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EG&G - ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT

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**ROCKY FLATS PLANT
EMD OPERATING
PROCEDURES MANUAL**

**Manual No.: 5-21000-OPS-FO
Procedure No.: Table of Contents, Rev 13
Page: 1 of 2
Effective Date: 05/12/92
Organization: Environmental Management**

THIS IS ONE VOLUME OF A SIX VOLUME SET WHICH INCLUDES:

**VOLUME I: FIELD OPERATIONS (FO)
VOLUME II: GROUNDWATER (GW)
VOLUME III: GEOTECHNICAL (GT)
VOLUME IV: SURFACE WATER (SW)
VOLUME V: ECOLOGY (EE)
VOLUME VI: AIR (AP)**

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FO.03	General Equipment Decontamination	2	05/12/92
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FO.10	Receiving, Labeling, and Handling Environmental Materials Containers	2	05/12/92

ADMIN RECORD

A-SW-001018

REVIEWED FOR CLASSIFICATION/UCI:

By [Signature]

Date 10/13/1992

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GENERAL EQUIPMENT DECONTAMINATION

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Category 2

**TITLE:
GENERAL EQUIPMENT
DECONTAMINATION**

Approved By:

[Signature]
(Name of Approver)

MAY 12 1992
(Date)

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By *[Signature]*
Date March 21, 1992

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2.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) describes procedures that will be used at Rocky Flats for general equipment decontamination. The collection of environmental samples requires that all equipment associated with collecting these samples be cleaned.

This requirement will ensure that contaminants will not be introduced into the sample from external sources. These procedures establish the cleaning and decontamination methods for achieving that goal.

3.0 RESPONSIBILITIES AND QUALIFICATIONS

The EG&G project manager has the overall responsibility for implementing this SOP. The subcontractor's project manager will be responsible for assigning project staff to implement this SOP and for ensuring that the procedures are followed by all subcontractor personnel.

All personnel performing these procedures are required to have the appropriate health and safety documentation and training as specified in the site-specific Health & Safety Plan. In addition, all personnel are required to have a complete understanding of the procedures described within this SOP and receive specific training regarding these procedures, if necessary.

All project staff are responsible for reporting deviations from this SOP to the individual's project manager. The subcontractor's project manager will report deviations and nonconformances to the EG&G project manager.

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4.0 REFERENCES

4.1 SOURCE REFERENCES

Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual. U.S. Environmental Protection Agency. Athens, GA. 1986.

Federal Register, Volume 44, 40 CFR Part 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act."

Test Methods for Evaluating Solid Waste. SW-846, 2nd Edition. U.S. Environmental Protection Agency. Washington, D.C. 1982.

Technical Enforcement Guidance Document (TEGD). EPA. 1986.

4.2 INTERNAL REFERENCES

Related SOPs cross-referenced in these procedures are as follows:

- SOP FO.4, Heavy Equipment Decontamination
- SOP FO.7, Handling of Decontamination Water and Washwater
- SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers
- SOP GW.2, Field Measurement of Surface Water Field Parameters

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5.0 PROCEDURES AND EQUIPMENT

5.1 INTRODUCTION

This procedure describes the method for physically removing contaminants. It applies to chemical and radioactive decontamination of equipment used in field investigations. All equipment must be cleaned before sample collection, decontaminated between samples, and decontaminated before being removed from the site.

Sufficient clean equipment should be transported to the field so that an entire study can be conducted without the need for field cleaning. However, this is not possible for some specialized items of field equipment (such as, well drilling rigs, soil coring rigs, and other large pieces of field equipment). In addition, during particularly large-scale studies, it may not be practical or possible to transport to the field all of the cleaned field equipment required, as steam cleaning is not always possible, it may be necessary to decon smaller metal and stainless steel equipment inside the exclusion zone (see 5.3.1) in order to have these items ready for repeated use (bailers, split spoons, etc.). This will decrease the need to travel to the MDF and decontaminate these items.

The following definitions apply to the cleaning procedures:

1. The laboratory detergent must be a standard brand of phosphate-free laboratory detergent, such as Liquinox or the equivalent.
2. Tap water is defined as RFP drinking water. It may be obtained from hydrants or the RFP fire department. The use of an untreated potable water supply is not an acceptable substitute for RFP drinking water.

