the results of the air sampling program. Bioassay methods to be considered should include in-vivo, as well as in-vitro, assessments. Routine bioassay of workers is not anticipated based upon the low concentrations of radioactivity in soils to be excavated.

7.4 EXTERNAL RADIATION MONITORING

External radiation monitoring of workers will be performed using film badges or thermoluminescent dosimeters. Dosimetry will be provided and processed by a service holding National Voluntary Laboratory Accreditation Program (NVLAP) certification. Pocket dosimeters may also be utilized for visitors and other infrequent personnel requiring access to the site.

7.5 RADIOLOGICAL SURVEYS

Radiological surveys will be performed to ensure that radiation levels and contamination levels are within regulatory limits for workers and the general public. Radiation surveys will consist of ambient gamma surveys using micro-R meter or Geiger detectors, as appropriate, and contamination surveys. Airborne radioactivity measurements will be performed as described in the Air Monitoring Plan (Appendix B to the Work Plan).

7.6 CONTAMINATION MONITORING

Samples shall be obtained periodically in work areas to ensure that radioactivity is present at acceptable levels and is prevented from leaving the site. Decontamination of elevated areas will be performed to maintain contamination at levels that are ALARA.

Before leaving the work site, site personnel shall be checked through use of a hand-held frisker to ensure that contamination is not present on skin or clothes. Field Team Leader will be immediately informed regarding any contamination on individuals and will initiate appropriate decontamination techniques. Proper disposition of contaminated personal effects and clothing also will be the responsibility of the Field Team Leader.

7.7 ACTION LEVELS

Radiological action levels for on-site workers will be determined by smear/swipe measurements as well as airborne particulate monitoring for the presence of radioactivity. The Field Team Leader will perform radiological monitoring. Action levels as determined by radioactive monitoring can be found in Table 7.1.

To avoid the need for upgrade of personal protection equipment due to airborne contamination, engineering controls such as the use of water to minimize dust levels will be implemented as necessary during excavation and restoration activities.

TABLE 7-1

ACTION LEVELS AS DETERMINED BY RADIOACTIVITY

Note: Personnel shall not be exposed to airborne radioactivity such that their daily intake exceeds 2 Derived Air Concentration (DAC)-hours without prior approval of the Field Team Leader or designee.

Level of protection may be increased to Level C (full-face air purifying respirator) when airborne monitoring indicates that contamination levels have reached 25% DAC. All assessments shall incorporate ALARA principles. Engineering controls shall be used prior to assignment of respiratory protective equipment.

Signs shall be posted at entrances to areas where airborne radioactivity levels exceed, or have the potential to exceed, 25% DAC.

Radiation Type	Action Level	Level of Respiratory Protection/Action
a. Contamination on smear samples	250 pCi/100 cm^2 gross alpha	Consider modified Level C (full- or half-face APR) based upon ALARA evaluation.
b. Airborne Radioactivity	25% DAC	Consider Level C (full-face APR) based upon ALARA evaluation. Ensure proper posting. Consider internal monitoring
c. Ambient Gamma (work areas)	(1)	Consider procedures for shielding of soils. Ensure proper posting.
d. Ambient Gamma (off-site areas)	(1)	Implement immediate controls to reduce dose equivalent rate.

Notes

(1) The ambient gamma dose equivalent rate action level of 5 mrem/h stems from the 10 CFR 20 radiaction area definition.

The ambient gamma action level for off-site is based upon the 10 CFR 20 requirements to maintain dose equivalent rates in unrestricted areas such that they do not exceed 0.002 rem in any one hour.

8. PERSONNEL PROTECTIVE EQUIPMENT

It is anticipated that most excavation activities can be conducted in Level D personal protective equipment (PPE), with a contingency upgrade to Level C, based on the action levels listed in Section 7. Level C will be used when required by Special Work Permits, whenever working with transite or other asbestos-containing materials, when cutting or sweeping in a contaminated area, or when directed by the Field Team Leader.

Level D personal protective clothing and equipment for excavation activities includes:

- Coveralls,
- Hard hat,
- Chemical resistant steel toe boots,
- Cotton or leather gloves,
- Safety glasses, and
- Dust mask (optional).

Level C protective clothing and equipment includes:

- Full-face air-purifying respirator (NIOSH/MSHA approved) fitted with radionuclides/HEPA cartridges and/or organic vapor cartridges, depending on which action levels are exceeded (see Section 7 of this HASP),
- Coveralls,
- Tyvek coveralls - required in areas when splashing by contaminated soils or water is a possibility,
- Cotton or leather gloves,
- Disposable latex inner gloves - required in areas when splashing by contaminated soils or water is a possibility,
- Nitrile outer gloves (taped) - required in areas when splashing by contaminated soils or water is a possibility,
- Chemical-resistant steel toe boots, and

- Hard hat.

Action levels used to determine the need to upgrade or downgrade the levels of protection are described in Section 7 of this HASP.

Respirator use will be in accordance with the Kerr-McGee Respiratory Protection Program (Appendix B).

9. CONTAMINATION REDUCTION PROCEDURES

9.1 EQUIPMENT

Portable equipment will be decontaminated with soap and water and rinsed with tap water. Heavy equipment will be steam-cleaned with water and, if necessary, a detergent solution. It is not anticipated that chemical cleaning will be necessary for decontamination.

9.2 PERSONNEL

If levels of radioactivity show that individuals can remove coveralls and other personal protective clothing and equipment before leaving the work site and, thus complete decontamination, the individuals may leave the site. If, however, levels of radioactivity show that individuals cannot achieve decontamination by the removal of coveralls and showering is required, they will be dressed in clean coveralls, boots and gloves and be transported to the Rare Earths Facility Contamination Reduction Zone to complete decontamination.

If substantial skin contamination occurs on an individual working with radioactive materials, the following specific procedures should be followed to prevent fixation of the material in the skin or absorption of the radioactivity through the skin.

Immediate Action: Notify the HSC, who will supervise the decontamination. If contamination is spotty, the HSC will supervise the cleaning of the individual spots with swabs, soap, or water. If the contamination is general, the HSC may recommend washing the area gently in warm or cool water (not hot) using hand soap (not detergent) for one minute. Rinse, dry, and monitor for radioactivity. This soap wash step may be repeated three times.

Evaluation: If the above procedure fails to remove all the skin contamination, the treatment should cease. An evaluation of the skin contamination should be performed by the HSC including an estimate of the dose commitment to the skin, and the quantity and identity of the nuclides contaminating the skin. If additional decontamination steps are necessary, they are performed and documented by the HSC. The guidelines for Personnel Decontamination in the Radiological Handbook, HEW 1970, beginning on page 194, can be used as applicable. CAUTION: Do not use chemicals for personnel decontamination until full evaluation of the contamination is made by the HSC.

9.3 CONTAMINATION PREVENTION

Work practices that minimize the spread of contamination will reduce worker exposure and help ensure valid sample results by precluding cross-contamination. Procedures for contamination avoidance include:

- knowing the limitations of all personal protective equipment being used,
- avoiding walking through areas of obvious or known contamination,
- refraining from handling or touching contaminated materials directly. Do not sit or lean on potentially contaminated surfaces,
- ensuring personal protective equipment has no cuts or tears prior to donning,
- fastening all closures on suits, covering with tape if necessary,
- taking steps to protect against any skin injuries,
- staying upwind of airborne contaminants, and
- when working in contaminated areas, refraining from eating, chewing gum, smoking, or engaging in any activity from which contaminated materials may be ingested.

9.4 DISPOSAL PROCEDURES

All discarded materials, waste materials, or other field equipment and supplies should be handled in such a way as to preclude the spread of contamination, creating a sanitary hazard, or causing litter to be left on-site. All potentially contaminated waste materials (e.g., clothing, gloves) shall be monitored and segregated in accordance with monitoring results into either radioactive or non-radioactive waste. Appropriate labels shall be affixed to all containers of radioactive materials.

10. GENERAL WORK PRECAUTIONS

10.1 KERR-MCGEE SAFETY HANDBOOK

All personnel who will be present on the site will be provided a copy the Kerr-McGee Safety Handbook. Receipt of the handbook shall be indicated by signing and submitting the form in the handbook. The handbook is a summary of general work precautions and is included as Appendix C.

10.2 PERSONNEL

In addition to general work precautions which are covered in the Kerr-McGee Safety Handbook, the following general work precautions apply to all site personnel.

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in the work site area.
- Hands and face must be thoroughly washed upon leaving the work area. Wash water will be provided at each site for this purpose.
- Whenever levels of radioactivity warrant, the entire body should be thoroughly washed as soon as possible after the protective coveralls and other clothing are removed as part of the decontamination process.
- No facial hair that interferes with a satisfactory fit of the mask-to-face-seal is allowed on personnel required to wear respirators.
- Contact with contaminated or suspected contaminated surfaces should be avoided. Whenever possible, do not walk through puddles, leachate, discolored surfaces, kneel on ground, lean, sit, or place equipment on drums, containers, or the ground.
- Medicine, drugs and alcohol may interfere with or impair judgment and reaction times. Therefore, usage of prescribed drugs must be specifically approved by a qualified physician and made known to the Field Team Leader prior to an individuals' presence on the work site. Alcoholic beverage intake is strictly prohibited at the site and prior to work in accordance with Kerr-McGee policy.
- All personnel must be familiar with standard operating procedures and any additional instructions and information contained in the HASP.

- All personnel must adhere to the requirements of the HASP.
- Contact lenses are not permitted when respiratory protection is required or where the possibility of a splash exists.
- Personnel must be cognizant of symptoms for radiological exposure on site, for heat stress and cold stress, and knowledgeable regarding emergency measures contained in the Emergency Contingency Plan.
- Respirators shall be cleaned and disinfected after each day's use or more often, if necessary.
- Prior to donning, respirators shall be inspected for worn or deteriorated parts. Emergency respirators or self-contained devices will be inspected at least once a month and after each use.
- Each employee shall be familiar with Kerr-McGee's Respiratory Protection Program (Appendix B).

10.3 OPERATIONAL PRECAUTIONS

The following operational precautions must be observed at all times.

- All site personnel shall be adequately trained and thoroughly briefed on anticipated hazards, equipment to be worn, safety practices to be followed, emergency procedures, and communications.
- All required respiratory protective devices and clothing shall be worn by all personnel going into areas designated for wearing protective equipment.
- All site personnel shall use the buddy system when wearing respiratory protective equipment. At a minimum, a third person, suitably equipped as a safety backup, is required during extremely hazardous entries.
- During continual operations, on-site workers act as a safety backup to each other. Off-site personnel provide emergency assistance.
- Personnel should practice any unfamiliar operations prior to undertaking the actual procedure.
- Entrance and exit locations shall be designated and emergency escape routes delineated. Warning signals for site evacuation must be established.
- Personnel and equipment in the contaminated work site area should be minimized, consistent with effective site operations.

- Work areas for various operational activities shall be established.
- Procedures for leaving a contaminated area shall be planned and implemented prior to going on-site. Work areas and decontamination procedures shall be established based on expected site conditions.
- Frequent and regular inspection of site operations will be conducted to ensure compliance with the HASP. If any changes in operation occur, the HASP will be modified to reflect those changes.

11. SANITARY FACILITIES

11.1 POTABLE WATER

a. An adequate supply of potable drinking water shall be maintained at all times immediately outside each work site. Drinking water shall meet all federal, state and local health requirements.

b. Drinking water shall be supplied to project personnel via approved dispensing sources.

c. Paper cups shall be permitted for the drinking of potable water supplies.

d. Drinking water dispensers shall be clearly marked and shall, in no way, have the potential for contamination from non-potable supplies.

e. Site personnel must be fully decontaminated prior to approaching the drinking water supply.

11.2 TOILET FACILITIES

a. Adequate toilet facilities shall be provided immediately outside each work site.

b. These facilities shall be in the form of chemical porta-toilets.

c. Routine servicing and cleaning of the toilets should be established with the selected contractor and shall be in accordance with federal, state, and local health regulations.

d. Site personnel must by fully decontaminated prior to approaching the toilet facilities.

11.3 WASHING AREAS

a. Adequate washing areas shall be provided for personal use within the work site area.

b. Washing areas shall be maintained in a sanitary condition and will be provided with adequate supplies of soap, towels for drying, and covered waste receptacles.

c. Washing areas shall be maintained and sanitized daily.

d. No eating, drinking or smoking shall be permitted on the work site. This policy will be strictly enforced by the Field Team Leader.

12. FIRE CONTROL EQUIPMENT

An adequate number of approved portable fire extinguishers (class rated A, B and C) shall be readily available at the work site at all times.

All site personnel shall be trained in the use of the extinguishers. Extinguishers shall only be used on outbreak stage fires or fires of minor nature. The local fire department shall be contacted in the event of a larger fire and site evacuation procedures should be commenced in accordance with the procedures described in the Emergency Contingency Plan.

13. CONFINED SPACE PROGRAM

13.1 PURPOSE

In the event that confined space work is a necessity, a Confined Space Program will be implemented. Training in the recognition of confined spaces is a component of the health and safety training program.

The purpose of the Confined Space Program is to establish procedures to protect personnel from this serious hazard in the course of their work; and at a minimum, to comply with 29 CFR OSHA 1910.146. This document assigns responsibilities and sets standards for personnel engaged in activities where confined spaces may be present.

13.2 RESPONSIBILITIES

13.2.1 Project Health and Safety Coordinator

The Project Health and Safety Coordinator administers the Confined Space Program. The Project Health and Safety Coordinator's responsibilities include:

- Review of the HASP for potential confined space hazards and design alternative approaches to accomplish the confined space tasks;
- Coordinating and managing the Confined Space Program in the event one is required;
- Establishing priorities for implementation of the program;
- Assisting with recognition and implementation of the Confined Space Program;
- Advising project management on confined space issues; and
- Communicating the Confined Space Program to personnel by training related to specific site activities.

13.2.2 Offsites Manager

The Offsites Manager directs the application of the Confined Space Program to project work. The Offsites Manager is responsible for:

- Working with the Project Health and Safety Coordinator to prepare information describing activities that might be conducted in a confined space area;
- Assuring that all personnel engaged in project activities are familiar with the definition of a confined space;
- Assuring that personnel are familiar with the Confined Space Program, and that project activities are conducted in compliance with the Confined Space Program;
- Assuming the responsibilities of the Field Team Leader if another person is not assigned these responsibilities.

13.2.3 Field Team Leader

The Field Team Leader is responsible for the implementation of the Confined Space Program on-site during field activities. The Field Team Leader is responsible for:

- Overseeing implementation of the Confined Space Program during field operations; and
- Reporting confined space work activity, and any violations of the Confined Space Program, to the Offsites Project Manager and the Project Health and Safety Coordinator.

13.2.4 Personnel

Personnel are responsible for:

- Familiarizing themselves with the Confined Space Program and following it;
- Becoming familiar with the criteria for determining a confined space, and with the monitoring, permitting, and other requirements of the program; and
- Reporting immediately a confined space condition to the Field Team Leader.

13.3 DEFINITION OF A CONFINED SPACE

Confined space means a space that:

1. Is large enough and so configured that an employee can bodily enter and perform assigned work;

2. Has limited or restricted means for entry or exit (pits, storage bins, hoppers, crawl spaces, storm cellar areas); and

3. Is not designed for continuous employee occupancy.

Any workspace meeting all of these criteria is a confined space and the Confined Space Program must be followed.

13.4 CONFINED SPACE ENTRY PROCEDURES

13.4.1 Entry Permit Required

All spaces shall be considered permit-required confined spaces until the pre-entry procedures demonstrate otherwise. The Confined Space Permit must be completed before work begins; it verifies completion of the items necessary for confined space entry. The Permit will be kept at the job site for the duration of the confined space work. If there is an interruption of work, or the alarm conditions change, a new Permit must be obtained before work begins.

A permit is not required when the space can be maintained for safe entry by 100% fresh air mechanical ventilation. This must be documented and approved by the Project Health and Safety Coordinator. Mechanical ventilation systems, where applicable, shall be set at 100% fresh air.

The Offsites Manager must certify that all hazards have been eliminated on the Entry Permit. If conditions change, a new permit is required.

