

TASK SPECIFIC HEALTH AND SAFETY PLAN

POLYMETRICS, INC

REVERSE OSMOSIS FILTER PILOT TEST

POND A-4

AUGUST 1994



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Task HASP Review and Approval

The Task HASP has been prepared according to applicable requirements and reflects health and safety measures appropriate to the task performed and the associated hazards

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Occupational Safety (EG&G) Date

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## **PART I**

### **POLYMETRICS, INC HEALTH AND SAFETY PLAN**

#### **1 1 INTRODUCTION**

Polymetrics, Inc policy is to manage all operations in a manner that protects the environment and the health and safety of employees, customers, other contractors and the public To accomplish this, we will

- 1 Advise each employee of safety, health and environmental requirements and hold them responsible for their performance
- 2 Design and manage operations to minimize environmental and human health impacts and provide work places free of recognized safety hazards
- 3 Comply with all laws and regulations governing safety, health and environmental protection
- 4 Recognize the importance of safety, health and environmental factors where there is competition with economic factors
- 5 Provide professional staff to support safety, health and environmental protection
- 6 Monitor, evaluate and report performance in safety, health and environmental protection
- 7 Provide training to protect human, environmental and physical resources
- 8 Participate in programs designed to enhance knowledge and improve technology, laws and regulations

#### **POLYMETRICS SAFETY HEALTH AND ENVIRONMENTAL PHILOSOPHY**

Our goal in safety is to prevent all injuries We rely on each employee to actively support and implement both the spirit and letter of this policy All employees are responsible for safety, health and environmental compliance It is very important for each of us to understand this policy and conduct our daily business in a manner that assures compliance

#### **SCOPE AND PURPOSE**

This philosophy is a tool to help accomplish Polymetrics' policy throughout all operations, and serves as a guide and reference in maintaining uniform safety policies by specifying minimum rules and standards applicable in all areas as endorsed by management Always check with your supervisor or local safety, health and environmental professionals or management for site specific procedures that would require additional and/or specific requirements

## 1 2 PROJECT MANAGER RESPONSIBILITIES

The project manager is responsible for giving safety primary consideration. In doing so, they should project an attitude that all injuries can be prevented. All are responsible for actively supporting safety and accident prevention by

- 1 Holding employees accountable through annual performance reviews, qualifications, counseling, or disciplinary action
- 2 Communicating safety rules and standards to all employees
- 3 Setting safe examples
- 4 Reporting and investigating incidents and injuries and serious potential incidents
- 5 Conducting routine safety inspections
- 6 Promptly correcting unsafe conditions
- 7 Holding and documenting regular safety meetings

## 1 3 GENERAL SAFETY RULES

- 1 Immediately report all injuries and/or incidents, no matter how slight, to a supervisor and, if necessary, treat the injury at the nearest facility
- 2 All spills, no matter how small, are to be reported immediately to a supervisor
- 3 Immediately report any unsafe condition or practice to a supervisor. Unsafe equipment must be tagged to prevent use
- 4 Horseplay on or around Polymetrics equipment is prohibited
- 5 Seat belts must be worn by all passengers in Polymetrics vehicles including rental cars and all terrain vehicles. The driver is responsible to ensure that all passengers are wearing seat belts prior to putting the vehicle in motion
- 6 The use, transportation or possession of illegal drugs, alcoholic beverages, firearms, deadly weapons or unauthorized explosives is prohibited
- 7 Smoking is permitted in designated areas only
- 8 No work may be started in any area or on any equipment without the consent of the person in charge
- 9 Under normal operations, all operating machinery and electrical switchgear must have all safety guards, switches and alarms in place and functional

10 Finger rings, loose clothing, unsecured long hair and other loose accessories are not to be worn when within arms reach of operating machinery

11 All personnel, including other contractors and visitors are required to wear approved safety equipment in all designated areas

12 Approved safety glasses or goggles are mandatory in designated eye protection areas When working with chemicals or hazardous materials, review the appropriate MSDS before handling

13 Wear hearing protection in high noise areas (85dbA) or higher or where posted

14 Wear shoes in good condition, suitable for the job Hard toes are recommended

15 Erect barricades or use warning tape around equipment if it is being used in an area where unauthorized people may be

16 Fire extinguishers, first aid kits, eyewash equipment and other emergency equipment must be in good condition, inspected regularly and kept clear of any obstructions

17 Use proper lifting techniques such as bending of knees, obtaining assistance and mechanical lifting aids when lifting loads

18 Climbing on equipment is prohibited Use only ladders if something is out of reach

19 A grounding bar will be driven into soil and properly connected to RO prior to electrical start-up

#### 14 START-UP AND PERMITTING

This standard establishes proper procedure for the beginning of equipment operation

1 It is the responsibility of the supervisor to ensure that the equipment to be run is in safe operating condition A complete pre-operational check with the operator will be done prior to equipment startup

2 After equipment startup, a complete system checkout will be initiated, prior to contaminant treatment If any problems or leaks are found, immediate action will be taken to rectify these problems

3 All safety equipment will be inspected prior to each use

4 Barricades and/or warning tape, if required, will be in place

5 MSDS sheets will be located in the trailer if any chemicals are to be used or treated

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6 All necessary permits, (E P A , O S H A , local or state health departments), will be obtained prior to equipment startup and will be prominently displayed in the trailer

## 1 5 POTENTIAL HAZARDS

Liquid Spills Under normal operating conditions it is unlikely that personnel will be in contact with the water being treated, other than by hands, which should be covered with gloves Any repair to hoses, valves, gauges, etc should be done with flow stopped and pressures reduced If spills occur within the treatment system they should be cleaned up with wet/dry vacuum or mop This water is to be placed into 55 gallon setting drum or directly into the pretreatment tank

### Sampling -

Latex gloves should be worn at all times when sampling is done Method used for sampling shall be followed according to "Standard Methods for the Examination of Water & Wastewater", 18th edition, 1992, published by American Health Association

### Equipment -

Pumps and the compressor have moving parts and emit noise, no work should be performed on this equipment when it is operating Equipment must be Locked Out/Tagged Out before any work is performed by properly trained individuals per HSP 2 08 Any testing on electrical equipment should be done in a safe manner to ensure against electrical shock Hearing protection is available

### Filter Media -

Whenever filter media is removed or placed into the pressure vessels protective clothing and breathing equipment should be used along with PPE protection for hands and eyes Latex gloves and goggles or safety glasses

This standard establishes proper safety precautions to be taken for all personnel in the job area whether working or transient

- 1 If the system is operating, ALWAYS have the exhaust fan on This will insure that any heat/fumes from the equipment or treatment process that might accumulate will be vented
- 2 In the case of inclement weather (cold) never use any type of heater that has an open flame to heat the trailer Use only electric space heaters
- 3 Never allow anyone access to the trailer or related equipment that is not authorized No one except those with the proper credentials is to be allowed entry
- 4 Warning tape, orange or red cones or barricades should be installed around the treatment area if there is any possibility of transient personnel in the immediate area All precautions should be taken to keep anyone not authorized away from the site
- 5 If it is necessary to leave the treatment site, always lock the trailer All management personnel should have a key to all trailers