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The following are general comments:

- During cleaning operations, the substitution of a higher grade water (such as substituting distilled or organic-free water for tap water) is permitted and need not be noted as a variation.
- The brushes used to clean equipment as outlined in the various sections of this procedure must not be of the wire-wrapped type.
- Solvents, nitric acid solution, laboratory detergent, and rinse waters used to clean equipment must not be reused, except as specifically permitted.
- Field equipment or reusable sample containers needing cleaning must not be stored with clean equipment, sample tubing, or sample containers. Field equipment, reusable sample containers, disposable sample containers, and sample tubing that are not used may not be replaced in storage without being recleaned if these materials are transported to a facility or study site where contamination or suspected contamination was present.
- Previously cleaned sample containers and field equipment that are cleaned using the procedures outlined in the attachments will be stored in an area and manner that protects them from exposure to contaminants. Sample containers and field equipment will be stored separately from all other equipment and supplies, and from each other.
- Sample containers that contain a sample, regardless of the assumed or known level of hazard associated with that sample, must have all exterior surfaces decontaminated. For sample containers used in areas other than a controlled

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access area, a wipedown with disposable rags or toweling, or rinse with distilled water followed by drying with disposable rags or toweling, will suffice. Any visible dirt, water droplets, stains, or other extraneous materials must be removed. For containers used in controlled access areas, a more rigorous cleaning and/or radiation monitoring may be required.

- Solvents, including water and mineral acids, used for equipment cleaning purposes other than as described in this SOP must be justified and approved by the responsible EG&G project personnel and will be documented in logbooks. The laboratory to which the samples are sent must be informed as well.

5.2 CLEANING PROCEDURES FOR TEFLON®, OR GLASS FIELD SAMPLING EQUIPMENT USED FOR THE COLLECTION OF SAMPLES FOR TRACE ORGANIC COMPOUNDS AND/OR METALS ANALYSES

When this sampling equipment is used to collect samples that contain oil, grease, or other hard-to-remove materials, it may be necessary to steam clean the field equipment before proceeding with Step 1. If the field equipment cannot be cleaned utilizing these procedures, it should be discarded.

1. Wash equipment thoroughly with laboratory detergent and tap water using a brush to remove any particulate matter or surface film.
2. Rinse equipment thoroughly with tap water.
3. Rinse equipment thoroughly with distilled water.
4. Wrap equipment with a non-reactive plastic to prevent contamination during storage and/or transport to the field.

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5. If the equipment is not decontaminated immediately after use, rinse the Teflon® or glass sampling equipment thoroughly with tap water in the field as soon as possible after use.

5.3 CLEANING PROCEDURES FOR STAINLESS STEEL OR METAL SAMPLING EQUIPMENT

When this sampling equipment is used to collect samples that contain oil, grease, or other hard-to-remove materials, it may be necessary, in extreme cases, to steam clean or sandblast equipment before proceeding with Step 1. Any sampling equipment that cannot be cleaned using these procedures should be discarded. If necessary, rinsate sampling frequency and procedures are specified in the Task QAPP.

1. Scrape and then steam clean gross contamination if needed.
2. Wash equipment thoroughly with laboratory detergent and tap water and use a brush to remove any particulate matter or surface film.
3. Rinse equipment thoroughly with tap water.
4. Rinse equipment thoroughly with distilled water.
5. Wrap equipment with a non-reactive plastic to prevent contamination during storage and/or transport to the field.
6. If equipment is not decontaminated immediately after use, rinse the stainless steel or metal sampling equipment thoroughly with tap water in the field as soon as possible after use. This process will make later decontamination easier and will help prevent the spread of contamination.

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5.3.1 Cleaning Steel or Metal Sampling Equipment Without Steam in the Field

1. Scrape gross contamination from equipment while in the exclusion zone.
2. Remove equipment from exclusion zone and wash in laboratory detergent and distilled water; a brush may be used for particulate residual.
3. Double rinse in distilled water.
4. Equipment may now either be wrapped in plastic to prevent cross-contamination or be re-used immediately.

5.4 CLEANING PROCEDURES FOR AUTOMATIC DECONTAMINATION WATER SAMPLING EQUIPMENT

5.4.1 General

Automatic samplers will be cleaned as follows:

1. The exterior and accessible interior portions (excluding the waterproof timing mechanism) of automatic samplers will be washed with laboratory detergent and rinsed with tap water.
2. The face of the timing case mechanism will be cleaned with a clean, damp cloth.
3. All silastic tubing (sample intake and pump tubing) will be discarded after use at site. SOP FO.10 Receiving, Labeling, and Handling Environmental Materials Containers will be followed.

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4. New precleaned, silastic pump tubing (see Subsections 5.5.1 and 5.5.2) will be installed.
5. When utilizing the samplers for collecting samples for metals and/or organic compounds analyses, all sampling train components that come in direct contact with the liquid sample must be of glass, Teflon®, or disposable silastic material.