13.4.2 Pre-entry Testing for Potential Hazards

a. Surveillance

Personnel first will survey the surrounding area to assure the absence of hazards such as contaminated water, soil, or sediment, barrels, tanks, or piping where vapors may drift into the confined space.

b. Testing

No personnel will enter a confined space if any one of these conditions exists during pre-entry testing. Determinations will be made for the following conditions:

1. Presence of toxic gases or dusts: Equal to or more than 5 (parts per million (ppm) on the organic vapor analyzer with an alarm, above background outside the confined space area; or other action levels for specific gases, vapors, or dusts as specified in the Health and Safety Plan and the Confined Space Permit based on knowledge of site constituents;

2. Presence of explosive/flammable gases: Equal to or greater than 10% of the Lower Explosive Limit (LEL) as measured with a combustible gas indicator or similar instrument (with an alarm); and

3. Oxygen Deficiency: A concentration of oxygen in the atmosphere equal to or less than 19.5% by volume as measured with an oxygen meter.

Pre-entry tests results will be recorded and kept at the site for the duration of the job by the Offsites Manager. Affected personnel can review the test results.

c. Authorization

Only the Offsites Manager and the Project Health and Safety Coordinator can authorize any personnel to enter into a confined space. This is reflected on the Confined Space Entry Permit. The Offsites Manager must assure that conditions in the confined space meet permit requirements before authorizing entry.

d. Entry Permit

An entry permit must be filled out by the Project Health and Safety Coordinator or Field Team Leader. A copy of the Confined Space Entry Permit is included as Figure 13.1.

e. Attendants

One worker will stand by outside the confined space ready to give assistance in the case of an emergency. Under no circumstances will the standby worker enter the confined space or leave the standby position. There shall be at least one worker within sight or call of the standby worker.

f. Observation and Communication

Communications between standby worker and entrant(s) shall be maintained at all times. Methods of communication that may be specified in the Entry Permit and the HASP may include voice, voice by powered radio, tapping or rapping codes, signaling tugs on rope, and standby worker's observations that activity appears normal.

13.4.3 Rescue Procedures

Acceptable rescue procedures include entry by a team of rescuers only if the appropriate air-purifying respirator is available; or use of public emergency services.

The standby worker must be trained in first aid, CPR and respirator use. A first aid kit should be on hand and ready for emergency use. The standby worker must be trained in rescue procedures.

13.5 TRAINING

Personnel who will engage in field activities will be given annual training on the requirements and responsibilities in the Confined Space Program and on OSHA 1910.146. Only trained personnel can work in confined spaces. Workers should be experienced in the tasks to be performed, instructed in proper use of respirators, lifelines and other equipment, and practice emergency procedures and self-rescue.

Before each site activity, the determination of confined space work will be part of the site characterization process. Training in the site-specific confined space activities will be part of the site-specific health and safety training

13.6 SAFE WORK PRACTICES

- Warning signs should be posted. These include warnings for entry permits, respirator use, prohibition of hot work and emergency procedures and phone numbers.

- Cylinders containing oxygen, acetylene or other fuel such as gasoline must be removed a safe distance from the confined space work area.

- Purging and ventilating is done before work begins to remove hazardous vapors from the space. The space should be monitored to ensure that the gas used to purge the space (e.g. tank) has also been removed. Local exhaust should be used where general exhaust is not practical.

- The buddy system is used at all times. A standby person always must be posted within sight of, or in communication with, the person inside the confined space. The standby should not enter the confined space, but instead will call for help in an emergency and not leave the post. Communication should be maintained at all times with workers inside the confined space.

- Emergency planning in the HASP and an Entry Permit must be approved in advance and the proper rescue equipment must be immediately available.

Figure 13.1

Confined Space Entry Permit (Page 1 of 2)

Confined Space Entry Permit

Date and Time Issued: _____

Job site/Space ID: _____

Equipment to be worked on: _____

Standby personnel: _____

1. Atmospheric Checks: Time _____
   Oxygen _____% Explosive _____% L.F.L.
   Toxic _____PPM
2. Tester's signature: _____
3. Source isolation (No Entry):

	N/A	Yes	No
Pumps or lines blinded.	( )	( )	( )
disconnected, or blocked	( )	( )	( )

4. Ventilation Modification:

	N/A	Yes	No
Mechanical	( )	( )	( )
Natural Ventilation only	( )	( )	( )

5. Atmospheric check after isolation and Ventilation:

Oxygen _____%	≥	19.5	%
Explosive _____% L.F.L.	≤	10	%
Toxic _____PPM	≤	10	P P M
Time _____			H_2S
Tester's Signature _____			

6. Communications Procedures:

7. Rescue Procedures:

Date and Time Expires: _____

Job supervisor: _____

Work to be performed: _____

8. Entry, standby, and back up persons:

	Yes	No
Successfully completed required training?		
Is it current?	( )	( )

9. Equipment:

	N/A	Yes	No
Direct reading gas monitor - tested	( )	( )	( )
Safety harnesses and lifelines for entry and standby persons	( )	( )	( )
Hoisting equipment	( )	( )	( )
Powered communications	( )	( )	( )
SCBA's for entry and standby persons	( )	( )	( )
Protective Clothing	( )	( )	( )
All electric equipment listed Class I, Division I, Group D and Non-sparking tools	( )	( )	( )

10 Periodic atmospheric tests:

Oxygen: _____% Time: _____

Explosive: _____% Time: _____

Toxic: _____ppm Time: _____

We have reviewed the work authorized by this permit and the information contained here-in. Written instructions and safety procedures have been received and are understood. Entry cannot be approved if any squares are marked in the "No" column. This permit is not valid unless all appropriate items are completed.

Permit Prepared By: (Supervisor) _____

Approved By: (Unit Supervisor) _____

Reviewed By (Confined Space Operations Personnel):(printed name & signature)

_____

This permit to be kept at job site. Return job site copy to Safety Office following job completion.
Copies: White Original (Safety Office) Yellow (Unit Supervisor) Hard(Job site)

Figure . . . .

Confined Space Entry Permit (Page 2 of 2)

ENTRY PERMIT

PERMIT VALID FOR 8 HOURS ONLY. ALL COPIES OF PERMIT WILL REMAIN AT JOB SITE UNTIL JOB IS COMPLETED
DATE:_____ SITE LOCATION and DESCRIPTION_____
PURPOSE OF ENTRY_____
SUPERVISOR(S) in charge of crews Type of Crew Phone #_____
Communication procedures:_____
Rescue procedures (phone # at bottom):_____
* BOLD DENOTES MINIMUM REQUIREMENTS TO BE COMPLETED AND REVIEWED PRIOR TO ENTRY*

REQUIREMENTS COMPLETED	DATE	TIME	REQUIREMENTS COMPLETED	DATE	TIME
Look Out/De-energize/Try-out	____	____	Full Body Harness w/"D" ring	____	____
Line(s) Broken-Capped-Blanked	____	____	Emergency Escape Retrieval Equip	____	____
Purge-Flush and Vent	____	____	Lifelines	____	____
Ventilation	____	____	Fire Extinguishers	____	____
Secure Area (Post and Flag)	____	____	Lighting (Explosive Proof)	____	____
Breathing Apparatus	____	____	Protective Clothing	____	____
Resuscitator - Inhalator	____	____	Respirator(s) (Air Purifying)	____	____
Standby Safety Personnel	____	____	Burning and Welding Permit	____	____

Note: Items that do not apply enter N/A in the blank.
** RECORD CONTINUOUS MONITORING RESULTS EVERY 2 HOURS**

CONTINUOUS MONITORING TEST(S) TO BE TAKEN	PERMISSIBLE ENTRY LEVEL	MONITORING RESULTS EVERY 2 HOURS							
PERCENT OF OXYGEN	19.5% to 23.5%	____	____	____	____	____	____	____	____
LOWER FLAMMABLE LIMIT	Under 10%	____	____	____	____	____	____	____	____
CARBON MONOXIDE	35 ppm	____	____	____	____	____	____	____	____
Aromatic Hydrocarbon	1 ppm - 5 ppm	____	____	____	____	____	____	____	____
Hydrogen Cyanide	4.7 ppm* (S)	____	____	____	____	____	____	____	____
Hydrogen Sulfide	10ppm*, 15ppm†	____	____	____	____	____	____	____	____
Sulfur Dioxide	2 ppm*, 5 ppm†	____	____	____	____	____	____	____	____
Ammonia	25ppm*, 35ppm†	____	____	____	____	____	____	____	____

* Short-term exposure limit:Employee can work in the area up to 15 minutes.
† 8 hr. Time Weighted Avg.:Employee can work in area 8 hrs (longer with appropriate respiratory protection).
REMARKS:_____
GAS TESTER NAME & CHECK # INSTRUMENT(S) USED,MODEL &/OR TYPE SERIAL &/OR UNIT #

_____ _____ _____ _____
_____ _____ _____ _____

SAFETY STANDBY PERSON IS REQUIRED FOR ALL CONFINED SPACE WORK

SAFETY STANDBY PERSON(S)	CHECK #	CONFINED SPACE ENTRANT	CHECK #
_____	_____	_____	_____
_____	_____	_____	_____

SUPERVISOR AUTHORIZATION - AMBULANCE#_____ FIRE#_____
ALL CONDITIONS SATISFIED_____ Safety Off#_____ Gas Coordinator#_____
DEPARTMENT_____Phone_____

14. ELECTRICAL LOCKOUT/TAGOUT

The Offsites Manager must approve all work in areas requiring lockout/tagout procedures. Specific procedures and permitting requirements will be specified in the HASP, or in a revised HASP based on the need for a worker to work around electrical equipment.

All systems must be locked out and tagged before the work begins. This includes pipes, air lines, electrical equipment and mechanical devices. The equipment must be start tested and approved for use by a worker by the Project Health and Safety Coordinator or the Offsites Manager by start-testing to make sure the locked-out equipment does not operate.

. APPENDIX A

. KERR-MCGEE MEDICAL EVALUATION PROGRAM

KERR-McGEE MEDICAL EVALUATION PROGRAM

All Kerr-McGee personnel and contractors performing field work at the Site will be required to have passed a pre-assignment and/or periodic medical examination that is consistent with requirements outlined in 29 CFR 1910.120(f) and 10 CFR 20.103(a). A physician's release for work and medical clearance to wear a respirator will be confirmed by the SM before any employee can begin site activities (see attached Medical Evaluation forms).

Contractors will maintain the medical records for their own employees, but shall provide the SM with written documentation certifying that each employee at the Site has met the requirements of the Medical Surveillance Program. Employees will be informed of their right to access their medical records.

Pre-assignment and periodic examinations are essentially the same in content and will include:

1. An updated medical and occupational history.
2. A screening physical examination.
3. Blood and urine laboratory tests.
4. Chest X-ray.
5. Pulmonary function tests (if indicated).
6. Audiometry.
7. Visual acuity test.

In addition, upon termination all employees who have not had a physical examination within the last six months will be given a physical examination. Kerr-McGee Corporate Policy also requires passing pre-employment drug screening as a condition of employment.

GUIDELINES FOR THE ROUTINE USE OF

DIAGNOSTIC X-RAY EXAMINATIONS FOR EMPLOYMENT PURPOSES

1. Prescription of clinically unproductive X-ray examinations should be avoided.

2. Chest X-ray examinations in routine physical examinations should follow the schedule outlined below:

Age of Employee	Frequency of Exam
18-29	Every 3rd year
30-39	Every 2nd year
40+	Annual

3. Prescription of X-ray studies for the purpose of obtaining diagnostic information should be based on clinical evaluation of symptomatic individuals.

4. Routine screening evaluations, without prior clinical evaluation, should not be performed without careful consideration of both benefit and risk.

5. X-ray examinations should only be prescribed by physicians with expertise to evaluate the examinations.

6. The number of standard views should be limited to those necessary to perform the diagnosis for the intended purpose.

7. Prescription of X-ray examinations for pregnant or possibly pregnant women should assure that medical consideration has been given to fetal exposure and that protective measures are taken.

8. The appropriate technique should be used to keep entrance skin exposure for routine chest X-rays to less than 30 mR.

KERR-McGEE CORPORATION

MEDICAL EVALUATION FOR WEARING RESPIRATORY EQUIPMENT KM—5437

NOTE TO PHYSICIAN: OSHA Safety and Health Standards require that persons should not be assigned to tasks requiring use of respirators unless it has been determined that they are physically able to perform the work while using the respiratory protection equipment. Pertinent health and physical conditions are to be determined by the physician. Care should be taken to ensure that a determination has been made that the employee is capable of wearing a respirator for the duration of the work assignment.

EMPLOYEE'S NAME	TYPE OF WORK

AMOUNT OF TIME RESPIRATOR WILL BE WORN	RESPIRATOR TYPE(S)

I have examined _____ and it is my opinion that this individual ☐ is ☐ is not (Check appropriate box) physically able to wear respiratory protection equipment as required in the performance of assigned work.

PHYSICIAN'S NAME (TYPE OR PRINT)	PHYSICIAN'S SIGNATURE	DATE

REASON FOR INABILITY TO WEAR RESPIRATORY EQUIPMENT

_____

_____

_____

KERR-McGEE CORPORATION

CONFIDENTIAL
Information to be used by Kerr-McGee Medical Director only

DATE

JOB-RELATED MEDICAL EXAMINATION

SECTION I: PERSONAL DATA

NAME (LAST FIRST MIDDLE) | DATE OF BIRTH | AGE

PLACE OF BIRTH | SEX | MARITAL STATUS | SOCIAL SECURITY NUMBER

ADDRESS | CITY | STATE | ZIP CODE

HOME PHONE | PERSONAL PHYSICIAN | ADDRESS

SPOUSE'S NAME | DATE OF LAST PHYSICAL EXAM

PERSON TO NOTIFY IN CASE OF EMERGENCY | RELATIONSHIP | PHONE | ADDRESS

SECTION II: OCCUPATIONAL DATA (To be completed by person authorizing examination)

FACILITY | DEPARTMENT

JOB TITLE | SUPERVISOR

HIRE DATE | WORK PHONE

NAME OF PERSON AUTHORIZING EXAMINATION

☐ New Hire ☐ Rehire/Recall ☐ Annual Physical ☐ Return to Work (Explain) ☐ Other (Explain)

SECTION III: OCCUPATIONAL HISTORY

PREVIOUS EMPLOYER (BEGINNING WITH CURRENT)	DATES	JOB TITLE	NATURE OF BUSINESS

HAVE YOU EVER:	YES	NO
Injured your back on the job?		
Suffered a hernia (rupture)?		
Been ill causing you to miss more than 3 consecutive days of work?		
Been sensitive to chemicals/dust/sunlight?		
Do you work more than 60 hours per week?		
Do you have any physical or mental disability which causes you to limit your activity?		

Have you ever changed jobs or work assignments because of health problem or injury? ☐ Yes ☐ No

IF YES, EXPLAIN

IF ANY OF THE ANSWERS AT LEFT ARE YES, EXPLAIN DETAILS BELOW

HAVE YOU EVER BEEN EXPOSED TO:	YES	NO
Asbestos		
Cutting Oils		
Coal Dust		
Lead		
Mercury		
Extreme Heat		
Extreme Cold		
Excessive Noise		
Radioactive Materials/Ionizing Radiation		
Pesticides/Herbicides		
Solvents/Grease		
Welding Fumes		
Benzene		
Dinitrophenol		
Fiberglass		
2, 4, 6 Trinitrotoluene		
Carbon Tetrachloride		
Chlorinated Hydrocarbons		

SECTION IV: PERSONAL HISTORY

Have you ever had or do you have any of the following medical problems

	YES NO		YES NO		YES NO
Measles (German)		Severe Headaches		Stomach Ulcers	
Measles (Hard)		Fainting Spells		Hemorrhoids	
Mumps		Seizures		Gallbladder Disease	
Chicken Pox		Hay Fever		Hepatitis	
Polio		Asthma		Jaundice	
Rheumatic Fever		Emphysema		Hernia	
Strep Throat		Frequent Lung Infections		Nervous Breakdown	
Anemia		Tuberculosis		Mental Illness	
High Cholesterol/Triglycerides		Angina Pectoris		Alcohol Abuse	
Cancer		Heart Attack		Drug Abuse	
Gout		Other Heart Disease		Back Trouble	
Thyroid Disease		High Blood Pressure		Broken Bones or Dislocation	
Diabetes		Kidney Disease		Venereal Disease	
Skin Problems		Frequent Bladder Infections		Serious Head Injuries	
Bleeding Tendency		Claustrophobia			

LIST ALL SURGERIES AND GIVE DATES

LIST ALL MEDICATIONS YOU ARE CURRENTLY TAKING

LIST ALL KNOWN ALLERGIES (INCLUDE MEDICATIONS)

LIST ALL HOSPITALIZATIONS AND GIVE DATES (OTHER THAN SURGERY)

Have you had any of the following tests? If yes, give dates of last test.