## 1 6 INDUSTRIAL HYGIENE MANAGEMENT PLAN

The objectives of Polymetrics Industrial Hygiene Management Plan are to

- 1 Provide a Health & Safety Specialist for site specific procedures
- 2 Protect employee and public health
- 3 Determine permissible exposure limits to the chemical and physical agents being used
- 4 Control exposures to minimize personal health risk

### Identification of Potential Hazards

- 1 A comprehensive and historical inventory of all chemical, biological and physical agents in the work place will be available and updated on a regular basis
- 2 Potential employee exposures will be identified through evaluation of employee work activities
- 3 If a hazard is believed to exist, a quantitative evaluation will be performed
- 4 The levels of exposure will be communicated to all employees monitored and to their, supervisor

### Control of Exposures

- 1 If the levels of actual exposure have been verified and there is a need to reduce the exposure levels the reduction should be accomplished by
  - a engineering design controls for the work place
  - b substitution of a less hazardous process
  - c use personal protective clothing as an interim measure

## 1 7 PERSONAL PROTECTIVE EQUIPMENT

### Head Protection

Hard hats meeting ANSI Z89 1 or Z89 2 are approved and provided by Polymetrics Employees should wear hard hats where ever head injury hazards exist Hard hats should be clean and regularly checked for cracks Metal hard hats should not be worn Metal hard hats are electrical conductive and do not offer as much impact resistance as an approved plastic safety hat

### Face and Eye Protection

Safety glasses with side shields meeting ANSI Z87 1 standards are issued to all employees whose job assignments indicate the need for this protection Plain spectacle type safety glasses will be issued to those employees who do not require corrective lenses

### Additional Eye Protection

Many operations may require more eye and face protection than provided by the safety glasses. Splash proof chemical goggles and face shields should be worn when handling hazardous chemicals, liquids or powders.

### Hearing Protection

Employees required to work in areas of high noise levels should wear ear plugs, ear muffs or both. Working in an area of high noise levels can cause both temporary and permanent hearing loss. Hearing loss can occur with no physical pain or other obvious warning. Wear hearing protection as the noise level warrants.

### Hand Protection

Polymetrics will provide all employees with the proper gloves to be used in any contamination clean up.

### Hazardous Materials Coveralls and Rubber Boots

All Polymetrics trailers are equipped with coveralls and rubber boots. This protective equipment will be used in the event that the contaminant warrants it.

## 1.8 HAZARD COMMUNICATION PLAN

In order to comply with the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard this Hazard Communication Program has been developed to inform and train employees concerning the use and dangers associated with hazardous chemicals.

A copy of this program is available at all work locations.

The contractor should provide employees with information about chemical hazards and other hazardous substance in the work place. The hazard communication program will provide this information along with control of hazards, proper labeling of containers, use of MSDS sheets and employee training.

### Employee Information and Training

All current employees and newly hired employees should attend an initial orientation on the Hazard Communication Program.

The supervisor is responsible for ensuring that all employees in his/her area of responsibility have received training concerning the Hazard Communication Program and use of MSDS. The supervisor is responsible for maintaining a copy of the program, a list of chemicals, and MSDS sheets on site at each location.

Contractors, Engineering Firms, PRP's

It is the responsibility of the contractor that Polymetrics is working for to provide Polymetrics employees with the following information

- 1 Hazardous chemicals to which they may be exposed while on location
- 2 Precautions which should be taken to lessen exposure
- 3 Use of proper protective equipment
- 4 Copies or location of Material Safety Data Sheets

## PART II

Task Specific Health and Safety Plan  
Environmental Operations Management  
Reverse Osmosis Filter Pilot Test

### 2 0 General Information

#### 2 1 Scope and Applicability to the Task Health and Safety Plan (HASP)

This task specific HASP is intended to demonstrate implementation of applicable health and safety requirements in conjunction with the Reverse Osmosis Filter Pilot Test at the Rocky Flats Pond A-4

##### 2 1 2 Visitors

Visitors will not be allowed to enter the operations area during the pilot test period without specific authorization from EG&G Environmental Management. Visitors must be escorted by trained personnel, will not be allowed to do any work, and will receive a HASP briefing.

Approved visitors will be required to log in and out.

##### 2 1 3 Site Description

The reverse osmosis filter pilot test will be conducted at the Rocky Flats Pond A-4. The system will be placed approximately 100 feet southeast from pond. Table 1 provides representative water quality data for Pond A-4, over a three year period.

##### 2 1 4 Unit Description

Treatment system is contained within a 16 foot trailer. Within the trailer are filtration tanks (150 PSI working pressure), 1,000 gallon poly-holding tank, pumps, generator, and miscellaneous hoses, valves and other equipment needed for operation.

### 2 1 5 Task Description

Activities to be performed will be controlled by the Project Manager. The task will involve the treatment of water from Pond A-4. Influent will be withdrawn from the pond by means of a floating boom and a pump located on shore. The water will be processed through the system and discharged back into the pond. No other intrusive activities of soil, air, or groundwater will occur at the site.

### 2 1 6 Health and Safety Responsibilities

#### Organization Chart

Project Personnel - Fielder Hill (Polymetrics)

Project Manager/Safety Manager - Paul Larsen (Polymetrics),

Contract Technical Representative - Tom Hergert (EG&G)

Responsible for the implementation and compliance to the Task Specific HASP. Maintain stop work authority if unsafe work conditions develop.

Ensure compliance to the task HASP

- Maintain stop work authority if unsafe work conditions develop

- Define the engineering, administrative, and work activity controls for identified chemical and physical hazards

Define Personal Protective Equipment (PPE) requirements for radiological hazards (if applicable)

Issue Property Release Evaluation (as appropriate)

### 3 0 Health and Safety Hazard Assessment

Most health and safety hazards are covered in Part I of this HASP under the Standard Polymetrics HASP. Site specific hazards are listed below. All tasks will take place at Pond A-4.