5.4.2 Automatic Sampler Headers

1. Disassemble header and, using a bottle brush, wash with tap water and phosphate-free laboratory detergent.
2. Rinse thoroughly with distilled water.
3. Reassemble header, let dry thoroughly, and wrap with plastic.

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5.43 Reusable Glass Composite Sample Containers

Under normal circumstances reusable glass containers are supplied clean by the laboratory. When this is not the case cleaning of reusable glass composite containers will be accomplished using the procedure below.

(Note: Glass composite containers used to collect in-process decontamination water samples at industrial facilities shall be discarded after sampling.) All materials will be disposed in accordance with SOP FO.10 Receiving, Labeling and Handling Environmental Materials Containers.

1. Scrub with liquinox or other phosphate-free laboratory detergent mixed with tap water.
2. Rinse with tap water.
3. Repeat step one.
4. Rinse in tap water again, and then in a triple-distilled water rinse.
5. Dry in inverted position on drain rack or suitable rack in clean room as is applicable.
6. If equipment is still discolored, spotted, or has a noticeable film or scale, discard in accordance with SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers.

5.4.4 Reusable Plastic Composite Sample Containers

Under normal circumstances reusable glass containers are supplied clean by the laboratory. When this is not the case use cleaning procedures as they are outlined in Subsection 5.4.3.

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5.4.5 Sequential Sample Bottles (Automatic Sampler Base for Sequential Mode)

1. Use cleaning procedures as they are outlined in Subsection 5.4.3.
2. Replace bottles in covered, automatic sampler base; cover with plastic for storage.

5.4.6 Sequential Sample Bottles (Automatic Sampler Base for Sequential Mode) to be Used for Collecting Samples for Organic Compounds Analyses

Routinely, precleaned sample bottles will be purchased and used with automatic sampling devices.

1. Use cleaning procedures as they are outlined in Subsection 5.4.3.
2. Replace in covered, automatic sampler base; cover with plastic for storage and mark the base as follows: "Cleaned for organic analyses."

5.4.7 Bottle Siphons Used to Transfer Sample From Composite Container

1. Use a new siphon for each sampling location.
2. Use new 3/8-inch Teflon® tubing for samples collected for organic compounds analyses. The siphon and tubing should be flushed with sample thoroughly before use.

5.5 CLEANING PROCEDURES FOR SAMPLE TUBING

5.5.1 Silastic Rubber Pump Tubing Used in Automatic Samplers and Other Peristaltic Pumps

1. New tubing will be used for each automatic sampler set-up.

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2. Teflon® tubing should be cleaned as follows:

- The exterior will be hand scrubbed with a solution of a phosphate free, laboratory grade detergent and tap water, followed by rinsing with ample amounts of tap water by spraying. The tubing will then be triple rinsed thoroughly with approved distilled water by submerging or spraying.
- Pump or pour laboratory detergent and water solution through tubing.
- Pump approved distilled water through the tubing equivalent to 10 volumes of the tubing capacity.

5.5.2 Teflon® Sample Tubing

1. New Teflon® tubing should be used for each sampling point.
2. Teflon® tubing should be cleaned as follows using the procedures of Subsection 5.5.1.

5.5.3 Stainless Steel Tubing

1. Wash with laboratory detergent and tap water using a long, narrow, bottle brush.
2. Proceed with Steps 3.6 as outlined in Subsection 5.3.

5.5.4 Glass Tubing

Use new glass tubing, precleaned as follows:

1. Rinse thoroughly with distilled water.
2. Air dry.

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3. Wrap tubing with plastic to prevent contamination.
4. Discard after use (see SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers).

5.6 MISCELLANEOUS EQUIPMENT CLEANING PROCEDURES

5.6.1 Well Sounders or Tapes Used to Measure Groundwater Levels

The procedure applies when this equipment is cleaned in the field.

1. Wash with laboratory non-phosphorus detergent and tap water.
2. Rinse with distilled water.
3. Equipment should be wrapped with non-reactive plastic to prevent contamination during storage or transit.

5.6.2 Submersible Pumps and Hoses Used to Purge Groundwater Wells

Where appropriate, pumps or bailers will be employed to purge and sample groundwater monitoring wells. This equipment will be cleaned as follows:

1. The external surfaces of the equipment will be vigorously hand scrubbed with a solution of a phosphate-free, laboratory grade detergent and tap water, followed by rinsing with water by submerging or spraying. The equipment will then be triple rinsed thoroughly with approved distilled water.

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2. Internal surfaces will be decontaminated by pumping a solution of non-phosphate detergent and water through the equipment.
3. Displace the soap solution immediately by pumping distilled water equivalent to 10 volumes of the pump storage capacity through the equipment.