	YES NO	DATE
Chest X-ray		
Kidney X-ray		
Stomach X-ray		
Colon X-ray		
Gallbladder X-ray		
Electrocardiogram (EKG)		
Other X-rays _____		
Have you ever had a T.B. skin test?		
Have you ever had a positive T.B. skin test?		

Have you ever had shots for

IMMUNIZATIONS

	YES NO
Small Pox	
Typhoid	
Polio (Oral)	
Tetanus (GIVE DATE OF LAST SHOT)	
Measles	
Mumps	

HAVE YOU EVER HAD A BLOOD TRANSFUSION? ☐ Yes ☐ No

SECTION V: FAMILY HISTORY

Check the box if any blood relative (grandparents, aunts, uncles, children, etc.) has or has had any of the following:

	YES NO	RELATION		YES NO	RELATION		YES NO	RELATION
Stroke			Emphysema			Nervous Breakdown		
Cancer			Bleeding Tendency			Gout		
High Blood Pressure			Heart Attack			Insanity		
Tuberculosis			Stomach Ulcers			Heart Disease		
Diabetes			Kidney Disease			On-the-job Injury		
Leukemia			Asbestosis			Alcohol Abuse		
Epilepsy			Goiter			Drug Abuse		
Migraine			Thyroid Disease			Inherited Blood Disorders		
Asthma			Arthritis					
Hay Fever			Colitis					

SECTION VI: SOCIAL HISTORY

CHECK IF YOU SMOKE: ___ Cigarettes ___ Cigars ___ Pipe ___ Chew/Dip tobacco. NO. PER: HOW LONG HAVE YOU BEEN SMOKING?

CHECK IF YOU DRINK: ___ Hard Liquor ___ Beer ___ Wine ___ less than ___ glass per day ___ 1 glass per day ___ 2 glasses per day

DO YOU DRINK COFFEE? ___ Yes ___ No ___ 3 or more cups per day

DO YOU EXERCISE REGULARLY? ___ Yes ___ No IF YES WHAT TYPE OF EXERCISE?

LIST YOU HOBBIES (ESPECIALLY THOSE INVOLVING PAINT CHEMICALS WOOD WELDING HUNTING SCUBA DIVING)

LIST PRECAUTIONS USED AND DURATION INVOLVED WITH HOBBY

LIST INSECTICIDES/HERBICIDES USED AT HOME (BRAND NAME)

DO YOU WEAR SEAT BELTS WHILE DRIVING? ___ Yes ___ No

SECTION VII: ORGAN SYSTEM REVIEW

		YES	NO
GENERAL	Do you worry a lot about your health?		
	Do you usually feel tired or worn out?		
	Have you recently been drinking more water or fluids?		
	Do you usually appear pale or look normal color?		
	Has there been an unusual weight gain or loss recently?		
SKIN (HAVE YOU NOTICED)	Any change in color of your skin?		
	Any skin rashes or itching?		
	Unusually dry skin?		
	Any sores or wounds that do not heal?		
	Any change in color or size of warts?		
EYES (HAVE YOU HAD)	Any pain in your eyes?		
	Glaucoma?		
	Blurry vision?		
	Halos around lights?		
	Change in vision?		
	Do you wear contact lenses or glasses?		
ENT (DO YOU HAVE)	Any trouble hearing?		
	Ringing or buzzing in your ears?		
	A lot or nasal stuffiness?		
	Drainage down the back of your throat?		
	Frequent or severe nosebleeds?		
	Persistent hoarseness?		
	A lump in your throat?		
RESPIRATORY (DO YOU HAVE)	Frequent chest colds?		
	A constant or bothersome cough?		
	Coughing up blood?		
	Sputum or phlegm between colds?		
	Difficulty breathing or shortness of breath?		
	Wheezing or whistling in your chest?		
MUSCULOSKELETAL	Do you have a problem with back pain?		
	Do you have pain in your legs or feet?		
	Does back pain interfere with your work or activities?		
	Do you have joint pain, stiffness or swelling?		
	Do you have difficulty climbing stairs?		
	Do you have trouble walking or using your hip or knee joints?		
	Have you experienced a loss of strength in your hands or feet?		
	Have you ever been told that you have an abnormal back x-ray?		
CENTRAL NERVOUS SYSTEM	Do you have frequent or severe headaches?		
	Do you have spells of dizziness, faintness, or lightheadedness?		
	Do you see double?		
	Do you have insomnia or trouble sleeping?		
	Do you ever lose track of what happens around you for a short time?		
	Have you recently fainted, blacked out or lost consciousness?		
	Have you ever had convulsions or fits?		
	Do you have numbness or tingling in your head, arms or legs?		

		YES	NO
CARDIOVASCULAR	Do you have any pain, tightness or pressure in the front or side of your chest?		
	If yes, is it when walking fast, working hard or when excited?		
	Have you ever been told your electrocardiogram was abnormal?		
	Do you have swelling of your feet or ankles?		
	Does your heart ever beat irregularly?		
	Do you have cramps in the calf muscles when you walk?		
	Do you ever awaken at night with severe difficulty breathing?		
	Do your fingers or toes get cold, become numb, or get very white or bluish?		
GASTROINTESTINAL	Have you recently had a change in your eating habits?		
	Are there any special foods that cause you to be upset or have upset stomach pains, nausea, etc.?		
	Do you tend to burp a lot?		
	Have you recently noted any trouble swallowing?		
	Do you have a lot of indigestion or heartburn?		
	Have you ever vomited blood?		
	Are you bothered with constipation?		
	Do you have frequent stools or diarrhea?		
	Do you pass a lot of gas?		
	Do you have a poor appetite?		
	Do you ever awaken at night with a feeling of fullness underneath your breastbone?		
	Have you ever passed blood from your rectum?		
	Have you ever had black or tarry stools?		
	Have you noticed any recent changes in your bowel movements?		
GENITOURINARY (DO YOU HAVE)	Anything wrong with your genitals (privates)?		
	Burning or pain when you urinate?		
	To pass water frequently?		
	To pass more than you used to?		
	Trouble passing water?		
	To get up at night to urinate?		
	Trouble with losing urine when you cough or sneeze?		
	A problem dribbling urine?		
	Have your ever passed blood in your urine?		
	Have you ever had an operation to prevent pregnancy? (Vasectomy or sterilization, such as tubal ligation)		
	Men, do you have prostrate gland trouble?		
REPRODUCTIVE	Do you have severe menstrual pain, irregular periods or extremely heavy flow?		
	Do you have vaginal discharge or itching?		
	Have you passed the menopause or change?		
	Do you have hot flashes?		
	Have you had or do you have lumps in your breasts?		
	Have you had any discharge from your nipples?		
	LAST PAP SMEAR	LAST MENSTRUAL PERIOD	

SECTION VIII: SIGNATURE

NOTE: If you are completing this form as part of your Executive Physical, do not sign the statement below. Your results are confidential.

FOR PRE-PLACEMENT AND PERIODIC CANDIDATES ONLY:

I certify that the answers given above are true, and I understand that any false statements will be considered cause for dismissal. I consent to this Physical Examination and I authorize the physician to communicate all findings to the medical Director of Kem-McGee and Subsidiaries for their use.

SIGNATURE OF APPLICANT

HEIGHT	WEIGHT	TEMPERATURE	PULSE	BLOOD PRESSURE	SNELLEN		COLOR	TONOMETRY
					Corrected			
					L 20/	20/ R	R	mm Hg
					Uncorrected			
					L 20/	20/ R	L	mm Hg

SECTION IX. PHYSICAL EXAMINATION

SYSTEM	NORMAL	ABNORMAL	COMMENT
Skin			
Head			
Eyes			
Ears			
Nose			
Throat			
Neck			
Breasts			
Chest			
Heart			
Abdomen			
G-U			
Rectal			
Extremities			
Back			
Neurologic			
Mental Status			

SECTION X: PHYSICIAN'S OPINION

COMMENTS

☐ ACCEPTABLE FOR TYPE OF WORK APPLIED FOR ☐ ACCEPTABLE FOR TYPE OF WORK APPLIED FOR WITH RESTRICTIONS INDICATED BELOW ☐ NOT RECOMMENDED FOR TYPE OF WORK APPLIED FOR

RECOMMENDED RESTRICTIONS

LEG AND FOOT
- ☐ Limited standing/walking _____ hours per day
- ☐ Unable to use foot/leg ☐ R or ☐ L
- ☐ Limited use of foot/leg ☐ R or ☐ L

VISION
- ☐ No depth perception
- ☐ Limited color discrimination
- ☐ Must wear eye protection at all times

HEARING
- ☐ No hearing
- ☐ Limited hearing
- ☐ No exposure to excessive noise

ATMOSPHERIC CONDITIONS
- ☐ No exposure to silica or asbestos dust
- ☐ No exposure to respiratory irritants
- ☐ No exposure to numerous dust, smoke or fumes

LOSS OF SELF CONTROL
- ☐ No work at elevations
- ☐ No serious hazards to self or others in event of loss
- ☐ No mobile equipment operation

CHEMICALS AND IRRITANTS
- ☐ No exposure to _____

ARM AND HAND
- ☐ Unable to use hand/arm ☐ R or ☐ L
- ☐ Limited use of hand/arm ☐ R or ☐ L

BACK AND GROIN
- ☐ Limited carrying/pushing/pulling
- ☐ Limited stooping/bending

LIFTING LIMITATIONS
- Less than ☐ 25 lbs. ☐ 50 lbs. ☐ 75 lbs.

PHYSICAL EFFORT
- ☐ Limited physical exertion

WORK SCHEDULE
- ☐ Can work only _____ hours per day
- ☐ Can work only _____ hours per week
- ☐ Can work any shift except
- ☐ Shift rotation? ☐ Yes ☐ No

I declare under penalty of perjury that I have examined this report and all statements contained herein and to the best of my knowledge and belief, they are true and correct and complete.

ATTENDING PHYSICIAN (PRINT NAME AND TITLE)

ATTENDING PHYSICIAN'S SIGNATURE DATE

* Mail completed form to: Medical Director, Kerr-McGee Corporation
P.O. Box 25861
Oklahoma City, Oklahoma 73125

PHYSICIAN'S COMMENTS

☐ ACCEPTABLE FOR TYPE OF WORK APPLIED FOR ☐ ACCEPTABLE FOR TYPE OF WORK APPLIED FOR WITH RESTRICTIONS INDICATED BELOW ☐ NOT RECOMMENDED FOR TYPE OF WORK APPLIED FOR

LEG AND FOOT

☐ Limited standing/ walking _____ hours per day
☐ Unable to use foot/leg ☐ R or ☐ L
☐ Limited use of foot/leg ☐ R or ☐ L

VISION

☐ No depth perception
☐ Limited color discrimination
☐ Must wear eye protection at all times

HEARING

☐ No hearing
☐ Limited hearing
☐ No exposure to excessive noise

ATMOSPHERIC CONDITIONS

☐ No exposure to silica or asbestos dust
☐ No exposure to respiratory irritants
☐ No exposure to nuisance dust, smoke or fumes

LOSS OF SELF CONTROL

☐ No work at elevations
☐ No serious hazards to self or others in event of loss
☐ no mobile equipment operation

CHEMICALS AND IRRITANTS

☐ No exposure to _____

ARM AND HAND

☐ Unable to use hand/arm ☐ R or ☐ L
☐ Limited use of hand/arm ☐ R or ☐ L

BACK AND GROIN

☐ Limited carrying/pushing/pulling
☐ Limited stooping/bending

LIFTING LIMITATIONS

Less than ☐ 25 lbs. ☐ 50 lbs. ☐ 75 lbs.

PHYSICAL EFFORT

☐ Limited physical exertion.

WORK SCHEDULE

☐ Can work only _____ hours per day
☐ Can work only _____ hours per week
☐ Can work any shift except
☐ Shift rotation? ☐ Yes ☐ No

I declare under penalty of perjury that I have examined this report and all statements contained herein and to the best of my knowledge and belief, they are true and correct and complete.

ATTENDING PHYSICIAN (PRINT NAME AND TITLE)

ATTENDING PHYSICIAN'S SIGNATURE DATE

PHYSICAL REQUIREMENTS AND WORKING CONDITIONS KM-55624

NAME (LAST, FIRST) SOCIAL SECURITY NUMBER SUPERVISOR DATE

JOB TITLE DEPARTMENT

BRIEF DESCRIPTION OF JOB REQUIREMENTS

O = Occasionally Up to 25% time on job
F = Frequently 25 - 75% time on job
C = Constantly More than 75% time on job

EMPLOYMENT STATEMENT OF JOB REQUIREMENTS

A. PHYSICAL DEMANDS

	NO	O	F	C
1. Standing				
2. Walking				
3. Sitting				
4. Lifting: Heavy-Max. 65lbs.				
5. Lifting: Heavy to Mod. - Max. 40lbs.				
6. Lifting: Moderate - Max. 25lbs.				
7. Lifting: Light - Max. 10lbs.				
8. Carrying Est. Wt.				
9. Pushing Est. Wt.				
10. Pulling Est. Wt.				
11. Pulling Hand over Hand				
12. Climbing Stairs				
13. Climbing: Use of legs/arms				
14. Balancing				
15. Stooping				
16. Kneeling				
17. Repeated Bending				
18. Crawling				
19. Reaching: High/Low/Level				
20. Fingers Movement - Repetitive				
21. Repetitive Twisting or Pressure Involving Wrists or Hands				
22. Both Hands Required				
23. Both Legs Required				
24. Ability for Rapid Mental/Muscular Coordination Simultaneously				
25. Oral Communication. Speak Clearly Spanish - English				
26. Hearing-Conversation				
27. Specific Visual Requirements	Near	Far		
28. Depth Perception	Yes	No		
29. Color Vision: Distinguish Basic Shades	Yes	No		
30. Color Vision: Distinguish Basic Colors	Yes	No		
31. Operation of Crane, Truck, or Motor Vehicle	Yes	No		
OTHER				

B. WORKING CONDITIONS

	NO	O	F	C
1. Outside				
2. Outside and Inside				
3. Heat between 90° - 100°				
Heat over 100°				
4. Cold below 55°				
5. Temperature Changes - Excessive - Frequent				
6. Wetness				
7. Dry Atmospheric Conditions				
8. Confined Spaces				
9. Heights				
10. Constant Noise above 85 dec.				
11. Intermittent Noise above 85 dec.				
12. Vibration				
13. Fumes Irritant - Toxic (Please circle)				
14. Dust More than Nuisance				
TYPE 15. Gases				
16. Lead				
17. Silica - Asbestos				
18. Chemicals				
TYPES				
19. Grease and Oils				
TYPES				
20. Working with Machinery W/Moving Parts				
21. Working with Moving Vehicles				
22. Working with Ladders/Scaffolding				
23. Working Below Ground				
24. Working with Hands in Water				
25. Working alone				
26. Hours Worked Weekly more than 40 (Average)				
OTHER				

C. PROTECTIVE EQUIPMENT REQUIRED

TYPE 1. Respirator			TYPE 5. Gloves	
TYPE 2. Eye Protection			TYPE 6. Boots	
TYPE 3. Hearing Protection			TYPE 7. Body Protection	
4. Hard Hat			8. Other	

To the attending physician: Please complete the reverse side of this form.