### 3 1 Task Analysis

TASK	TASK TITLE	SOP/OSA	TASK DESCRIPTION
1A	Mobilization	SOP	Site Set-up

#### Task Steps

- 1 Select best location
- 2 Position and secure trailer and generator in berm
- 3 Set-up emergency catch basin for generator
- 4 Extend and connect power cable
- 5 Start generator
- 6 Ensure correct power to system
- 7 Position influent pump, influent, effluent, backwash hoses, as not to disturb existing ecosystems

- 8 Position floating boom into landfill pond
- 9 Ensure all hose connections are secure

2A System Start Up SOP Start Up

Task Steps

- 1 Fill pretreat tank
- 2 Stage influent/effluent flow thru system
- 3 Check discharge hose outflow

2B System Operation SOP Process

Task Steps

- 1 Adjust and balance system, as necessary
- 2 Test for Ph, conductivity, turbidity as required
- 3 Take samples for testing as required
- 4 Maintain RO in safe working condition

3B Demobilization SOP Shut Down

Task Steps

- 1 Removal of media by qualified EG&G personnel
- 2 Shut all equipment down
- 3 Remove floating boom from pond
- 4 Collect all external hoses, pipe & pump
- 5 Remove generator and system from site
- 6 Leave site in same condition it was before arrival

3.2 Hazard Analysis

Since most of the tasks being performed at this job site will take place within the RO, operating hazards have been covered in Part I of this HASP

3.2.1 Radiological Hazards

No identified potential radiological hazards are associated with the task. Selected WQ Data for Pond A-4 is included in the SOW

3.2.2 Biological Hazards

Potential biological hazards to be aware of include plants, ticks, and other insects, rattlesnakes and rodents. Appropriate safety measures, such as wearing long pants and wearing insect repellent, shall be taken to avoid exposure to these hazards

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### 3 2 3 Confined Spaces Hazard

None

### 3 2 4 Physical Hazards

Minimal physical hazards exist with this operation Eye protection will be worn when handling any water during mobilization, operations, and demobilization Job site is located in an open field by Pond A-4 Although the majority of tasks will be performed within the treatment system, care should be taken when walking into the field to and from the pond, to avoid snakes and other habitat located within this area

#### Floating Boom -

Care should be taken when placing and removing the influent boom from pond Make sure that sure footing is established by water's edge and try not to disturb the pond vegetation Workers shall be provided an approved life jacket or buoyant work vest which must be inspected for defects prior to and after each use

#### Water -

Measured values of potential contaminants as recently reported are below specific standards therefore minimum risk exists on job site However handling of influent and effluent water should be done in accordance with guidelines for handling RCRA hazardous waste

## 4 0 Health and Safety Control

### 4 1 Personal Protective Equipment

The PPE required to conduct this task is Level D as defined by OSHA

- 1 Hard hat near overhead hazards
- 2 Gloves - latex when handling samples
- 3 Eye protection
- 4 Boots, safety toe

### 4 2 Monitoring

4 2 1 Monitoring for radiological exposures will be conducted by an EG&G subcontract Health & Safety Specialist

4 2 2 No air monitoring is required

## 5 0 Training Requirements

The following training requirements shall be for this task

- 1 40 hour OSHA
- 2 Buffer zone indoctrination

3 Polymetrics personnel will be escorted by a properly trained EG&G employee at ALL times while performing work in the Buffer Zone

All personnel will review a copy of the site specific HASP and sign the HASP log sheet

6 0 Medical Surveillance Requirements

Not applicable for this pilot test First aid kit is located in treatment system

7 0 Site Control Measures

Polymetrics personnel will be escorted by a properly trained EG&G employee at ALL times while performing work in the Buffer Zone

7 1 Site Map (Attached)

7 2 Nearest Medical Assistance

Emergency medical assistance is available by calling EXT 2911 Individuals requiring emergency medical assistance shall be transported to Building 122 by most expedient method available

7 3 Field Sanitation

Portable toilet facilities are located east of Pond A-4

8 0 Decontamination Plan

This Pilot Test will require very little, if any, decontamination procedures

8 1 Decontamination Procedures and Disposal

Equipment decontamination shall be conducted according to Environmental Operational Procedures

5 21000-OPS-FO 03, General Equipment Decontamination

5 21000-OPS-FO 06, Handling of Personal Protective Equipment

Equipment will, if determined by Radiological Survey, be decontaminated at main Decon facility

8 1 1 Filter media used during Pilot Test will be considered potentially radiologically and chemically contaminated Extraction of media from filter vessels located inside the RO will be done by qualified EG&G personnel and placed into plastic lined 55 gallon storage drums EG&G will assume responsibility for filter media after it has been encapsulated in the drums

8 1 2 Personnel will wash hands with soap and water prior to eating or drinking or departing RFP

## 8 2 Disposal of Decontamination Equipment and Solutions

Any contaminated clothing and/or equipment leaving the site shall be appropriately contained, managed, or decontaminated

Any wash solution used for decontamination will be collected and reintroduced into the treatment system through the pretreatment tank

## 9 0 Emergency Response

In the event of a emergency, personnel performing the task shall obtain emergency assistance by notifying the Project Manager at EXT 2312 or D1818 and the Shift Superintendent at EXT 2914

Life Threatening Emergencies - call EXT 2911 or Radio Channel 2911 This notification will provide access to Plant Protection Central alarm Station, Fire Department, Occupational Health

Ring buoys with at least 90 feet of line and at least one life saving skiff shall be provided

Non-Life Threatening Emergencies - notify Supervision, EG&G Project Manager

## 9 1 Spill Response and Control Procedures

The following procedures will be adhered to for the purpose of this Task

- 1 Procedure 1-62200-HSP-21 04, Emergency Response and Spill Control
- 2 Procedure 1-C49-HWRM-04, Rev 0, Release Response and Reporting
- 3 Procedure I-C90-EPR-SW 03, Rev 0, Containment of Spills Within the Rocky Flats Drainage

## 9 2 Evacuation Plan

In the event of an emergency, immediately exit the job site at the direction of the HSS or the Project Manager

Appendix A  
Material Safety Data Sheets

# Colorado Silica Sand, Inc.

3250 Drennan Industrial Loop  
 P.O. Box 15615  
 Colorado Springs, CO 80935  
 Phone (719) 390-7969  
 TWX. 910-920-4992  
 FAX: (719) 390-5517

Appendix B

## MATERIAL SAFETY DATA SHEET

### SECTION I - PRODUCT IDENTIFICATION

**IDENTITY:** Crystalline Silica (Quartz)  
**MANUFACTURER'S NAME:** Colorado Silica Sand, Inc  
**ADDRESS:** 3250 Drennan Industrial Loop  
 P O Box 15615  
 Colorado Springs, CO 80935  
**EMERGENCY TELEPHONE NUMBER:** (719) 390-7969  
**TELEPHONE NUMBER FOR INFORMATION:** (719) 390-7969  
**DATE REVISED:** August 31, 1990  
**REPLACES:** September 12, 1988

### SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

**HAZARDOUS COMPONENTS:** Silica, Crystalline Quartz (respirable)  
**CHEMICAL NAME:** Silicon Dioxide SiO<sub>2</sub>  
**FAMILY OR COMMON NAMES:** Silica sand, quartz, flint, sand, crystalline silica, free silica (a natural mineral extracted from the earth)  
**CHEMICAL ABSTRACT SERVICE NO:** 14808-60-7  
**TRADE NAME:** See Attachment A  
**OSHA PERMISSIBLE EXPOSURE LIMIT (PEL):** Exposure to airborne crystalline silica sand shall not exceed an 8-hour time-weighted average limit as stated in 29 CFR Section and Numbered Clause 1910.1000 specifically "Silica, Crystalline Quartz (respirable) PEL - TWA = 0.1 Mg/M3