MEDICAL DATA SHEET

Project Name/Location: Kerr-McGee/West Chicago

Employee Name: _____ Home Telephone: _____

Address: _____

_____

_____

Birthdate: _____ Height: _____ Weight: _____

Drug and Other Allergies:

Notable Medical Conditions/Medical Restrictions:

Do you wear contact lenses? _____ Yes _____ No

Are you using any medications? _____ Yes _____ No Please list:

Emergency Contact: _____ Relationship: _____

Address: _____ Phone: _____

_____

_____

Personal Physician: _____ Phone: _____

Address: _____

_____

_____

. APPENDIX B

. KERR-MCGEE RESPIRATORY PROTECTION PROGRAM

WEST CHICAGO FACILITY
RESPIRATORY PROTECTION PROGRAM
OUTLINE

1.0 INTRODUCTION

2.0 MANAGEMENT POLICY STATEMENT

3.0 EVALUATION OF RESPIRATORY HAZARDS

4.0 SELECTION OF RESPIRATORY EQUIPMENT

5.0 PRE-REQUISITES FOR USE OF RESPIRATORY EQUIPMENT

6.0 OPERATIONAL AND ADMINISTRATIVE PROCEDURES

- 6.1 Issuance and Return of Respirators
- 6.2 Respirator Use
- 6.3 Respirator Maintenance

7.0 REQUIREMENTS FOR BIOASSAY

8.0 EVALUATION OF RESPIRATORY PROTECTION PROGRAM EFFECTIVENESS

Section I Respiratory Protection Equipment Description

Section II Quantitative Fit Testing Procedure

Section III Qualitative Fit Testing Procedures

1.0 INTRODUCTION

This procedure is being written to consolidate procedures developed and implemented in October 1981 for the West Chicago Facility Respiratory Protection Program. Guidelines for this program are contained in 10 CFR 20.103, USNRC Regulatory Guide 8.15, NUREG 0041, K-M West Chicago Health and Safety Plan, and Kerr-McGee Corporation Respiratory Protection Safety Guideline 9.1.1.

KERR-McGEE CHEMICAL CORPORATION

798 FACTORY ST., WEST CHICAGO, ILLINOIS 60185

2.0 POLICY STATEMENT, RESPIRATORY PROTECTION PROGRAM

It is the policy and practice of Kerr-McGee Corporation and its subsidiaries to promote the safety and health of its employees in all company operations and activities.

In order to protect our employees from airborne controlled substances, it is the practice of Kerr-McGee Chemical Corporation, West Chicago Project, to require that respiratory protective equipment be used in certain areas and at certain times, as deemed necessary by our health physics personnel.

Management will continuously implement engineering and work practice controls to adequately limit employee exposure to controlled substances in the work area. Where these controls are not feasible or judged inadequate, respiratory protective equipment will be used to avoid excessive exposure.

A Respiratory Protection Program has been established to promote the proper use of respiratory protective equipment for routine and non-routine operations. All employees are required to follow procedures established in the Respiratory Protection Program.

_____ _____

M.S. Krippel - Site Manager/Health Physicist Date

_____ _____

Allan L. Dooley - Director Safety, Health, and Environment Date

3.0 EVALUATION OF RESPIRATORY HAZARDS

Taking into account the operations performed while the West Chicago Facility was in active production, the primary respiratory hazard encountered during remaining decommissioning activities will be exposure to radioactive dusts. Exposure to airborne asbestos fibers may also occur when handling transite building siding. Elevated levels of naturally occurring lead may be encountered during handling of tailings and pond sediments.

4.0 SELECTION OF RESPIRATORY EQUIPMENT

Only Bureau of Mines/NIOSH - certified or NRC-authorized equipment will be used for respiratory protection at the West Chicago Facility.

In order to select proper respiratory equipment to perform a particular job; surveys for contamination will be performed prior to the start of work in a contaminated area. Water spray and other appropriate dust control measures will be used to minimize exposure to airborne dusts and fibers.

Work area air samples and breathing zone samples will be taken to evaluate the effectiveness of dust control measures and calculate worker exposures to respiratory hazards.

Respiratory protection and air sampling requirements are indicated in Special Work Permits issued for all non-routine jobs in a contaminated area.

A general requirement to wear a half-face, air-purifying respirator is established for all cutting and sweeping activities in a contaminated area. In addition, a full-face, air-purifying respirator is required to work in any area exceeding the airborne thorium-232 Derived Air Concentration (DAC). No worker will be allowed to work in an area exceeding 50 times DAC.

5.0 PRE-REQUISITES FOR USE OF RESPIRATORY EQUIPMENT

Before using respiratory equipment, personnel must be trained, fit-tested, and medically cleared for respirator use.

Training in the proper use of respiratory equipment is given to all new employees as part of their radiation worker training. It will include as a minimum a description of respiratory hazards present, a viewing of Mine Safety Appliances, "Mini-Seminar on the Proper Care and Use of the Comfo II Particulate Filter Respirators", or equivalent training program, and training in the proper procedures for qualitatively field testing respirators prior to use.

Quantitative fit testing will be performed on all personnel prior to their use of respiratory equipment. Fit testing will be performed for both half-face and full-face air purifying respirators in accordance with NUREG 0041. Appendix II contains detailed fit-testing procedures used at the West Chicago Facility.

A physical examination is required for all personnel who will be required to wear respiratory protective equipment. A detailed description of the physical examination can be found in Appendix E of the Kerr-McGee West Chicago Project Health and Safety Plan. Only personnel who have been declared by the examining physician to be physically qualified to use respiratory equipment will be allowed to wear respirators.

Annual physicals will be provided for all personnel who may be required to wear respiratory equipment. Additionally, a physical will be provided upon termination of employment for all personnel exposed to airborne asbestos fibers as provided in OSHA 29 CFR 1910.1001.

6.0 OPERATIONAL AND ADMINISTRATIVE PROCEDURES

6.1 ISSUANCE AND RETURN OF RESPIRATORS

Respirators will be issued on a daily basis by Health Physics to all personnel who have returned a completed Respirator Issuance Record form. Clean respirators, in a bag, will be placed in a designated area of the change room. A new Respirator Issuance Record form will be completed by the issuer and placed in the appropriate file holder in the change room.

Returned respirators will be placed in the dirty respirator box in the change room. Respirators which have been used for asbestos removal are to be placed in a separate container which is labeled appropriate for asbestos materials. Upon returning the used respirator, the bottom of the Respirator Issuance Record must be completed, signed, and placed in the return slot.

Returned respirators and records will be inventoried before each work day to determine who will require respirators for that day.

6.2 RESPIRATOR USE

Respirators will be used when required by Special Work Permits, whenever working with transite, when cutting or sweeping in a contaminated area or when directed by Health Physics personnel.

Each time a respirator is put on, a positive and negative pressure qualitative fit test is to be performed. For half-face respirators, this is to be followed by an irritant smoke test (Appendix D Section III).

When not in use, the respirator should be placed back in its bag and put in a safe place.

The respirator user may at any time leave the area for relief from respirator use in the event of equipment malfunction, physical or psychological distress, procedural or communication failure, significant deterioration of operating conditions or any other condition that might require such relief.

6.3 RESPIRATOR MAINTENANCE

Respirators are to be cleaned in warm water using approved sanitizer solution according to the manufacturers instructions.

All cartridges removed from used respirators are to be checked for activity. Any cartridge showing fixed alpha activity above 200 dpm/100 cm^2 will be checked for removable activity. Any cartridge showing removable alpha activity above 20 dpm/100 cm^2 will be discarded. The respirator which contained the contaminated cartridge is to be checked for internal removable contamination and noted on the respirator maintenance form.

After cleaning is completed, each respirator should be inspected for defects which may impair its performance. Any discrepancies are to be noted on the respirator maintenance form. A survey for removable contamination is to be performed on 10 percent of maintained respirators. The clean respirators should then be put in ziplock bags and sealed.

The serial numbers of all maintained respirators should be recorded on the maintenance form which should then be returned to the health physics supervisor for review.

The health physics supervisor is to maintain a current inventory of all respirators in use at the site. Respirator Issuance Records and Respirator Maintenance Forms are to be checked against this inventory to insure that all respirators have been accounted for and properly maintained after being returned.

7.0 REQUIREMENTS FOR BIOASSAY

Routine bioassay for workers at the West Chicago Facility will be required infrequently, if at all. Bioassay will be performed on workers exposed to 1080 DAC-hours in a calendar year as a result of chronic inhalation exposure and/or a series of small acute exposures to airborne thorium. Acute inhalation exposures exceeding 1080 DAC-hours also require a bioassay.

Detailed bioassay requirements and procedures are found in Appendix A Section 4 of the West Chicago Project Health and Safety Plan.

8.0 EVALUATION OF RESPIRATORY PROTECTION PROGRAM EFFECTIVENESS

The adequacy of the West Chicago Facility Respiratory Protection Program will be determined by a quarterly review of records generated from the program by the site Health Physicist. The records to be reviewed include: respirator issuance and maintenance forms, air sampling results, DAC exposure calculations, work location forms and worker surveillance reports. Written documentation of the reviews will be maintained in the "Onsite Audits" file.

APPENDIX D

SECTION I
RESPIRATORY PROTECTION EQUIPMENT DESCRIPTIONS

TWIN-CARTRIDGE RESPIRATORS

10-00-05

FEATURES

- Available in both half-mask and full-facepiece styles.
- Choice of black Hycar rubber, green Hycar for chlorine and black silicone.
- Small, medium and large sizes fit a wide variety of faces.
- Filters/Cartridges are constructed of high-strength metal.
- Parts can be quickly connected and disassembled for ease of maintenance.

DESCRIPTION

MSA Twin-Cartridge Respirators provide protection against a variety of respiratory hazards. The respirators use chemical cartridges or aerosol filters, or a combination of the two, to remove specific contaminants from the inhaled air. The filters/cartridges are interchangeable among all MSA Twin-Cartridge Respirators. Back- and belt-mounted models put the cartridge assembly behind the wearer to reduce the contaminant load on the filter/cartridge and increase service life.

The respirators are available in three half-mask facepiece versions (Comfo® II, Back-Mounted and Belt-Mounted) and one full-facepiece style (Ultra-Twin®). All MSA Twin-Cartridge Facepieces are available in two formulations of Hycar rubber (black or green for chlorine atmospheres) or in black silicone, which has a unique sealing surface designed to reduce facepiece slippage. All three are formulated to maximize comfort and minimize the possibility of skin irritation, yet are resistant to chemicals and facial oils. They all come in small, medium and large sizes.

MSA

Facepieces

The Comfo II Half-Mask Facepiece is held to the face by four adjustable elastic straps attached to an aluminum yoke in the front. The top two straps are attached to two strips of plastic which form the cradle headband, which fits over the crown of the wearer's head. The bottom straps fasten around the neck. The fit can be adjusted by moving the tension slides on the elastic material. A large chin cup aids positioning and stability. Traditional elastic headbands are still available on the black or green Hycar facepieces.

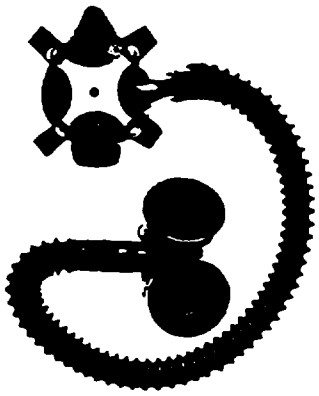
The Ultra-Twin Full Facepiece has an inturned lip around the edge for a tight seal against the face. A large chin cup makes it easy to position. Five suspension headstraps and roller-buckles hold the facepiece in place while minimizing hair entanglement. Wide polycarbonate lens is coated to resist scratching and chemical attack. Lens is held in place by a two-piece lens ring, which is color-coded to indicate size of the facepiece.

Filters/Cartridges

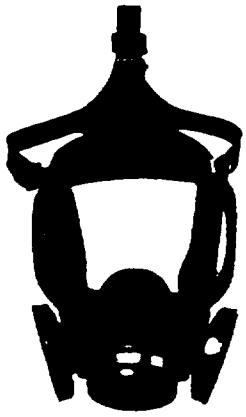
There are 21 MSA Filter Cartridge combinations that protect against a wide variety of contaminants. The cartridges are made of metal, which is not only stronger than plastic, but allows for easier detection of damage. The cartridge holders securely retain the screw-in cartridges and resist damage [illegible] chemicals. [illegible] each cartridge indicates the type of protection for which it is approved.

Four aerosol-type filters, six chemical-type cartridges and eleven combination filter cartridge-type respirators are all certified by NIOSH MSHA under 30 CFR (Code of Federal Regulations), Part 11. See pages 5 to 8 for hazard information and maximum use concentrations. For protection against dusts and mists, prefilters (Type F) are available for chemical cartridges; because these are the same filters used in Type F Respirators, they can be interchanged – helping reduce replacement filter inventory.

Comfo II Respirator (less filters and cartridges)



Belt-Mounted Respirator (less filters/cartridges)



Ultra-Twin Respirator (less filters and cartridges)

Back-Mounted Respirator (less filters and cartridges)

ORDERING INFORMATION

Select respirator style, material and size from table below. Order filters/cartridges separately, from table on next page. Respirators meet various NIOSH/MSHA approvals when combined with appropriate cartridges or filters.

Respirator (less filters/cartridges)	Size			NIOSH/MSHA Approval No.
	Small	Medium	Large	
Comfo II				TC-21C-133 (Type F) TC-21C-134 (Type S) TC-21C-135 (Type H and Sparktoe Type H) TC-23C-40 (GMA) TC-23C-41 (GMB) TC-23C-47 (GMC) TC-23C-43 (GMD) TC-23C-917 (GMF) TC-23C-157 (GMA-F) TC-23C-161 (GMA-H) TC-23C-156 (GMB-H) TC-23C-159 (GMC-H) TC-23C-160 (GMC-S) TC-23C-158 (GMD-H) TC-23C-923 (GMF-H) TC-23C-243 (GMI-H) TC-23C-79 (GMP) TC-23C-80 (Paint)
Black Hycar	479532	479531	479533	
Green Hycar	479535	479534	479536	
Black silicone	479529	479528	479530	
Comfo II (bulk packaged, 36 facepieces per carton)				
Black Hycar	480362	480364	480366	
Green Hycar	480363	480365	480367	
Black Silicone	480368	480369	480370	
Back-Mounted				TC-21C-274 (Type F) TC-21C-273 (Type S) TC-21C-272 (Type H and Sparktoe Type H) TC-23C-460 (GMA) TC-23C-461 (GMB) TC-23C-462 (GMC) TC-23C-463 (GMD) TC-23C-920 (GMF) TC-23C-469 (GMA-F) TC-23C-465 (GMA-H) TC-23C-470 (GMB-H) TC-23C-466 (GMC-H) TC-23C-467 (GMC-S) TC-23C-468 (GMD-H) TC-23C-924 (GMF-H) TC-23C-471 (GMI-H) TC-23C-464 (GMP) TC-23C-473 (Paint)
Black Hycar	480004	479999	480009	
Green Hycar	480005	480000	480010	
Black silicone	480007	480002	480012	
Belt-Mounted				TC-21C-181 (Type F) TC-21C-134 (Type S) TC-21C-135 (Type H and Sparktoe Type H) TC-23C-629 (Mersorb®) TC-23C-40 (GMA) TC-23C-41 (GMB) TC-23C-47 (GMC) TC-23C-43 (GMD) TC-23C-918 (GMF) TC-23C-157 (GMA-F) TC-23C-161 (GMA-H) TC-23C-156 (GMB-H) TC-23C-159 (GMC-H) TC-23C-160 (GMC-S) TC-23C-158 (GMD-H) TC-23C-925 (GMF-H) TC-23C-244 (GMI-H) TC-23C-79 (GMP) TC-23C-1046 (Mersorb-H) TC-23C-80 (Paint)
Black Hycar	479865	479860	479870	
Green Hycar	479866	479861	479871	
Black silicone	479868	479863	479873	
Ultra-Twin				TC-21C-188 (Type F) TC-21C-187 (Type S) TC-21C-155 (Type H and Sparktoe Type H) TC-23C-144 (GMA) TC-23C-145 (GMB) TC-23C-146 (GMC) TC-23C-147 (GMD) TC-23C-921 (GMF) TC-23C-151 (GMA-F) TC-23C-155 (GMA-H) TC-23C-150 (GMB-H) TC-23C-153 (GMC-H) TC-23C-154 (GMC-S) TC-23C-152 (GMD-H) TC-23C-926 (GMF-H) TC-23C-245 (GMI-H) TC-23C-148 (GMP) TC-23C-149 (Paint)
Black Hycar	471298	471286	471310	
Green Hycar	471300	471287	471312	
Black silicone *	480263	480259	480267	

Special-Purpose Respirators, complete

Type F Respirators: Available in all four facepiece styles. Each Type F Respirator comes complete with 10 spare filters and two filter covers.

Facepiece	Small	Medium	Large
Hycar			
Comfo II	479608	479605	479611
Back-Mounted	480059	480058	480060
Belt-Mounted	480050	480049	480051
Ultra-Twin	471730	461845	471731
Silicone			
Comfo II	479609	479606	479612
Back-Mounted	480062	480061	480063
Belt-Mounted	480053	480052	480054
Ultra-Twin	480390	480389	480391

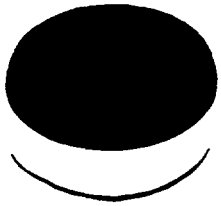
Paint Spray Respirators: Available in all four facepiece styles. Each Paint Spray Respirator comes with two chemical cartridges, two prefilters and two filter covers.

Hycar			
Comfo II	479707	479704	479710
Back-Mounted	479927	479926	479928
Belt-Mounted	479918	479917	479919
Ultra-Twin	471726	461846	471727
Silicone			
Comfo II	479709	479706	479712
Back-Mounted	479930	479929	479931
Belt-Mounted	479921	479920	479922
Ultra-Twin	480387	480386	480388

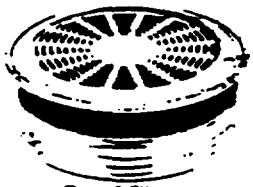
Note: Not for use with urethane or other diisocyanate-containing paints

Filters/ Cartridges (Order from table on pages 5-6.)

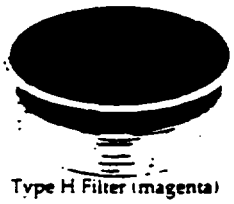
Aerosol Filters



Type F Filter



Type S Filter



Type H Filter (magenta)

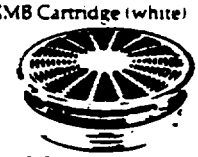
Sparkfoe Type H (magenta)

Chemical Cartridges

Protection extended to include dusts and mists by adding Type F filters and filter covers to the cartridges. Order 459027 (two required) and 459595 (pkg. of 10)

GMA Cartridge (black)

GMB Cartridge (white)



GMC Cartridge (yellow)

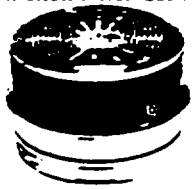
GMD Cartridge (green)

GMF Cartridge (olive)

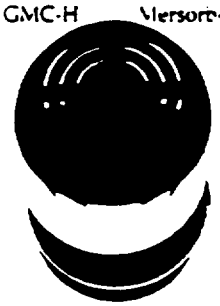
Chemical Cartridges (continued)

Mersorb Mercury Indicator Cartridge (orange)

Combination Filter-Cartridges



GMA-F	GMD-H
GMA-H	GMF-H
GMB-H	GMI-H
GMC-S	GMP
GMC-H	Mersorb-H



Paint Filter Cartridge

Filters/Cartridges

Respiratory Hazards	Protection Type	Part No.	NIOSH-MSHA Approval No.
Dusts and mists having a time-weighted average (TWA) not less than 0.05 mg/m³ or two million particles per cu. ft.	Type F	459595 (box of 10) 459693 (strip of 100) 489353 Filter cover (2 required)	TC-21C-133
(1) Dusts, fumes and mists having a TWA not less than 0.05 mg/m³ or two million particles per cu. ft. and (2) radon daughters attached to dust, fumes and mists described above	Type S	464034 (box of 10)	TC-21C-134
(1) Dusts, fumes and mists having a TWA less than 0.05 mg/m³ (2) asbestos-containing dusts and mists and (3) radionuclides	Type H	464035 (box of 10)	TC-21C-135
(1) Dusts, fumes and mists having a TWA less than 0.05 mg/m³ (2) asbestos-containing dusts and mists and (3) radionuclides	Sparktoe Type H	465798 (box of 10)	TC-21C-135
(1) Not more than 1,000 ppm organic vapors by volume and (2) dusts and mists having a TWA not less than 0.05 mg/m³ or two million particles per cu. ft.	GMA	464031 (box of 10) 459595* (box of 10)	TC-23C-40 (cartridges separately) TC-21C-133 (filters separately)
(1) Chlorine, chlorine dioxide, hydrogen chloride, sulfur dioxide and escape only from hydrogen sulfide (2) dusts and mists having a TWA not less than 0.05 mg/m³ or two million particles per cu. ft.	GMB	464032 (box of 10) 459595* (box of 10)	TC-23C-41 (cartridges separately) TC-21C-133 (filters separately)
(1) Not more than 1,000 ppm organic vapors, chlorine, chlorine dioxide, hydrogen chloride, sulfur dioxide and escape only from hydrogen sulfide (2) dusts and mists having a TWA not less than 0.05 mg/m³ or two million particles per cu. ft.	GMC	464046 (box of 10) 459595* (box of 10)	TC-23C-47 (cartridges separately) TC-21C-133 (filters separately)
(1) Ammonia or methylamine and (2) dusts and mists having a TWA not less than 0.05 mg/m³ or two million particles per cu. ft.	GMD	464033 (box of 10) 459595* (box of 10)	TC-23C-43 (cartridges separately) TC-21C-133 (filters separately)
(1) Formaldehyde or not more than 1,000 ppm organic vapors; chlorine, chlorine dioxide, hydrogen chloride and sulfur dioxide, (2) dusts and mists having a TWA not less than 0.05 mg/m³ or two million particles per cu. ft.	GMF	490173 (box of 10)	TC-23C-917
(1) Metallic mercury vapor and chlorine.	Mersorb	466204 (box of 10)	TC-23C-629 (approval limited to Belt-Mounted Respirator only)
(1) Not more than 1,000 ppm organic vapors and (2) dusts and mists having a TWA not less than 0.05 mg/m³ or two million particles per cu. ft.	GMA-F	464023 (box of 10)	TC-23C-151
(1) Mists of paints, lacquers and enamels, (2) not more than 1,000 ppm organic vapors by volume, (3) pesticides, (4) dusts, fumes and mists having a TWA less than 0.05 mg/m³, (5) asbestos-containing dusts and mists, (6) radionuclides and (7) any combination thereof. Not for use with urethane or other diisocyanate-containing paints.	GMA-H	464029 (box of 6)	TC-23C-155
(1) Chlorine, chlorine dioxide, hydrogen chloride, sulfur dioxide and escape only from hydrogen sulfide (2) dusts, fumes and mists having a TWA less than 0.05 mg/m³, (3) asbestos-containing dusts and mists and (4) radionuclides.	GMB-H	464028 (box of 6)	TC-23C-150
(1) Not more than 1,000 ppm organic vapors, chlorine, chlorine dioxide, hydrogen chloride, sulfur dioxide, and escape only from hydrogen sulfide, (2) pesticides, (3) dusts, fumes and mists having a TWA less than 0.05 mg/m³, (4) asbestos-containing dusts and mists and (5) radionuclides.	GMC-H	464027 (box of 6)	TC-23C-153

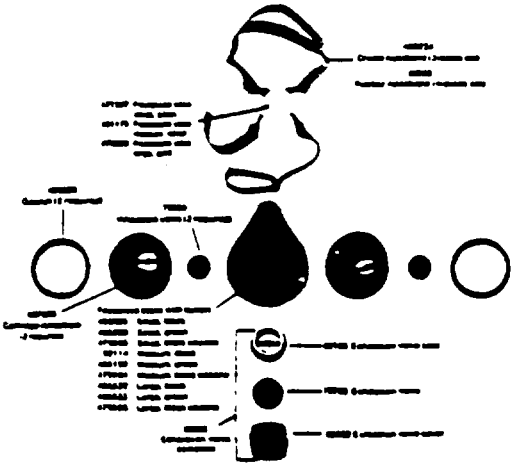
Respiratory Hazards	Protection Type	Part No.	NIOSH-MSHA Approval No.
(1) Not more than 1,000 ppm organic vapors, chlorine, chlorine dioxide, hydrogen cyanide and sulfur dioxide and escape only from hydrogen sulfide. (2) pesticides. (3) dusts, fumes and mists having a TWA not less than 0.05 mg/m³ or two million particles per cu. ft. and (4) radon daughters attached to dusts, fumes and mists described above.*	GMC-S	464026 (box of 6)	TC-23C-154
(1) Ammonia and methylamine. (2) dusts, fumes and mists having a TWA less than 0.05 mg/m³ (3) asbestos-containing dusts and mists and (4) radionuclides.	GMD-H	464030 (box of 6)	TC-23C-152
(1) Formaldehyde or not more than 1,000 ppm organic vapors, chlorine, chlorine dioxide, hydrogen chloride and sulfur dioxide. (2) dusts, fumes and mists having a TWA less than 0.05 mg/m³. (3) asbestos-containing dusts and mists and (4) radionuclides.	GMF-H	490174 (box of 6)	TC-23C-923
(1) Metallic mercury vapor and chlorine. (2) dusts, fumes and mists having a TWA less than 0.05 mg/m³. (3) asbestos-containing dusts and mists and (4) radionuclides.	Mersorb-H	492924 (box of 6)	TC-23C-1046 (approval limited to Belt-Mounted Respirator only)
(1) Not more than 1,000 ppm organic vapors. (2) dusts, fumes and mists having a TWA less than 0.05 mg/m³. (3) asbestos-containing dusts and mists and (4) radionuclides.*	GMI-H	464049 (box of 6)	TC-23C-243
(1) Pesticides, not approved for fumigants. (2) not more than 1,000 ppm organic vapors. (3) mists of paints, lacquers and enamels. (4) dusts and mists having a TWA not less than 0.05 mg/m³ or two million particles per cu. ft. and (5) any combination thereof. Not for use with urethane or other diisocyanate containing paints.*	GMP	464025 (box of 6)	TC-23C-79
(1) Mists of paints, lacquers and enamels. (2) not more than 1,000 ppm organic vapors and (3) any combination thereof. Also approved against dusts and mists having a TWA not less than 0.05 mg/m³ or two million particles per cu. ft. Not for use with urethane or other diisocyanate-containing paints.*	Paint	464031 GMA Cartridge (box of 10) 465667 Paint Prefilter (dispenser pkg. of 20) 489219 Cover for Prefilter (2 required)	TC-23C-40 (cartridges) TC-23C-80 (prefilters)

Notes:
*Also order 489353 Filter Cover (2 required)
1. Do not use in atmospheres containing less than 19.5 percent oxygen, in atmospheres containing toxic gases or vapors or in atmospheres immediately dangerous to life or health.
2. Do not use in atmospheres containing less than 19.5 percent oxygen, or in atmospheres immediately dangerous to life or health.
3. Do not wear for protection against organic vapors with poor warning properties or those which generate high heats of reaction with the sorbent material in the cartridge.
4. Protection extended to dusts and mists only by adding Type F filters and filter covers.
5. 99.97 percent effective against 0.3 micron DOP.

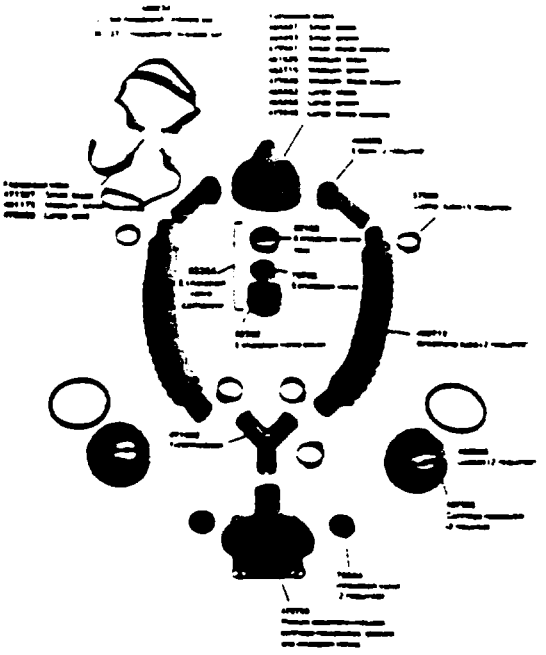
Warning: Chemical cartridge respirators should not be used for respiratory protection against these gaseous materials, regardless of concentration or time of exposure. This partial list is far from complete and is offered only as a guide to proper evaluation of the many contaminants found in industry. Contact MSA for further information on other specific materials.

Arsine
Bromine
Carbon monoxide
Diisocyanates
Dimethylaniline
Dimethyl sulfate
Hydrogen cyanide
Hydrogen fluoride
Hydrogen selenide
Methanol
Methyl bromide
Methyl chloride
Methylene chloride
Nickel carbonyl
Nitric acid
Nitro compounds:
Nitrobenzene
Nitrogen oxides
Nitroglycerin
Nitromethane
Ozone
Phosgene
Phosphine
Phosphorous trichloride
Stibine
Vinyl chloride

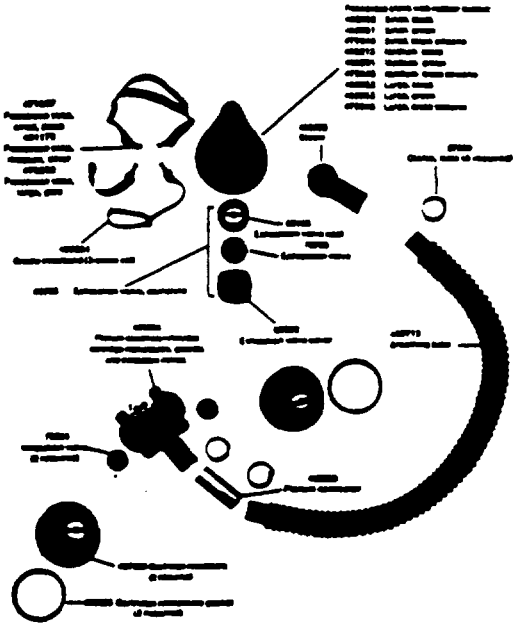
Comfo II Respirator Components:



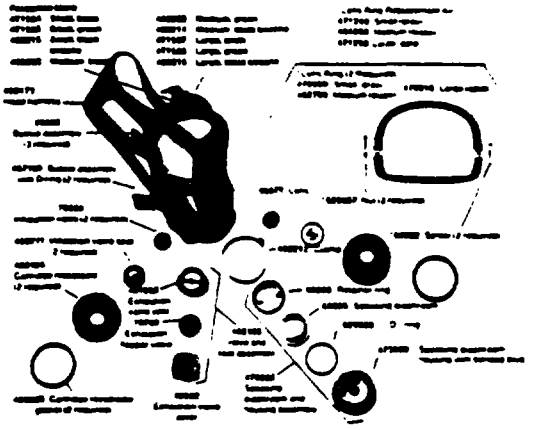
Back-Mounted Respirator Components:



Belt-Mounted Respirator Components



Ultra-Twin Respirator Components



ACCESSORIES

MSA Spectacle Kit
For use by workers who must wear corrective lenses, easily inserted into the facepiece. Kit includes wire support, rubber guide and one pair of metal-frame spectacles.

454819	Prescription Spectacle Kit. Universal bridge, 44mm lens size (less lenses); for use with Ultra-Twin Facepiece

Nosecup
Used to reduce the possibility of lens fogging under low-temperature and high-humidity conditions. For use with Ultra-Twin Facepiece.

471710	Nosecup (Small)
471711	Nosecup (Medium)
471712	Nosecup (Large)

Cover Lens
Protects the lens of the Ultra-Twin Facepiece from scratches during storage, handling and in use.