Crystalline Quartz (respirable)	<u>Mppcf</u> 250	<u>Mg/M3</u> 10mg/M3
Quartz (Total Dust)	<u>%SiO<sub>2</sub> + 5</u>	<u>%SiO<sub>2</sub> + 2</u>  <u>30mg/M3</u> <u>%SiO<sub>2</sub> + 2</u>

**ACGIH TLV (Threshold Limit Value):** Crystalline Quartz  
 TLV-TWA 0.1 mg/M3 (Respirable Dust)  
 See Threshold Limit Value & Biological Exposure Indices for 1987-1988 - American Conference of Governmental Industrial Hygienists

**MSHA TLV (Threshold Limit Value)** Exposure to airborne crystalline silica shall not exceed an 8-hour time-weighted average limit as stated in MSHA Standards, Subpart D, Section 56.5001 on Air Quality specifically "Silica, Crystalline Quartz (respirable)

Crystalline Quartz (respirable)	<u>Mg/M3</u> 10 mg/M3
	<u>%SiO<sub>2</sub> + 2</u>

**OTHER LIMITS RECOMMENDED** National Institute for Occupational Safety and Health (NIOSH) Recommended standard maximum permissible concentration = 0.05 mg/M3 (respirable free silica) as determined by a full-shift sample up to 10-hour working day, 40-hour work week See NIOSH Criteria for a Recommended Standard Occupational Exposure to Crystalline Silica

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**SECTION III - PHYSICAL & CHEMICAL CHARACTERISTICS**

APPEARANCE AND ODOR	Sand - granular, crushed or ground No odor or taste
COLOR	Tan or white
BOILING POINT	4046 F
SPECIFIC GRAVITY	(H <sub>2</sub> O = 1) 2.65
SOLUBILITY IN WATER.	Insoluble
MELTING POINT	3000 F
VAPOR PRESSURE (mmHg at 20 C)	None
VAPOR DENSITY (Air = 1):	None
EVAPORATION RATE	(Butyl Acetate = 1): None

**SECTION IV - FIRE AND EXPLOSION DATA**

FLASH POINT	Non Flammable
FLAMMABLE LIMITS.	None
LEL	None
UEL	None
FIRE EXTINGUISHING MATERIALS:	N/A
USUAL FIRE AND EXPLOSION HAZARDS.	None
SPECIAL FIRE FIGHTING PROCEDURES.	None

**SECTION V - REACTIVITY DATA**

STABILITY	Stable (Inert - Neutral - Non-Reacting)
INCOMPATIBILITY (MATERIALS TO AVOID)	Contact with powerful oxidizing agents such as fluorine, chlorine, trifluoride manganese trioxide, and oxygen difluoride may cause fires. Silica will dissolve in hydrofluoric acid (HF) and produce a corrosive gas, silicon tetrafluoride (SiF <sub>4</sub> )

**HAZARDOUS DECOMPOSITION PRODUCTS INCLUDING COMBUSTION PRODUCTS.**

None

**HAZARDOUS POLYMERIZATION** Will not occur**CONDITIONS TO AVOID** Generation of respirable quartz particles.**SECTION VI - HEALTH HAZARD INFORMATION:**

ROUTES OF ENTRY	Inhalation Yes, Skin No, Ingestion. No
HEALTH HAZARDS (Acute and Chronic)	Excessive inhalation of dust may result in respiratory disease, including silicosis, pneumoconiosis and pulmonary fibrosis. Acute or rapidly developing silicosis may occur in a short period of time in heavy exposure in certain occupations such as sandblasters. Silicosis is a form of disabling pulmonary fibrosis which can be progressive and may lead to death. Be sure to maintain current physicals. The International Agency of Research on Cancer (IARC) has evaluated in Volume 42, Monographs on the Evaluation of the Carcinogenicity Risk of Chemicals to Humans, Silica and Some Silicates (1987), that there is "sufficient evidence for the carcinogenicity of crystalline silica to experimental animals" and "limited evidence" with respect to humans.

**SIGNS AND SYMPTOMS OF OVEREXPOSURE.**

**INHALED** Undue breathlessness, coughing, sputum production, and reduced pulmonary function  
**CONTACT WITH SKIN OR EYES** Irritation  
**ABSORPTION THROUGH SKIN.** Not Applicable  
**SWALLOWED.** May cause nausea

**CARCINOGENICITY.**

NPT. No

IARC MONOGRAPHS Yes - Level 2A Grouping

OSHA REGULATED Not as a carcinogen

**MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:**

Individuals with pulmonary or respiratory disease such as asthma, bronchitis and emphysema should avoid prolonged exposure of silica dust. Pulmonary functions may be reduced by inhalation of respirable crystalline silica. Also lung scarring produced by such inhalation may lead to a massive fibrosis of the lung which may aggravate other pulmonary conditions and diseases and which increases susceptibility to pulmonary tuberculosis. Massive fibrosis may be accompanied by the right heart enlargement, heart failure, and pulmonary failure. Smoking aggravates the effects of exposure.

**EMERGENCY FIRST AID PROCEDURES**

For sand in eyes, wash immediately with water. If irritation persists, seek medical attention. For inhalation, remove person to fresh air, give artificial respiration as needed, seek medical attention as needed. If swallowed, do not induce vomiting. Vomiting may be fatal if breathed into lungs. Seek medical attention.

**SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE****STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED**

Use dustless methods (vacuum) and place into closable container for disposal, or flush with water. Do not dry sweep. Wear protective equipment. Avoid generating airborne respirable dust.

**WASTE DISPOSAL METHOD:** If uncontaminated, dispose as an inert, non-metallic mineral. If contaminated, use appropriate method in accordance with Federal, State and Local laws.

**PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING.** Avoid spillage. Use dustless systems for handling and employ engineering controls to reduce concentration of airborne dust.

**OTHER PRECAUTIONS** Use dustless systems for handling, storage, and cleanup so that airborne dust does not exceed the PEL. Use adequate ventilation and dust collection. Do not permit dust to collect on walls, floors, sills, ledges, machinery, or equipment. Maintain good housekeeping. Maintain, clean, and fit test respirators in accordance with OSHA regulations. Maintain and test ventilation and dust collection equipment. Wash or vacuum clothing which has become dusty. We recommend that smoking be prohibited in all areas where respirators must be used.

**WARN YOUR EMPLOYEES (AND YOUR CUSTOMER-USERS IN CASE OF RE-SALE) BY POSTING AND OTHER MEANS OF THE HAZARD AND OSHA PRECAUTIONS TO BE USED. PROVIDE TRAINING FOR YOUR EMPLOYEES ABOUT THE OSHA PRECAUTIONS**

See OSHA Hazard Communications Rule 29 CFR Sections 1910.1200, 1915.99, 1917.26, 1918.90, 1926.59, and 1926.21, and State and Local Worker of Community "Right to Know" laws and regulations.

See American Society for Testing and Materials (ASTM) standard practice E1132-86, "Standard Practice for Health Requirements Relating to Occupational Exposure to Quartz Dust."

See the most recent standards of the American National Standard Institute (ANSI Z 88.2), and the Mine Safety and Health Administration (MSHA) (30 CFR Part 56).

**SECTION VIII - CONTROL MEASURES**

**RESPIRATORY PROTECTION (type)** Use conventional particulate respiratory protection based on consideration of airborne concentrations and duration of exposure. See most recent standards of the American National Standard Institute (ANSI Z 88.2), the Occupational Safety and Health Administration (OSHA) (29 CFR Part 1910.134) and the Mine Safety and Health Administration (MSHA) (30 CFR Part 56). Use NIOSH or MSHA approved respiratory protection for respirable quartz under appropriate OSHA standards and regulations. Supplied air types recommended.

**VENTILATION AND ENGINEERING CONTROLS**

Use sufficient local exhaust to reduce the level of respirable crystalline silica to the PEL. See ACGIH "Industrial Ventilation - A Manual of Recommended Practice" the latest edition.

**EYE PROTECTION (type)**

Wear protective safety glasses at all time.

**PROTECTIVE GLOVES:** When exposed to hot product

**OTHER CLOTHING & EQUIPMENT** Provide eye wash Monitor respirable quartz levels in workplace regularly

**WORK PRACTICES, HYGIENIC PRACTICES:** Minimize dust generation Clean up spills promptly Train all employees on handling product before they work with it

**OTHER HANDLING AND STORAGE REQUIREMENTS** Protect containers from physical damage Handle with minimum dust generation Do not reuse containers

**SECTION IX - TRANSPORTATION**

**DOT HAZARD CLASSIFICATION** None

**PLACARD REQUIRED.** None

**LABEL REQUIRED** Labels required by the OSHA Hazard Communication standard [29 CFR - 1910 1200 (f)] and applicable state and local regulations

This form has been completed to meet all current state and federal (OSHA) regulations, but is offered without guarantee. Our company expressly disclaims all applications beyond our control. The data in this material safety data sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process. The information set forth herein is based on technical data that Colorado Silica Sand, Inc. believes reliable. It is intended for use by persons having technical skills and at their own discretion and risk. Since conditions of use are outside our control, we make no warranties, expressed or implied, and assume no liability in connection with any use of this information. Nothing herein is to be taken as a license to operate under or a recommendation to infringe any patents. Any use of this data and information must be determined by the user to be in accordance with federal, state, and local laws and regulations. Customers and users of silica must comply with all applicable health and safety laws, regulations, and orders.

**COLORADO SILICA SAND, INC.  
ATTACHMENT "A"  
COLORADO SANDS**

**FRAC SAND & WATER WELL GRAVEL PACK**

4-6	16-30
4-8	16-40
6-9	20-40
8-12	32-42
8-14	40-60
8-16	100 Mesh
10-20	

**OIL WELL GRAVEL PACK**

4-8	14-20
6-9	16-20
8-12	18-30
10-14	20-30
10-16	20-40
10-20	30-40
12-18	40-60

**BLAST SAND GRIT**

# 10  
# 16  
# 20  
# 30  
# 70

**STUCCO SAND  
FINES BLEND  
FOUNDRY SAND  
FILTER MEDIA SAND  
PIPELINE SAND**

**ENGINE SAND  
TOP DRESSING  
SAND TRAP I  
SAND TRAP II  
SAND TRAP III  
MARK IV**

**TEXAS RESCREENED SANDS**

6-9	16-20
8-12	16-30
8-16	20-30

ALL MATERIALS SOLD BY COLORADO SILICA SAND, INC INCLUDING BUT NOT LIMITED TO THE PRODUCTS NAMED ABOVE

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Appendix C



**Material Safety Data Sheet**  
 May be used to comply with  
 OSHA's Hazard Communication Standard,  
 29 CFR 1910.1200. Standard must be  
 consulted for specific requirements.

**U.S. Department of Labor**  
 Occupational Safety and Health Administration  
 (Non-Mandatory Form)  
 Form Approved  
 OMB No. 1218-0072

IDENTITY (As Used on Label and List)

**ACTIVATED CARBON TYPE AC**

Note: Blank spaces are not permitted. If any item is not applicable or no information is available, the space must be marked to indicate that.

**Section I**

Manufacturer's Name <b>ACTIVE-CARB LIMITED</b>	Emergency Telephone Number <b>(310) 366-7663</b>
Address (Number, Street, City, State, and ZIP Code) <b>1501 W 130 TH STREET GARDENA, CA 90247</b>	Telephone Number for Information <b>(310) 3667663</b>
<b>P.O. BOX 238, GARDENA, CA 90248</b>	Date Prepared <b>10-22-93</b>
	Signature of Preparer (optional)

**Section II -- Hazardous Ingredients/Identify Information**

Hazardous Components (Specific Chemical Identity, Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
<b>NON HAZARDOUS PER OFFICE OF HAZARDOUS MATERIALS MANAGEMENT</b>				

**Section III -- Physical/Chemical Characteristics**

Boiling Point	N/A	Specific Gravity (H <sub>2</sub> O = 1)	nominal	0.20
Vapor Pressure (mm Hg)	N/A	Melting Point		N/A
Vapor Density (AIR = 1)	N/A	Evaporation Rate (Butyl Acetate = 1)		N/A
Solubility in Water	<b>NOT SOLUBLE</b>			
Appearance and Odor	<b>BLACK IRREGULAR GRANULES WITHOUT ODOR</b>			

**Section IV -- Fire and Explosion Hazard Data**

Flash Point (Method Used)	N/A	Flammable Limits	LEL N/A	UEL N/A
Ignition Temp.	340 °C			
Extinguishing Media	<b>WATER - INERT GASES SUCH AS N<sub>2</sub> OR CO<sub>2</sub>, dry chemical agents</b>			
Special Fire Fighting Procedures	<b>SINCE WET ACTIVATED CARBONS ADSORB OXYGEN, DO NOT ENTER CLOSED VESSELS WITHOUT USING A SELF CONTAINED BREATHING APPARATUS</b>			
Unusual Fire and Explosion Hazards	N/A			

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**Section V -- Reactivity Data**

Stability	Unstable		Conditions to Avoid
	Stable	X	

Incompatibility (Materials to Avoid)

**AVOID CONTACT WITH HIGH CONCENTRATION OF KETONES IN AIR**

Hazardous Decomposition or Byproducts

**NONE**

Hazardous Polymerization	May Occur		Conditions to Avoid
	Will Not Occur	X	

**Section VI -- Health Hazard Data**

Route(s) of Entry:                      Inhalation?                      Skin?                      Ingestion?