456975	Clear Cover Lens (Package of 25)
480326	Smoke Tinted Cover Lens (Package of 25)

Ultra-Twin Adapter
Converts demand Ultravue Facepieces to a twin cartridge respirator.

483477	Ultra-Twin Adapter

Carrying Pouch
Belt-mounted carrying pouch with Velcro closures for use with Comfo II Respirator.

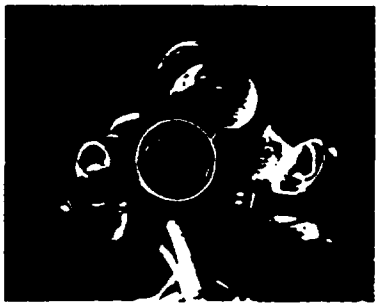
468730	Carrying Pouch for use with Comfo II Respirator

Cradle Conversion Kit
For simple, snap-on replacement of elastic headstraps with a cradle headband.

479875	Cradle Conversion Kit Top headband only

MSA Cleaner-Sanitizer II
To thoroughly clean and sanitize respirators and other safety equipment. (See Data Sheet 10-00-13.)

34337	Cleaner-Sanitizer II (dispenser box of 12 2-oz. packets)



Quik-Chek™ Adapter
For quantitative facepiece fit testing, this adapter easily attaches to the facepiece's exhalation valve, providing a connection point for the user's quantitative fit test probe. Use of the adapter eliminates the need to use special probed facepieces typically required for quantitative fit testing.

Part No.	Description
802710	Quik-Chek Adapter
82382	Exhalation valve cover also required for Advantage 100 respirator.
803196	Replacement kit with 25 tubes, suction cups, connectors, and terminals.

Special Test Respirators
Probed Comfo II Respirator

466211	Small, Hycar
482109	Small, silicone
463439	Medium, Hycar
482105	Medium, silicone
466488	Large, Hycar
482113	Large, silicone

Probed Belt-Mounted Respirators

467902	Small, Hycar
466248	Medium, Hycar
467903	Large, silicone

Probed Back-Mounted Respirators

472780	Small, Hycar
472781	Medium, Hycar
472782	Large, Hycar

Probed Ultra-Twin Respirators

471683	Small, Hycar
482025	Small, silicone
465457	Medium, Hycar
482024	Medium, silicone
471684	Large, Hycar
482026	Large, silicone

Training Aids
MSA offers VHS videotape training aids on the proper care, use and maintenance of MSA Twin-Cartridge Respirators.

696810	Comfo II Chemical Cartridge Respirator
696811	Comfo II Particulate Filter Respirator
696818	Comfo II Belt-Mounted Respirator
696820	Ultra-Twin Respirator
696806	Air-Purifying Respirators

Note: This Data Sheet contains only a general description of MSA Twin-Cartridge Respirators. While uses and performance capabilities are described, under no circumstances should the products be used except by qualified, trained personnel and not until the instructions, labels or other literature accompanying them have been carefully read and understood and the precautions therein set forth followed. Only they contain the detailed information concerning these products.

MSA
Offices and representatives in principal cities worldwide.
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Corporate Headquarters P.O. Box 426, Pittsburgh, PA 15230 USA

Data Sheet 10-00-03
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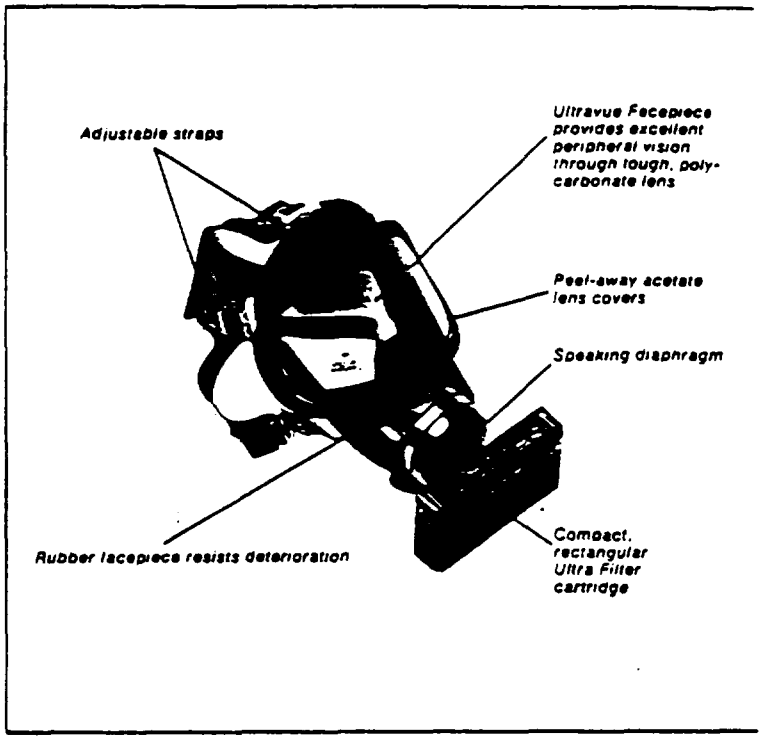
Ultra Filter® Respirator

Small, lightweight rectangular filter cartridge allows head to move freely from side to side.



Application

The Ultra Filter® Respirator provides respiratory protection in environments contaminated with dusts, fumes, and mists having a Time Weighted Average less than 0.05 milligram per cubic meter, and radioactive nuclides. In addition, NIOSH regards this respirator as satisfactory for respiratory protection against asbestos.

Description

The Ultra Filter Respirator consists of an Ultravue® Facepiece and a small, rectangular, cartridge-type replaceable filter. The Clearvue® Facepiece is also available for use with the Ultra Filter Respirator as a non-stock item.

The rectangular filter cartridge mounts directly below the facepiece; the compact filter has a large, effective filter area to provide low breathing resistance and high loading capacity.

The Ultravue Facepiece—which is interchangeable on a wide variety of MSA respiratory devices—has a large, tough polycarbonate lens which is located close to the wearer's face to provide excellent peripheral vision. Facepiece is supplied with a cellulose acetate cover lens which may be worn with the respirator to protect the facepiece lens from scratches and contamination. The rubber facepiece resists deterioration from facial oils. Speaking diaphragm is standard.

A soft rubber nosecup which reduces lens fogging and a spectacle kit for use by workers who must wear corrective lenses are available as options.

Approvals and Standards

The Ultra Filter Respirator has been approved by the Mine Safety and Health Administration (MSHA) and the National Institute of Occupational Health and Safety (NIOSH) under Approval No. TC-21C-150 for respiratory protection against dusts, fumes, and mists having a Time Weighted Average less than 0.05 milligram per cubic meter, and radionuclides. Not for use in atmospheres containing toxic gases and vapors.

Ordering information

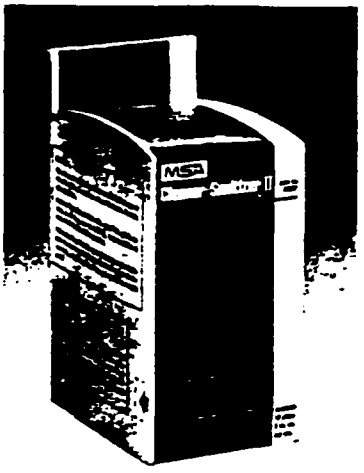
Catalog numbers

457117	Ultra Filter Respirator with rectangular cartridge and medium Ultravue Facepiece
464807	Replacement rectangular Ultra Filter cartridge
471218	Small Ultravue Facepiece. Black, with coupling nut
457126	Medium Ultravue Facepiece. Black, with coupling nut
471230	Large Ultravue Facepiece. Black, with coupling nut

Ultravue Facepiece with nosecup

With Spectacle Kit

471710	Nosecup, small, for use with small Ultravue Facepiece
471711	Nosecup, medium, for use with medium Ultravue Facepiece
471712	Nosecup, large, for use with large Ultravue Facepiece
456975	Cover lens, clear, for Ultravue Facepiece (pkg of 25 lenses)
454819	Prescription Spectacle Kit, Universal Bridge, 44-mm lens size (less lenses); for use with Ultravue Facepiece
34337	Cleaner-Sanitizer II: 2 2-oz pkgs in carton/dispenser
456975	Cover lens, clear, for Ultravue Facepiece (pkg of 25 lenses)
454819	Prescription Spectacle Kit, Universal Bridge, 44-mm lens size (less lenses); for use with Ultravue Facepiece



Note: This Data Sheet contains only a general description of the Ultra Filter Respirator. While uses and performance capabilities are described, under no circumstances should it be used except by qualified, trained personnel, and not before the instructions, labels, or other literature accompanying it have been carefully read and understood and the precautions therein set forth followed. Only they contain the complete and detailed information concerning this product.

MSA
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Branch offices throughout the United States (Call toll-free 1-800-MSA-2222).
Subsidiaries in: Barcelona • Berlin • Bern • Calcutta • Glasgow • Harare
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Santiago • São Paulo • Singapore • Sydney • Tokyo • Toronto.
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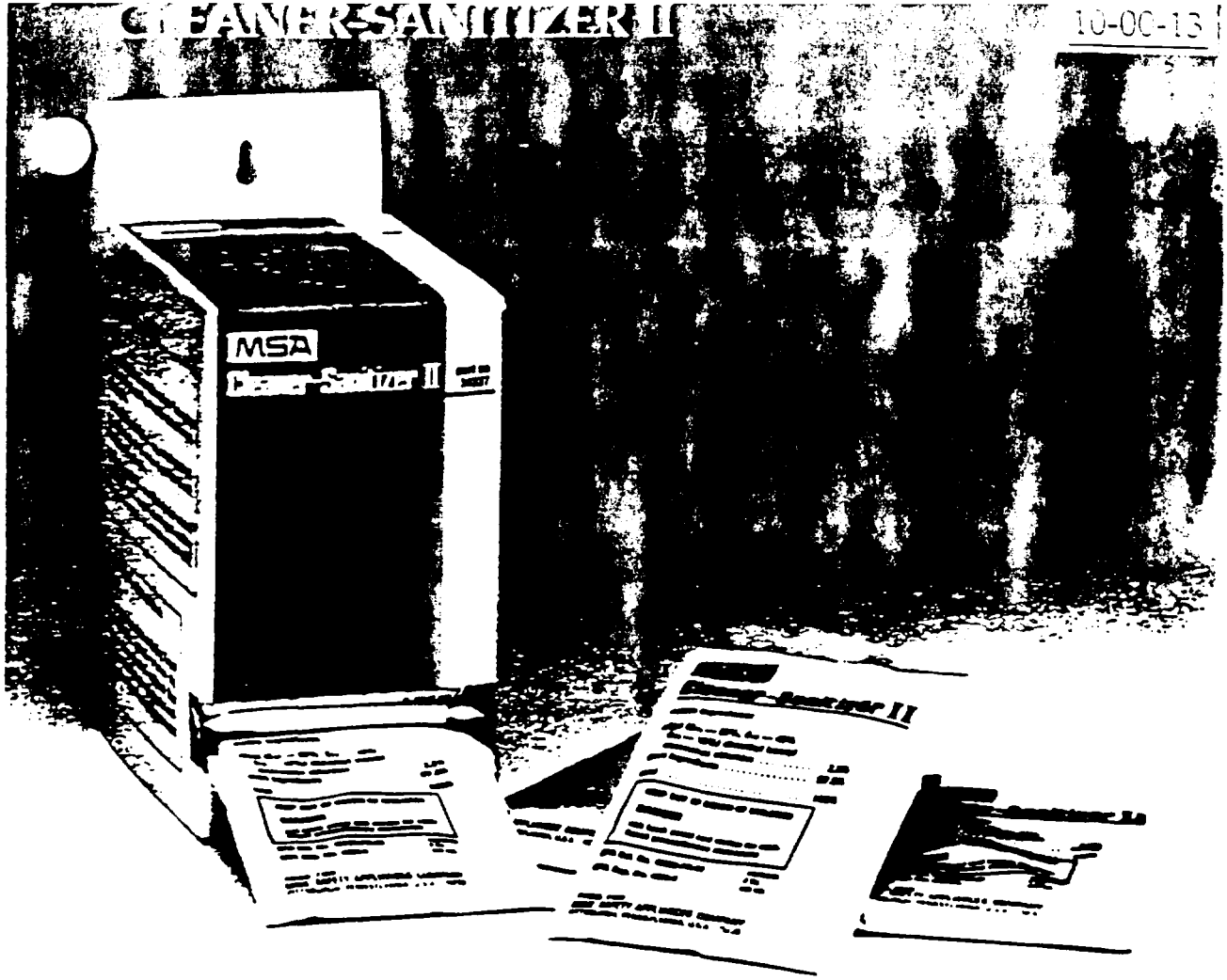
Data Sheet 10-00-08 MSA 1985 Printed in U.S.A. 351(L)

CLEANER-SANITIZER II

10-00-13



FEATURES

- Supplied in individual two-ounce plastic packages
- Disposable carton/dispenser holds 12 two-ounce packages, mounts on wall with a screw or nail
- Non-corrosive in use dilutions

DESCRIPTION

MSA Cleaner-Sanitizer II is a water-soluble powder supplied in individual two-ounce plastic packages. When added to one gallon of warm water (120° F) Cleaner-Sanitizer II is used to clean and sanitize personal protective equipment such as gas masks, breathing apparatus, goggles, spectacles, faceshields, hearing protectors, respirators and protective headwear.

MSA

A disposable carton dispenser holds 12 two-ounce packages and can be mounted on a wall with a screw or nail. A perforated strip near the bottom of the package can be removed to create a slot through which one package at a time can be removed.

To use, add one 2-ounce package of the powdered Cleaner-Sanitizer II to one gallon of warm water (about 120° F). Immerse the soiled equipment in the solution and scrub gently with a soft brush or cloth until clean. Rinse thoroughly in plain warm water and allow to dry.

Cleaner-Sanitizer II at recommended use dilution (2 oz/gal.) retains its germicidal efficiency in hard water up to 500 ppm hardness, measured as calcium and magnesium.

Cleaner-Sanitizer II is non-corrosive in use dilutions, and will not deteriorate rubber, plastic, glass or metal parts.

Bacterial strength of Cleaner-Sanitizer II has been verified by A.O.A.C. Use Dilution Confirmation Test against the organisms Salmonella choleraesuis and Staphylococcus aureus.

Cleaner-Sanitizer II will not deteriorate with age.

CAUTIONS

Equipment washed in a solution of Cleaner-Sanitizer II must be rinsed thoroughly in plain water (about 120°F). Cleaning and sanitizing at the recommended 120°F temperature will avoid overheating and distortion of parts and thus prevent unnecessary replacement.

Use Cleaner-Sanitizer II only in the recommended dilution (2 oz per gal. of water) to clean personal protective equipment; more concentrated dilutions could cause corrosion.

Cleaner-Sanitizer II is harmful or fatal if swallowed. If swallowed, drink milk, egg whites, gelatin solution, or, if these are not available, large quantities of water. Avoid alcohol. Call a physician.

Avoid contaminating food with Cleaner-Sanitizer II.

Avoid getting Cleaner-Sanitizer II in eyes, because such contact may cause burns or damage the eyes; in case of eye contact, flush eyes immediately with plenty of clean water. Immediately get medical attention.

Avoid prolonged skin contact. If skin irritation develops and persists, get medical attention.

APPROVALS & STANDARDS

MSA Cleaner-Sanitizer II is registered with the Environmental Protection Agency (EPA). Registration number is 4204-4. No other standards are applicable.

SPECIFICATIONS

Active Ingredients: 2.5%
Alkyl (C_{14}—50%, C_{12}—40%, C_{16}—10%) Dimethyl Benzyl Ammonium Chlorides

Inert Ingredients: 97.5%
Sodium Carbonate
Sodium Bicarbonate
Pentasodium Triphosphate
Water
Trisodium Phosphate
Nonoxynol 10
Ethanol

Phenol Coefficients (A.O.A.C. Method, 20 C)
Salmonella Typhosa—11.2
Staphylococcus aureus—16.7

ORDERING INFORMATION

Part No.	Description
34337	MSA Cleaner Sanitizer II. 12 two-ounce packages in carton/dispenser

Note: This Data Sheet contains only a general description of MSA Cleaner-Sanitizer II. While uses and performance capabilities are described, under no circumstances should these products be used until the instructions, labels or other literature accompanying the products have been read and understood and the precautions therein set forth followed. Only then contact the company and detailed information concerning these products.