**DUST MAY BE INHALED**

Health Hazards (Acute and Chronic)

**N/A**

Carcinogenicity      N/A      NTP?      N/A      IARC Monographs?      N/A      OSHA Regulated?      N/A

Signs and Symptoms of Exposure

**SLIGHT IRRITATION OF EYES AND NOSE MAY RESULT FROM CONTACT WITH CARBON FINES**

Medical Conditions

Generally Aggravated by Exposure      **N/A**

Emergency and First Aid Procedures

**RINSE AFFECTED AREAS WITH COPIOUS AMOUNTS OF WATER AND FOLLOW UP WITH PHYSICIANS EXAM IF NECESSARY.**

**Section VII -- Precautions for Safe Handling and Use**

Steps to Be Taken in Case Material is Released or Spilled

**COLLECT WITH BROOM AND SHOVEL. WET CARBON MAY BE COLLECTED WITH BROOM AND SHOVEL AND DISPOSED OF IN PLASTIC CONTAINERS. SEE SEC. IV**

Waste Disposal Method

**PLACE IN SUITABLE CONTAINER AND DISPOSE OF BY INCINERATION OR**

**BY TRANSFER OF A SANITARY LANDFILL.**

Precautions to Be Taken in Handling and Storing

**N/A**

Other Precautions

**N/A**

**Section VIII -- Control Measures**

Respiratory Protection (Specify Type)

**DUSTMASK**

Ventilation	Local Exhaust	N/A	Special	N/A
	Mechanical (General)	N/A	Other	N/A

Protective Gloves      **DISPOSABLE GLOVES (OPTIONAL)**      Eye Protection      **SAFETY GOGGLES**

Other Protective Clothing or Equipment

Work Hygienic Practices

**N/A**

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Technical Bulletin

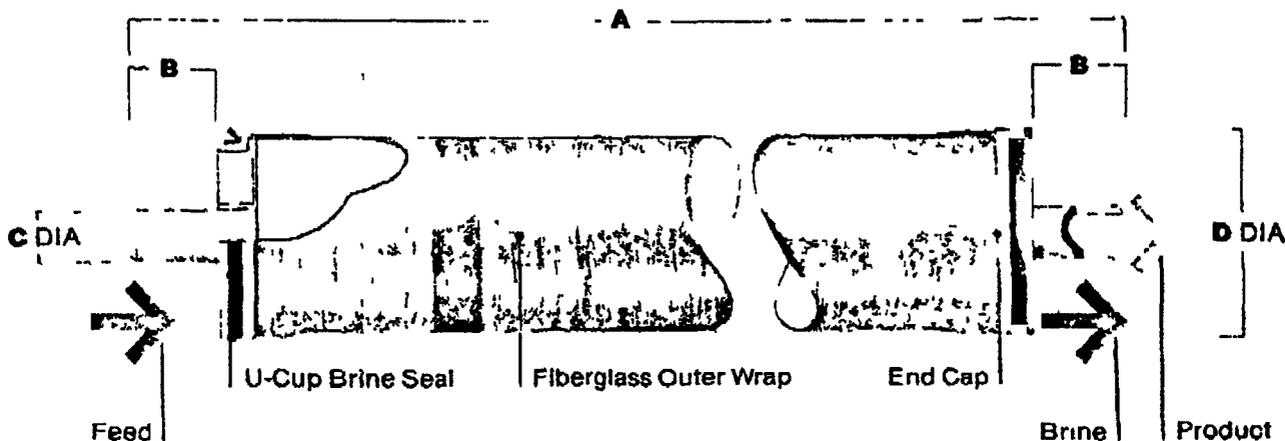
# FILMTEC® Membranes

Appendix D

## 4" Brackish Water RO Element Specifications

	Product Water Flow Rate gpd (m <sup>3</sup> /D)	Minimum Salt Rejection (%)	Typical Salt Rejection (%)
BW30-4014	450 (1.7)	96	98
BW30-4021	800 (3.0)	96	98
BW30-4040	1800 (6.8)	96	98

1. Permeate flow and salt rejection based on the following test conditions: 2000 ppm NaCl, 225 psi (1.6 MPa), 77°F (25°C), pH 8, and recovery as indicated below.  
 2. Flow rates for individual elements may vary ± 15%.



### Operating Limits

Membrane Type	Thin-Film Composite
Maximum Operating Pressure	600 psi (4.1 MPa)
Maximum Operating Temperature	113°F (45°C)
Maximum Feed Turbidity	1 NTU
Free Chlorine Tolerance	< 0.1 ppm
pH Range	
Continuous operation	2-11
Short-term (30 min), cleaning	1-12
Maximum Feed Flow	16 gpm (60 lpm)
Maximum Feed Silt Density Index	SDI 5

Single Element Recovery (Permeate Flow to Feed Flow)	Recovery	Dimensions (Inches)			
		A	B	C	D
BW30-4014	0.05	14.0	1.1	0.75	3.9
BW30-4021	0.08	21.0	1.1	0.75	3.9
BW30-4040	0.15	40.0	1.0	0.75	3.9

3. Consult most recent DESIGN GUIDELINES for multiple element applications and recommended element recovery rates for various feed sources. 4. Element to fit 4.00 inch I.D. pressure vessel.

# FILMTEC®

## MEMBRANES

For more information about  
FILMTEC membranes call  
The Dow Chemical Company  
at 1-800-447-4369

### Important Operating Information

1. Keep elements moist at all times after initial wetting
2. If operating specifications given in this Technical Bulletin are not strictly followed, the warranty will be null and void.
3. Permeate obtained from first hour of operation should be discarded
4. To prevent biological growth during storage, shipping, or system shutdowns it is recommended that FILMTEC RO elements be immersed in a protective solution. The standard storage solution contains 18 percent (by weight) propylene glycol and 1.0 percent (by weight) sodium metabisulfite (food grade). This solution also provides protection from freeze damage. For short-term storage of one week or less, a 1.0 percent (by weight) sodium bisulfite solution is adequate for the inhibition of biological growth. See Technical Bulletin "Biological Protection and Disinfection" for further details.
5. Elements must be in use for at least six hours before formaldehyde is used as a biocide. If the elements are exposed to formaldehyde before being in use for this period of time, a loss in flux may result.
6. The membrane shows some resistance to short-term attack by chlorine (hypochlorite). Continuous exposure, however, may damage the membrane and should be avoided.
7. The customer is fully responsible for the effects of unapproved chemicals on FILMTEC elements. Their use will void the element warranty.

**NOTICE** FilmTec Corporation believes the information herein to be accurate as of July, 1990 to July, 1992 or when revised, whichever is earlier. But since this information is provided without charge and intended for educational purposes only, and since use of the products and information is not within its control, FilmTec assumes no obligation or liability for such information and does not guarantee results from use of said products or such information. No warranty, express or implied, is given nor is freedom from any patent owned by FilmTec or others to be inferred from this publication.

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# TFCL® Spiral-Wound Reverse Osmosis Element

## Brackish Model 4820LP

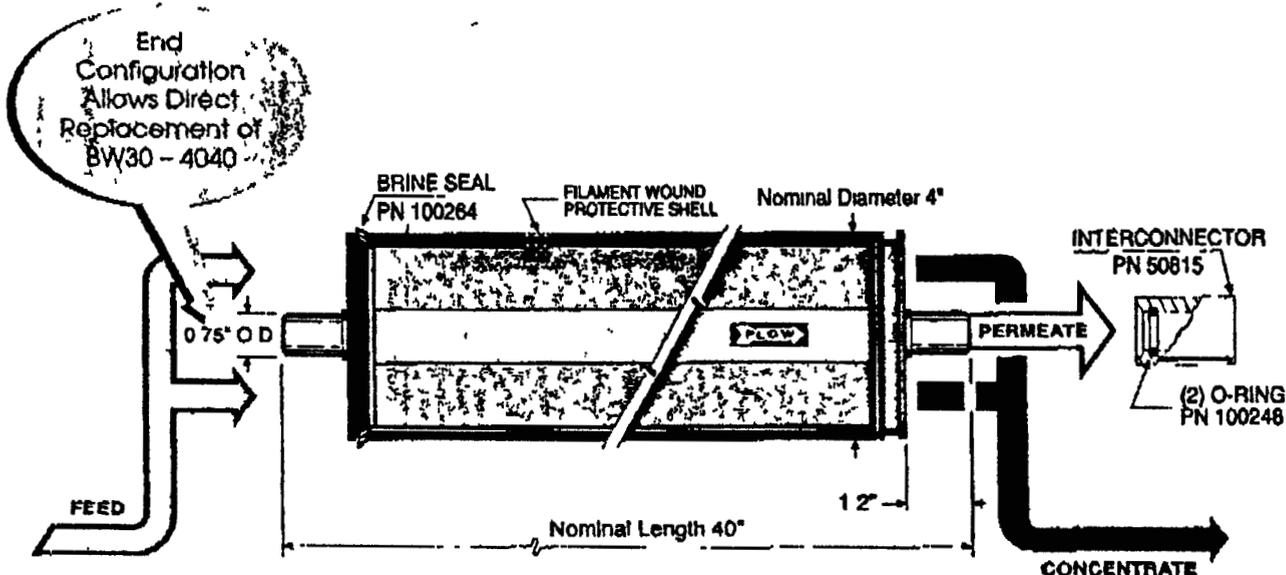
### Standard Rejection Polyamide Membrane

**PERFORMANCE SPECIFICATION**

DESIGN CHLORIDE ION REJECTION	98.5%
DESIGN PERMEATE PRODUCTIVITY	1800 U.S. gpd (6.8 m <sup>3</sup> /d)

TEST CONDITIONS 2000 mg/L NaCl solution at 225 psi (1,550 kPa), 10% water recovery, 25°C (77°F) and pH 7.5. Data are collected on each element after 30 minutes of operation at these conditions.

NOMINAL ACTIVE MEMBRANE AREA	72 ft <sup>2</sup>
DRAINED WEIGHT	10 lb (4.5 kg)



Refer to the back of this sheet for important operating and design information. This information is intended for use as a guideline. For operation outside these guidelines, please contact Fluid Systems.

## Fluid Systems

10054 Old Grove Road • San Diego, CA 92131 • Telephone 619-695-3840 • FAX 619-695-2176  
 Use this toll free number to place your order 1-800-525-4369

# TFCL® MODEL 4820LP

## Operational and Design Information

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1. The design chloride ion rejection and permeate productivity are based on average values obtained during the final quality assurance testing of the elements at Fluid Systems. These average values should be used when designing systems.
2. Individual element permeate productivities may vary from minus 15 percent to plus 15 percent of the design value. At the test conditions shown, the minimum chloride ion rejection is 97%.
3. For this element, the optimum rejection is achieved at pH 8.0. Only sufficient acid should be added to the feedwater to minimize the tendency to precipitate sparingly soluble salts in the concentrate stream.

Allowable operating pH range 4 to 11  
 Allowable cleaning pH range 2.5 to 11

4. Recommended design pressure 225 psi (1,550 kPa) to 450 psi (3,100 kPa). Operation at any pressure below 600 psi (4,130 kPa) is permissible provided the design permeate productivity per element does not exceed and the operation is within the hydraulic limits stated in 5 and 11 below.

Maximum operating pressure 600 psi (4,130 kPa)

5. Maximum pressure drop per element 10 psi (69 kPa)

6. Recommended Silt Density Index (SDI) 5.0 or less

7. Maximum allowable feedwater turbidity 1.0 NTU. Experience has shown that prolonged operation on feedwater turbidities greater than 0.2 NTU generally results in prohibitively frequent cleaning requirements. Fluid Systems strongly recommends that pretreatment equipment be designed to routinely attain feedwater turbidity of less than 0.2 NTU.

8. Allowable feedwater temperature range 1 to 45°C (34 to 113°F). The effects of temperature on net operating pressure and/or permeate productivity can be calculated from FSC Bulletin TEMPERATURE EFFECT.

9. Maximum allowable exposure to chlorine or similarly active oxidizing agents such as iodine, bromine and ozone Zero. If chlorine is present, dechlorination is required to reduce oxidant levels to zero prior to the elements. Sodium metabisulfite is preferred as the deoxidizing agent. This element can tolerate limited exposure to oxidizing agents, contact FSC for additional information.

10. Elements may be cleaned with anionic or nonionic surfactants. Cationic surfactants should be avoided as irreversible fouling may occur.

11. Maximum recovery rate for any pressure tube in a system

Elements/tube	one	two	three	four	five	six
Maximum % recovery	17	30	40	44	49	53

Operation at greater than the maximum recovery may result in excessive boundary layer conditions or brine concentrations. Please Contact Fluid Systems or your distributor for assistance.