MSA
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Corporate Headquarters: P.O. Box 426, Pittsburgh, PA 15230 USA.

Data Sheet 10-03-13
MSA, 1991
Printed in U.S.A. (MUTL)

KERR-McGEE CHEMICAL CORPORATION

WEST CHICAGO FACILITY

KM-4796

RESPIRATOR ISSUANCE RECORD

Issue of Respirator

DATE _____ TIME _____

NAME _____

ID NO. _____

SWP NO. _____

TYPE OF RESPIRATOR _____

RESPIRATOR NUMBER _____

_____
SIGNATURE

Return of Respirator

DATE _____ TIME _____

NO. OF HOURS RESPIRATOR USED _____

☐ RESPIRATOR FUNCTIONING PROPERLY

☐ RESPIRATOR DAMAGED OR NOT FUNCTIONING

_____
SIGNATURE

Survey Ref. #: _____ Date: _____

Signature: _____

RESPIRATOR MAINTENANCE DAILY REPORT

1. Check removed filter cartridges for activity and build-up (discoloration); discard bad cartridges. Report cartridges showing excessive activity and respirator number from which it originated.

2. Smear Survey: Smear respirators before washing only if contamination is found on cartridges. Smear 10-20% of respirators after washing.

3. Respirators will be washed with a soft bristle brush in hot water (120° F) using approved sanitizer solution in the concentration of one (1) packet for every one (1) gallon of hot water.

4. Respirators will be rinsed individually using warm running water. Ensure all check valves are rinsed completely.

5. Dry respirators completely either by air drying or toweling dry and removing straps to be dryed separately in the dryer.

6. Check all sealing surfaces, check valves, gaskets, and straps for deterioation. Note discrepancies below.

7. Ensure check valves are free by using a blunt instrument such as a pen top.

8. Place in ziplock bag and seal.

SERIAL #'S OF MAINTAINED RESPIRATORS

9. Note below any damage or discrepancies (eg. resp. with no issuance sheet) and note corrective action.

_____

_____

_____

_____

_____

APPENDIX D

SECTION II
QUANTITATIVE FIT TESTING PROCEDURE

SECTION II

TEST PROCEDURE
TDA-80 FACEFIT TESTER

The following is the test procedure for testing an individual for fit of a respirator face-piece. Operators of face-fit test equipment tend to follow their own inclinations with respect to procedure while generally proceeding along the same lines. The method suggested herein is a composite of opinions, leaning heavily on ASTM-OSHA information. What is important is that a simple method be used to evaluate the fit of face-pieces.

1. The photometer is set up to sample clear air on the most sensitive range desired. For protection factors less than 10,000 the photometer can be zeroed on the 0.1% range.

2. The range switch is set to the 100% range.

3. The sample valve is set to the upstream or 100% position and the detector indicates the booth concentration.

4. When the booth concentration is stable at 100% of full scale, proper test concentration is indicated.

5. Now that the test equipment is ready, the subject should be logged in, and the following data (at least) should be recorded:

   a. Name
   b. Badge Number

   Once this data is recorded, the subject's name, date, type and size of respirator being tested with, is noted on the recorder strip chart. Subject then dons modified respirator and enters the test chamber.

6. The aerosol concentration in the booth is rising, and will continue to rise as seen at points 12 and 25 in the sample chart. It is best to wait until a certain degree

of stability is reached, as in point 12, before continuing the fit test. The operator then makes a quick check of the amount of aerosol within the respirator to be assured that there is no gross leak. If there is, the subject is asked to leave the test chamber immediately, and adjustments to the mask, inspection of hook-ups for leaks, etc. are performed.

7. It is possible that facial hair, unusual facial configuration or other factors may affect the fit of the face-piece. It is also possible that one type mask will not fit while another will, thus requiring the operator to exercise his best judgement to obtain the best combination for the best fit.

Range Switch Position	PF at Full Scale	PF at Mid-Range	PF at 10% FS
100	1	2	10
10	10	20	100
1	100	200	1,000
0.1	1,000	2,000	10,000
0.01	10,000	20,000	100,000

The quick check estimate will allow the operator the opportunity to do one of the following:

a. Continue the test due to an acceptable estimated protection factor.

b. Instruct the test subject to readjust mask and/or tighten head straps, etc. or check line fitting integrity for leakage.

c. Abort the test and try another mask, or inspect for faulty exhalation valve, wrong filter cartridge, loose fittings, etc.

8. With these preliminaries out of the way, the operator may not proceed with the major part of the test - determining the protection factor (PF). Essentially, the PF is the concentration reading in the face-piece. Thus, a reading of 100 in the chamber and 0.4 in the face-piece results in a PF of 250.

9. Set range switch to 100% range.

10. Change sample valve to up stream or 100% position to check the buildup of aerosol concentration in the booth. It is preferable to limit the change in concentration throughout the test to a value less than 10% of full scale. It may be necessary to wait a few minutes until the concentration has built up. In the example, the value at point 12 is between 95-75% of full scale and the ending value at point 25 is 98%, which is acceptable. The difference between points 12 and 25 are compared to point 4 is an additional source of dilution air supplied by the test subject's clean exhaled breath.

11. The initial booth concentration is 97% of full scale.

12. The operator changes the sample valve to the downstream or TEST position to return to a breathing zone sample. This concentration is much lower than the booth and the reading decreases rapidly.

13. The operator changes ranges until he reaches a range which displays the breathing zone concentration in a readable portion of the range. Generally, this is between 10% and 80% of full scale. The operator should be alert to sudden changes in range. It is highly desirable, though not absolutely necessary, to measure all breathing activity on the same range.

14. The subject is instructed to breathe normally. The peaks and valleys correspond to a changing mask penetration during inhalation and exhalation.

15. The subject is instructed to breathe deeply. The peak penetration increases on inhalation because a greater pressure differential is created across the mask, thus causing leaks to increase.

16. The subject is instructed to move his head from side to side. Peaks of penetration in this exercise in excess of previously measured values indicate improper strap tension or misfit, thus allowing the mask to unseat in a head turning motion.

17. The subject is instructed to move his head up and down. This test, primarily, the chin strap cup seal, nose bridge fit, and head strap tension. A chin style canister may bump the subject's chest which may also unseat the mask.

18. Full Face Respirators Only the subject is instructed to frown. This tests the fit and movement of the full face respirator since frowning uses a number of different facial muscles at the same time.

19. The subject is instructed to talk loud, usually reading a script posted in the chamber. This pattern is similar to deep breathing with penetrations indicating poor mouth/cheek fit superimposed upon the breathing profile.

20. The subject is instructed to run in place. This tests for head and neck strap tension during increased activity.

21. The subject is instructed to breathe normally. The measured penetration allows the operator to verify whether the mask has moved during exercises. The final normal breathing exercise is usually slightly less than or equal to the initial value. A greater reading indicates a mask that does not fit well and is thereby subject to movement during exercise. The reduction of penetration may be due to perspiration in the seal region and subsequent beneficial sealing effect.

22. The sample valve is set to the clear position.

23. The zero/clear position at the end of the test is monitored to assure that the instrument did not drift during the test.

24. The range switch is changed to the 100% range prior to sampling the chamber.

25. The sample valve is set to the upstream or 100% position.

26. A final reading of the challenge aerosol concentrations is noted. The test is now complete and the test subject may disconnect and exit the test chamber.

SIMPLIFIED PROTECTION FACTOR FORMULA

$$PF = \frac{\left(\frac{AT+AF}{2}\right)}{\frac{NB1+DB+SS+UD+F+T+R+NB2}{8}}$$

Where:

AI	=	Initial Ambient		
AF	=	Final Ambient		
NB1	=	Normal Breathing Initial	)	Use
DB	=	Deep Breathing	)	Peak

SS	=	Side to Side	)	Reading
UD	=	Up and Down	)	
F	=	Frowning	)	
T	=	Talking	)	
R	=	Running in Place	)	
NB2	=	Normal Breathing Final	)	

A brief Description of Threshold Limit Values

The American Congress of Governmental Industrial Hygienist define the following:

"Threshold Limit Values (TLV) refer to airborne concentrations of substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse effect."

The TLV is further defined in terms of three categories as follows:

TLV-TWA: Threshold limit Value Time Weighted Average - 8 hour exposure.

TLV-STEL: Threshold Limit Value Short Term Excursion Limit - (applies to an unusual 15 minute excursion).

TLV-C: Threshold Limit Value - Ceiling - (applies to peak concentration).

Substances which are assigned to TLV-TWA need not necessarily be assigned STEL or C values. In these instances excursion factor guidelines are established on the basis of the absolute value of the TWA. If a TLV-C notation has not been established, one can derive its value from the following table:

		TLV Range	Excursion Factor
0	-	TLV 1 (ppm or mg/m^3)	3
1	-	TLV 10 (ppm or mg/m^3)	2
10	-	TLV 100 (ppm or mg/m^3)	1.5
100	-	TLV 1000 (ppm or mg/m^3)	1.25

APPENDIX D

SECTION III
QUALITATIVE FIT TESTING PROCEDURES

SECTION III
QUALITATIVE FIT TESTING PROCEDURES

Negative Pressure Test

Close off the inlet opening of the canister or the breathing tube by covering it with the palm of the hand or by replacing the tape seal, gently inhale so that the facepiece collapses slightly, and hold the breath for 10 seconds. If the facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is satisfactory.

Positive Pressure Test

If necessary, remove the exhalation valve cover, close off the exhalation valve with the palm of the hand, and exhale gently sot hat a slight positive pressure is built up in the facepiece. If no outward leakage of air is detected at the periphery of the facepiece, the face fit is satisfactory.

Irritant Smoke Fit Test

1. Soap off ends of smoke tube using gloves to activate the tube.
2. Attach the smoke tube to the applicator bulk.
3. Close your eyes and breathe normally.
4. Pass the applicator under your respirator while giving a firm squeeze to the bulb.
5. If you can smell or taste the smoke, refit your respirator and repeat the smoke test. If a good fit cannot be obtained, contact the health physics for assistance. DO NOT use the respirator.

. APPENDIX C

. KERR-MCGEE SAFETY HANDBOOK

EXHIBIT "C"

Safety Handbook

Safety First

W-4399

TABLE OF CONTENTS

INTRODUCTION .....

GENERAL SAFETY RULES .....

Personal Safety Equipment ..... 3.

Machine Guarding .....

Electrical Safety .....

Material Handling and Storage .....

Hand and Power Tools, Equipment ...

Fire Prevention and Protection .....

Welding and Burning Operations 1

Hazardous Entry 1

Mobile Equipment and Vehicles .. 12.

Safe Rigging Procedures .....

Ladders and Scaffolding ..... 15.

Excavations and Trenches .....

Demolition Operations .....

Explosives ..... 19.

MISCELLANEOUS SAFETY RULES ...

INDEX ..... 22.

ACKNOWLEDGEMENT FOR RECEIPT O

HANDBOOK .....

GENERAL SAFETY RULES

1. Employees shall maintain a clean work site.

2. Tripping hazards, protruding nails, oil slicks, scrap materials and other hazardous conditions occurring during the course of the job shall be eliminated as work progresses.

3. Employees shall not attempt to work when ill or in any other unfit condition which may jeopardize the safety of themselves or others. Employees must notify supervision if taking medication which may affect mental or physical alertness, or if they become ill while on company premises or while on duty.

4. Tools, machinery and equipment shall be operated only by employees who fully understand their use, and have been authorized to do so.

5. Employees shall exercise due care to prevent jeopardizing the safety of themselves or others.

6. All posted signs shall be obeyed.

7. Defective tools and equipment shall not be put into service and shall be reported to management. Unsafe tools and equipment shall be taken out of service and properly tagged.

8. All unsafe conditions or practices shall be reported to management immediately.

9. Employees shall examine their work area and equipment for unsafe conditions prior to proceeding with their work assignments.

10. Employees shall report all injuries to their supervisors before the end of the shift on which they occur.

11. Sliding down ropes, cables, and guys, etc., is strictly prohibited.

12. Employees are prohibited from riding on slings, cradles, skips, conveyors, suspended loads, headache balls, or any other conveyance except where such equipment is approved for this purpose.

PERSONAL SAFETY EQUIPMENT

1. Approved hard hats and foot protection are required to be worn in all mine and construction areas except parking lots and general offices.

2. Approved eye protection including face-shields and goggles shall be worn when welding, cutting or working with molten metal or when other hazards to the eyes exist such as grinding, chipping, using jackhammers, air chisels, steam cleaning, compressed air for cleaning, while handling hazardous chemicals, or as otherwise directed by management.

3. Approved safety belts and lanyards or life lines properly secured shall be worn from elevated work positions eight (8) feet or greater in height where no railings or other perimeter protection exists. Employees shall inspect the equipment to insure it is in proper condition before each use.

4. All employees shall wear protective clothing and equipment required by management.

5. Clothing shall be worn to protect against sunburn.

6. Ragged, torn or loose clothing will not be permitted on the job where it may cause an accident.

7. Long hair (hair extending to the shoulder and longer) and facial hair shall be contained when necessary to guard against fire hazards and rotating machinery hazards.

8. Gloves or other hand protection shall be worn or used when required to prevent an injury.

9. Office personnel entering other work areas shall wear the required protective clothing and equipment for that area.

10. Approved hearing protection shall be worn as directed by management or where noise warning signs are posted.

PERSONAL SAFETY EQUIPMENT (Cont'd)

11. Approved respirators offering protection against the specific contaminant shall be worn as directed by management.

12. Where work requires respiratory protection, employees shall limit the growth of facial hair in the seal area of the respirator to maintain the effectiveness of the respirator.

MACHINE GUARDING

1. Gears, sprockets, chains, drives, couplings, flywheels, shafts, saw blades, fan blades and similar exposed moving machine parts which may be contacted by persons, and which may cause injury, shall be adequately guarded. Employees shall immediately report any guard which is missing or damaged to the extent it is ineffective.

2. Guards shall be kept in place on tools and equipment. Machine guards and safety appliances shall not be removed or made inoperative, except for the purpose of making repairs.

3. All mobile equipment under repair shall be adequately chocked and blocked against movement.

4. No work shall be performed under equipment or machinery in a raised position until it is securely blocked in place.

5. Repairs or maintenance shall not be performed on machinery until the source of power is off and the machinery is securely blocked against motion, except where motion is necessary to make adjustments, the "lockout" procedure shall be followed when maintenance or repairs are made.

ELECTRICAL SAFETY

1. Only authorized employees shall perform maintenance or repairs on electrical wiring or equipment.

2. The electrical "lockout" procedure shall be followed. No maintenance or repairs shall be attempted until the lockout is in place to prevent start up, movement or electrical shock.

3. No one will remove lockout tags, locks or multiple locking bars other than those who attached them. Locks shall not be cut off any lockout.

4. All temporary electrical wiring shall be installed and maintained by qualified personnel in accordance with applicable codes.

5. All electrical tools and equipment must be grounded.

6. Electrical tools or equipment shall not be used unless they have been inspected. Damaged or defective electrical tools must be properly tagged and returned immediately to the tool room for repair.

7. Temporary electric cords must be covered or elevated. They must be kept clear of walk-ways and other locations where they may be exposed to damage or create tripping hazards.

8. Equipment and vehicles shall not be driven over any power cable unless the cable has been physically protected from damage.

9. Booms and masts of equipment shall not be operated within 12 feet of an energized overhead high voltage line.

MATERIAL HANDLING & STORAGE

1. Heavy or awkward materials shall be moved with mechanical aid or with additional help to prevent a lifting hazard.

2. Materials and supplies shall be neatly and securely stacked, blocked and limited in height so as to be stable and in no danger of collapsing, sliding or falling over.