Appendix E

FIGURE 3-4  
MAJOR SURFACE WATER  
FEATURES AT  
ROCKY FLATS

LEGEND

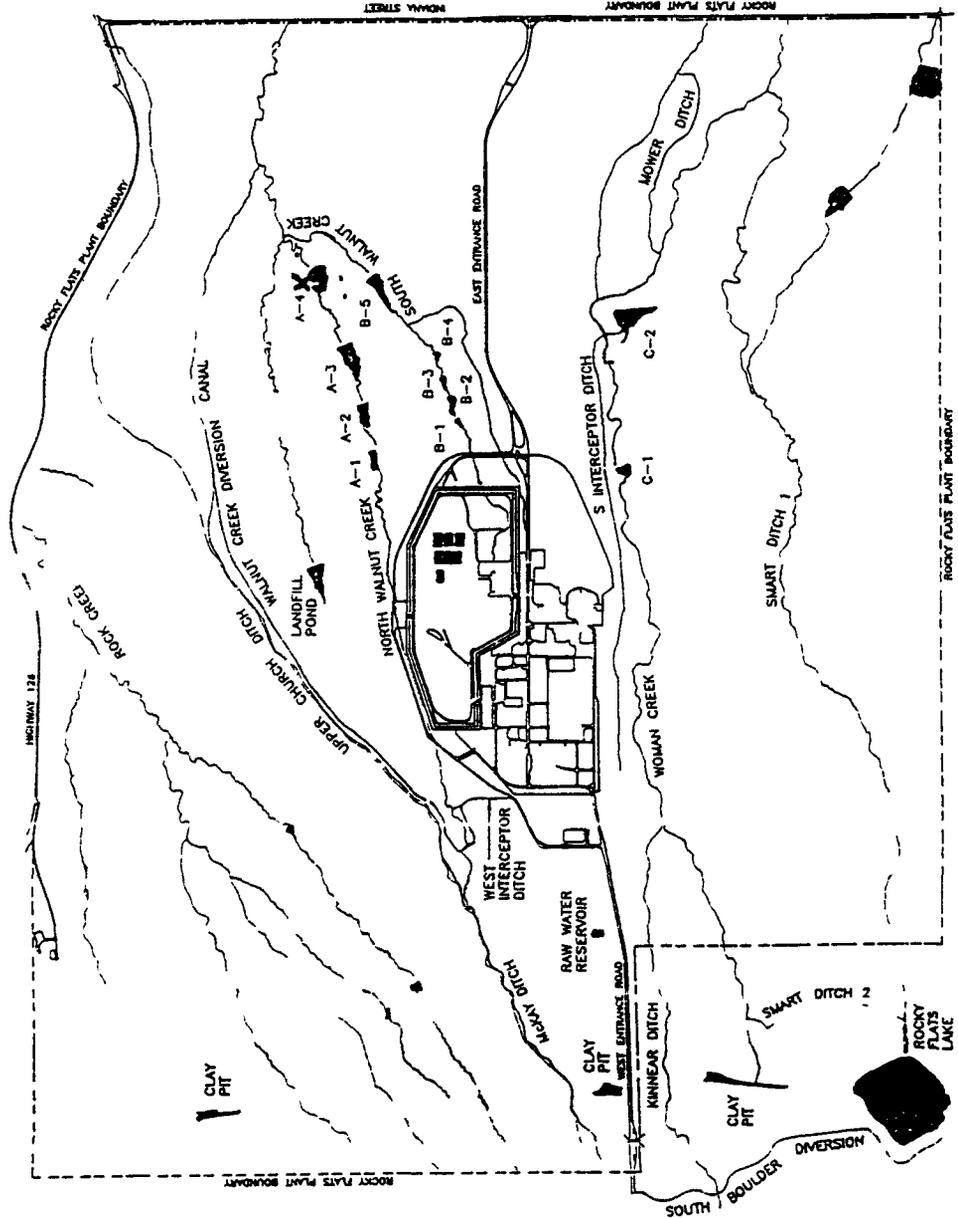


SURFACE WATER FEATURE

X - Marks the location  
of the proposed  
Reverse Osmosis (RO)  
Pilot Test at Pond A-4



ROCKY FLATS PLANT  
WATERSHED  
MANAGEMENT PLAN



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# Industrial Hygiene Environmental Contractor Compliance Assessment Form

**Part One: Records Review**

Contractor- EG+G Auditor(s) MD Schreckengast  
TT Sangaline  
 OU 6 and 10 Date 8-24-94

**General Documents**  
 Site Specific Health & Safety Plan  yes  no Last Update 7/1/94  
 OSHA 200 Form EGG-N/A  yes  no  
 Instrument Calibration  
 (random 2 instruments)  
 Make/Model/Unit# Rad instruments Date Calibrated  
verified by RE

At random, pull files for two (2) onsite field employees One employee should be a field supervisor Enter most current date Enter "N/A" if not applicable Harold Metzger 515216

	Field Employee	Field Supervisor
Name, SSN:	<u>Harold Metzger 515216</u>	<u>Harold Metzger 515216</u>
Document	Date Completed	Date Completed
Health & Safety Plan Sign-off	<u>6-3-94</u>	<u>6-3-94</u>
Site Safety Briefing	<u>6-3-94</u>	<u>6-3-94</u>
Tailgate Safety (min frequency <u>daily</u> )	<u>8-24-94</u>	<u>8-24-94</u>
<b>Training Records</b>		
General Hazard Communication Training	<u>N/A</u>	<u>N/A</u>
Respirator Training	<u>N/A</u>	<u>N/A</u>
Respirator Fit-test	<u>N/A</u>	<u>N/A</u>
Radiological Safety Training (One Day)	<u>8-16-93</u>	<u>7-21-93</u>
OSHA 40-Hour Training	<u>2-8-93</u>	<u>6-15-90</u>
OSHA 3-Day Field Experience (for 40-Hour)	<u>( )</u>	<u>( )</u>
OSHA 8-Hour Refresher Training	<u>2-14-94</u>	<u>11-29-93</u>
OSHA 8-Hour Supervisor Training	<u>N/A</u>	<u>( )</u>
<b>Medical Records</b>		
General Physical (respirator use authorization)	<u>N/A</u>	<u>N/A</u>
Exposure Monitoring (see Field Inspection) <u>RAD</u>	<u>N/A</u>	<u>N/A</u>
Are exposure monitoring records retrievable for each employee <input checked="" type="checkbox"/> yes <input type="checkbox"/> no		

Site Safety Officer Otis Canard [Signature]  
 Auditor (EG&G, IH Representative) M.D. Schreckengast [Signature]  
T.T. Sangaline [Signature]

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**Industrial Hygiene  
Environmental Contractor Compliance Assessment Form**

**Part Two: Field Inspection**

Site Location/IHSS 964 Laydown Yard Site Safety Officer (SSO) Otis Canard  
0u6/0u10  
Present Activity Rad survey, equipment transfer

Do the following conform with SSHSP?  
Site Control yes no  
Briefly describe method (cones, tape, etc)  
roped RCA, site safety officer control.

If not, or if SSO discretion exercised, describe:  
\_\_\_\_\_  
\_\_\_\_\_

Decontamination yes no  
Briefly describe method (solutions, equip, etc)  
personal monitoring

\_\_\_\_\_  
\_\_\_\_\_

Communication yes no  
Briefly describe method (radio, telephone, etc)  
radio, verbal

\_\_\_\_\_  
\_\_\_\_\_

Personal Pro Equip yes no  
Briefly describe materials and types  
emergency equipment - field location

need to get safety glasses with side shields, for HAZ wounding for long sleeve coveralls.

Respiratory Protection yes no  
Briefly describe type & filter (if applicable)  
NA

\_\_\_\_\_  
\_\_\_\_\_

Exposure Monitoring yes no  
Briefly describe method  
Hazard heat stress  
Hazard RAD  
Hazard noise

Instrument not yet monitored  
Instrument checked by RE  
Instrument not yet monitored

Site Safety Officer (SSO) Otis Canard  
Print Name

Otis Canard  
Signature

Auditor(s) (EG&G, IH Representative) M.D. Schreckengast  
Print Name (1)

M.D. Schreckengast  
Signature (1)

J.T. Sangaline  
Print Name (2)

J.J. Sangaline  
Signature (2)