3. Heavy items shall be stored on lower shelves and blocked against falling or rolling.

4. Material shall not be permitted to protrude from shelves in such a manner as to create a hazard.

5. Storage of acids or caustics shall be maintained on the lowest available shelf or rack.

HAND & POWER TOOLS, EQUIPMENT

1. Power saws, grinders, and other power tools must have proper guards in place at all times.

2. Power tools shall be hoisted or lowered by a hand line; never by the cord or hose.

3. Hand held power tools shall not be operated unless they are equipped with controls requiring constant hand or finger pressure or are equipped with friction devices.

4. Cords and hoses must be kept out of walkways and off stairs and ladders. They must be placed so as not to create a tripping hazard for employees or to be subjected to damage from equipment or materials.

5. Hand tools shall be used for their intended purpose only. The design capacity of hand tools shall not be exceeded by unauthorized attachments.

6. Powder-actuated tools may be used only by assigned employees who have been instructed and trained in their safe use.

7. The use of powder-actuated tools is prohibited in explosive or flammable atmospheres.

8. Safe operating procedures provided by the manufacturers of powder actuated tools shall be followed explicity.

9. Employees shall maintain all hand tools in good condition.

FIRE PREVENTION AND PROTECTION

1. Smoking is prohibited while using, di pensing or being around flammable or combu: tible liquids, or as otherwise posted.

2. Welding, cutting, or other open flame c spark producing operations in areas classifie hazardous are permitted only after a "hot wor permit" has been issued by management.

3. Flammable and combustible liquids shall b used and stored away from ignition sources.

4. Flammable and combustible liquids shall b dispensed from approved safety cans and storec in approved safety cabinets.

5. Gasoline-powered equipment shall not be fueled while the engine is running.

6. Unobstructed access to fire extinguishers and other fire fighting equipment shall be maintained.

7. Employees shall know the location of the fire protection equipment in their work area.

8. Fire protection equipment once used shall be reported to management for servicing.

9. If a fire is discovered, employees shall immediately notify their supervisors, and provide the location and extent of the fire.

10. Only approved solvents shall be used to clean parts and equipment. Solvents shall not be left in open containers when not in use. They shall be stored in approved, closed containers.

11. Oily rags, trash, and other combustible scrap materials shall be placed in their proper receptacles.

WELDING & BURNING OPERATIONS

1. Compressed gas cylinders shall be secured in an upright position. Valves on compressed gas cylinders shall be protected by valve covers when the cylinders are not in use. Gauges shall be protected from falling objects when in use. Valves shall be shut off when cylinders are not in use.

2. Employees shall wear appropriate welding protective apparel, including proper density lens protection.

3. When arc-welding near other workers, non-combustible screens must be used to prevent welder's flash.

4. Oil and grease shall be kept away from oxygen and acetylene gauges and valves.

5. No cutting, welding or burning shall be conducted where there is oil, grease, flammable liquids or gases, or combustible materials without first removing them from the area. Should it be impossible to remove them, they shall be protected by a metal barrier or some fire retardant material and a fire extingusher shall be on hand.

6. Cutting, welding or burning shall not be conducted on tanks or drums which have contained flammable liquids or grease until they have been thoroughly cleaned or other precautions taken to prevent fire or explosion.

7. Employees shall ensure there is adequate ventilation when welding, cutting or burning in confined spaces or with exotic metals.

8. Do not use matches to light torches. Spark igniters must be used. Torches must not be used to light smoking materials.

9. When a special wrench is required to operate the acetylene cylinder valve, the wrench must be kept in position on the valve.

HAZARDOUS ENTRY

1. Employees shall not enter closed or confined tanks, bins or vessels which have contained hazardous materials, atmospheric contamination, or conditions which could be injurious before an air quality check has been conducted.

2. Employees required to enter contaminated tanks, bins or vessels shall wear the appropriate respiratory protection, including self-contained breathing apparatus, as directed by management.

3. Employees performing hazardous entry work shall wear company approved safety belts and lifelines where there is a danger of falling; a second employee shall tend the lifeline from the outside whenever tanks, bins or vessels are entered, and shall wear the appropriate respiratory protection also.

4. Employees required to enter confined spaces containing power drive components or pinch point hazards shall use "lockout" procedures to insure there is no possibility of inadvertent movement or accidental start up. Lockouts shall be utilized.

MOBILE EQUIPMENT AND VEHICLES

1. Only authorized employees shall operate mobile equipment.

2. Mobile equipment operators shall perform "walkaround" safety inspections prior to getting on equipment. Discrepancies affecting safe operation shall be noted and reported to management immediately.

3. Employees shall wear seat belts in all equipment where provided. Equipment with Rollover Protection Systems shall not be operated without seatbelts.

4. Extraneous material shall not be allowed to accumulate in the cabs of equipment and vehicles.

5. Employees shall obey the posted speed limits and other traffic control signs. Operating speeds shall diminish accordingly with adverse weather conditions and reduced visibility.

6. Employees shall use the following horn signals when operating heavy mobile eqipment:

   a. One blast of horn prior to starting engine.

   b. Two blasts of horn for forward movement.

   c. Three blasts of horn for reverse move ment.

7. Vehicles or mobile equipment shall not be coasted in neutral.

8. Dippers, buckets, scraper blades, scarifiers, dozer blades, rippers and similar movable parts shall be secured or lowered to the ground when not in use.

9. Employees shall not ride on the outside of mobile equipment.

10. Mobile equipment requiring automatic back-up alarms shall not be operated without the alarm functioning.

MOBILE EQUIPMENT AND VEHICLES (Cont.d)

11. Employees shall not work on or from a piece of mobile equipment in a raised posit until it has been securely blocked in place. T does not preclude equipment designed specifically for elevated work usage.

12. Employees shall not get on or off moving equipment or vehicles.

13. Jumping on or off equipment is prohibited. Employees climbing on or off equipment shall face the equipment and use the handrails, handholds and steps provided.

14. Employees shall obey the mobile equipment and vehicle rights of way established.

15. Equipment or vehicles shall not be driven over compressed air or oxygen and acetylene hoses unless the hoses have been physically protected from damage.

16. The parking brake must be set whenever the vehicle is parked. Equipment parked on an incline must have the wheels chocked.

SAFE RIGGING PROCEDURES.

1. Cable clips shall be installed in accordance with established standards.

2. The weight of the load shall be determined to select the proper size of choker.

3. Sharp edges of the material to be rigged shall be protected to prevent damaging the choker and creating a hazard.

4. Tag lines shall be used when hoisting and rigging loads.

5. Material or equipment rigging shall not be rigged from structural points which are unstable (such as unfinished work, handrail, or conduit).

6. Chains, ropes, slings and hooks shall be inspected before each use. Damaged chains, ropes, slings and hooks shall be tagged and removed from service.

7. Loads suspended by cranes shall not be hoisted over other employees.

8. Employees shall not work under suspended loads.

9. All cranes and hoists must be inspected prior to use on each shift, and all deficiencies repaired before the equipment is used.

10. Employees shall use standard crane signals.

11. Accessible areas within the swing radius of all cranes must be barricaded to prevent employees from being injured by the counter-weight.

12. Safety latches are required on all crane hooks.

LADDERS AND SCAFFOLDING

1. Job-made ladders must be constructed to conform with the established standards.

2. Manufactured ladders used on the job must be the heavy-duty industrial type.

3. Broken or damaged ladders must not be used. Repair or destroy them immediately. Ladders to be repaired must be tagged "DO NOT USE."

4. Short ladders shall not be spliced together to make a longer ladder.

5. All straight ladders must be tied off at the top.

6. The base of the ladder must be set back a safe distance from the vertical approximately one-fourth of the working length of the ladder.

7. Whenever ascending or descending a ladder, employees shall face the ladder and use both hands and feet.

8. Scaffolds shall be substantially constructed to carry the loads imposed upon them and to provide a safe work platform. All scaffolds more than 8 feet high shall have approved guardrails on all exposed ends and sides. Toeboards and screens shall be provided on a scaffold if persons are required to pass under it.

9. Guardrails, midrails, and toeboards must be installed on all open sides of scaffolds 8 feet or more in height.

10. Only approved scaffolds shall be used. Barrels, boxes and other makeshift substitutes for scaffolds shall not be used.

11. Scaffold planks must be at least 2- x 10-inch full thickness lumber, scaffold grade, or equivalent.

12. Scaffold planks must be cleated and must extend over the end suppoorts at least 6 inches -but not more than 12 inches.

13. All scaffolds must be at least two planks wide; no employee may work from a single plank.

14. Scaffold planks must be visually inspected before each use. Damaged scaffold planks must be destroyed immediately.

15. Adequate mud sills or other rigid footing, capable of withstanding the maximum intended load, must be provided.

16. Scaffolds must be tied on to the building or structure at intervals which do not exceed 30 feet horizontally and 26 feet vertically.

17. Do not overload scaffolds. Materials shall be brought up as needed. Scaffolds must not be loaded in excess of one-fourth of their rated capability.

18. Where persons are required to work or pass under a scaffold, a screen of 18-gauge, 1/2-inch wire mesh is required between the toeboard and the guardrail.

19. Overhead protection is required if employees working on scaffolds are exposed to overhead hazards. Such protection must be a 2-inch plank or the equivalent.

20. Rebar is not to be used for scaffold supports.

21. Where adequate guardrails cannot be provided, employees shall wear the appropriate fall protection as required in rule number 3, Personal Safety Equipment section of this handbook.

1. All excavations must be sloped to the proper angle of repose, except in solid rock.

2. Materials must be placed 2 feet or more from the edge of the excavation. Precautions must be taken to prevent such materials from falling into the excavation.

3. Trenches 4 feet or deeper must be shored or sloped back to the angle of repose. Any excavation in unstable soil may require shoring or sloping.

4. Each excavation must be inspected daily. If evidence of cave-ins or slides is apparent, all work in the excavation must cease until necessary precautions have been taken to safeguard employees.

5. Where vehicles or equipment operate near excavations or trenches, the sides of the excavation must be shored or braced as required to withstand the forces exerted by the superimposed load. Also, stop logs or other substantial barricades must be installed at the edges of such excavations.

6. Materials used for sheeting, shoring, or bracing must be in good condition. Timbers must be sound, free of large or loose knots, and of adequate dimensions.

7. Safe access must be provided into all excavations by means of ladders, stairs, or ramps.

8. Trenches 4 feet or more in depth must have ladders spaced so that employee lateral travel does not exceed 25 feet. Such ladders must extend at least 3 feet above the grade level.

9. Walkways or bridges with standard guardrails must be provided where employees or equipment are required or permitted to cross over excavations or trenches.

DEMOLITION OPERATIONS

1. Employees shall utilize appropriate shoring in accordance with the demolition plan and to protect against weather forces.

2. Materials shall not be thrown to the ground or from upper floors to lower ones. Conveyances for lowering materials shall be used.

3. Barricades shall be placed around areas where materials are lowered to the ground and around the discharge end of material chutes.

4. Employees shall not remove material from chutes with their hands; the appropriate tools shall be used.

5. Cranes, hoists, derricks and other material handling equipment shall not be loaded beyond their capacity.

6. Taglines shall be used to guide suspended loads.

7. Employees shall not enter buildings or structures being demolished by wrecking ball or other mechanical means.

EXPLOSIVES

1. Only authorized employees shall store transport, handle or use any explosive materials

2. All explosives shall be stored, transported and used in accordance with the blasting procedures, Federal and State regulations.

3. Blasting at scheduled blasting times shall not commence until it has been made certain that no one is in the blasting area. Blasting at other than scheduled blasting times shall be authorized by management only.

4. Unattended explosives, explosive materials and open magazine storage shall be immediately reported to management.

5. Fuse shall be cut at a uniform length as directed by management; no one will be permitted to shorten a fuse.

6. NO ONE shall be permitted to hand light a fuse or ignitor cord attached to a fuse.

7. All blasting circuits shall be provided with a safety switch which shall be locked in the open position, except when closed to fire a blast.

8. Safety plugs and shunts shall be installed in each permanent blasting line, and the shunt shall be kept in place except when the shot is to be fired.

9. Smoking, matches, open flame or other spark-producing devices are prohibited in or within 50 feet of explosives magazines or while explosives are being handled, transported or used.

10. Areas in which charged holes are awaiting firing shall be barricaded against unauthorized entry.

11. Employees shall examine the work place for misfired holes. Misfired holes shall be reported to management.

12. Misfired holes shall not be scaled or picked out.

13. Misfired holes shall be reprimed and reblasted at the regular scheduled blasting time or under direct supervision only.

14. All entrances to the blasting area, at other than the regular scheduled blasting time, must be physically guarded. A "Keep Out" or other warning sign is not considered an adequate guard.

15. In the event of a known misfire, no one shall enter the blast area for a minimum of 15 minutes when electric blasting caps are used and 1 hour with cap and fuse.

16. Vehicles containing explosives shall not be taken to a repair shop or garage for any purpose.

17. Explosives and detonators shall be transported in separate vehicles, or separate compartments of the same vehicle.

18. Explosives must be stored in approved magazines; unused explosives must be returned to the magazine immediately.

19. Detonators shall not be stored in the same magazine with other explosives.

20. Magazines and box-type magazines shall be suitably labeled.

MISCELLANEOUS

1. Split rim tires shall be inflated within the protection of tire cages. Tires will be physically removed from rims before any welding, cutting or burning is performed on the rim.

2. Gloves shall not be worn while operating drill presses or bench grinders.

3. Bench grinder tool rests shall be maintained not to exceed 1/8 distance from the grinding wheel or brush.

4. Floor openings or holes shall be protected by approved guardrails or covers. If covers are used, they shall be strong enough to support the loads to be imposed upon them and shall be secured to prevent accidental displacement.

5. The open edges of all floors eight feet or more above the next floor or level shall be guarded by an approved barricade secured to prevent accidental displacement.

6. Do not remove covers on floor openings without approval of your supervisor. When a cover has been removed to bring in equipment or material, replace the opening immediately upon completion of material handling.

7. Do not remove warning signs or posters advising of floor openings or open covers.

8. Protruding reinforcing steel (rebar) shall be properly capped or otherwise protected to prevent a hazardous condition.

9. Repairs involving high pressure systems, such as air lines, receivers or compressed air equipment shall not be attempted until the pressure has been relieved.

10. At no time shall compressed air be directed toward an employee. Compressed air shall not be used to clean clothing being worn.

11. All air hose connections 1/2 inside diameter or larger shall be secured with approved safety ties.

INDEX

Accidents, reporting of 2
Air lines 13, 21
Back up alarms 12
Blasting procedures 19, 20
Booms or masts 6
Clothing, protective 3, 10
Compressed air 21
Compressed gas cylinders 10
Cranes 14
Defective tools and equipment 2, 5, 8
Drill presses 21
Electrical 6
Eye protection 3
Explosives 19, 20
Face shields 3
Facial hair, respiratory protection 4
Fire, reporting of 9
Fire prevention and protection 9
Flammable and combustible liquids 9
Gas cylinders 10
Glasses, safety 3
Gloves 3, 21
Goggles 3
Guarding moving parts 5
Hair, long 3
Hardhat 3
Haulage equipment 12, 13
Hazardous entry 11
Hearing protection 3
Hot work permit 9
Housekeeping 2
Illness 2
Injury, reporting of 2

INDEX

Inspection, work area and equipment 2, 12
Ladders 15, 16
Lifeline 3, 11, 16
Lockouts 5, 6, 11
Lockout procedure 5, 6, 11
Material handling and storage 7
Medication 2
Mobile equipment operation 12, 13
Motor vehicles 12, 13
Personal protective equipment 3, 4
Pinch points 5, 11
Powder-actuated tools 8
Power cables, protection 6
Raised equipment 5
Repairs or maintenance 5, 6
Respiratory protection 4
Riding on suspended loads 2
Riding on vehicles or equipment 12
Rigging 14
Safety belt 3, 11, 16
Scaffolds 15, 16
Shoring, excavations 17
Signs, posted and warning 2, 20, 21
Smoking 9, 19
Speed limits 12
Storage of materials 7, 9
Tools, use and maintenance of 2, 8
Traffic control 12
Unsafe conditions or practices, reporting of 2
Valves on compressed gas cylinders 10
Walkaround inspection 12
Welding and burning 10
Working from mobile equipment 7