5.6.3 Field Analytical Equipment and Other Field Instrumentation

The exterior of sealed, watertight equipment should be washed with a laboratory detergent and rinsed with tap water before storage. The interior of such equipment may be wiped with a damp cloth if necessary. Ensure that the equipment is dry prior to storage.

Other field instrumentation should be wiped with a clean, damp cloth; and pH meter probes, conductivity probes, dissolved oxygen (DO) meter probes, etc. should be rinsed with distilled water before storage.

If desiccant is present in flow meters or other equipment, it should be checked and replaced, if necessary, each time the equipment is cleaned.

For operations involving environmental or background samples, water quality sampling equipment (such as Kemmerers, buckets, DO dunkers, dredges, etc.) may be cleaned with distilled water between sampling locations. A brush may be used to remove deposits of material or sediment, if necessary. If distilled water is used, water samplers should be flushed with ambient water at the next sampling location before the sample is collected. It should be emphasized that these procedures can only be used to clean equipment used for the collection of background samples.

Flow measuring equipment (such as, weirs, staff gauges, velocity meters, and other stream gauging equipment) will be cleaned with tap water after use between measuring locations.

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5.6.4 Ice Chests and Shipping Containers

All ice chests and reusable containers will be steam cleaned thoroughly inside and out at MDF. If an ice chest is so contaminated it cannot be decontaminated, dispose of it in accordance with SOP FO.10, Receiving, Handling, and Labeling Environmental Materials Containers.

5.6.5 Uncontaminated and Potentially Contaminated Drums

Gray drums used for the temporary containment of uncontaminated or potentially contaminated solid environmental materials or environmental liquids will require decontamination prior to any additional use. It may also be necessary to decontaminate the exterior of gray drums due to radiological contamination. The following procedures will be used:

- General Procedure
 - All general gray drum decontamination will be performed at the Main Decontamination Facility (MDF)
- Ensure the drums are empty.
- Scrape or shovel out any residual contaminants.
- Place drum in wash rack with open end down.
- Stand upwind/crosswind of the surface being decontaminated. If necessary the equipment will be reoriented inside the decontamination station to allow an upwind or crosswind position.

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Thoroughly steam clean all surfaces of drum including lid, locking ring, bottom, and interior surface. A brush may be used for stubborn particulate matter.

- Place top of the drum down in a clean area where it will not come in contact with contaminants to dry.
- When dry, turn the drum upright and put the top and locking ring in place.
- Return the decontaminated drum to EG&G.

- **Surface Radiologically Contaminated Drums**

- Stand upwind/crosswind of the surface being decontaminated. If necessary the equipment will be reoriented inside the decontamination station to allow an upwind or crosswind position, or hand brushing will be used to complete decontamination.
- Steam clean all exterior surfaces including drum bottom.
- Remove the drum to a clean area where it will not come in contact with contaminants to dry.
- When the drum is dry, subcontractor personnel will monitor the drum for radiological contamination.
- If radiological contamination is still present, repeat decontamination as necessary.

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- If verified free of radiological contamination by a Radiological Engineering-approved contractor Health and Safety Specialist, return the drum to the storage area.

6.0 QUALITY ASSURANCE/QUALITY CONTROL

Quality Assurance (QA) and Quality Control (QC) activities will be accomplished according to applicable project plans as well as quality requirements presented in this SOP.

This section outlines guidelines for specific quality control procedures to monitor the effectiveness of cleaning procedures given in the attachments.

6.1 EQUIPMENT RINSE SAMPLES

The effectiveness of the equipment cleaning procedures is monitored by submitting to the laboratory rinse water for low-level analysis of the parameters of interest. Select different pieces of equipment for this procedure, each time equipment is washed, so that a representative sampling approximately 10 percent of all equipment is obtained over the length of the project. Distilled water is poured over the representative equipment. This water is captured directly into Sample bottles. If a funnel is needed, glass or Teflon® will be used.

7.0 DOCUMENTATION

A permanent record of the implementation of this standard operating procedure (SOP) will be kept by documenting field observations and data. Observations and data will be recorded on Form FO.3A, Equipment Decontamination/Wash Checklist and Record.

EQUIPMENT DECONTAMINATION/WASH CHECKLIST AND RECORD

I. General Information completed by:

Name	Date	Phone No.
------	------	-----------

Subcontractor's Name

NOTE: Sections I and II will be completed by the same individual.

Equipment Manufacturer, Model and Common Name: _____

Equipment Owner: _____

Name and Phone Number of Person Responsible for the Equipment: _____

Serial Number/Equipment Identification Number: _____

Delivered to Decontamination Station by: _____

Initial contaminate characterization of work area: (check one)

Not potentially contaminated _____

Potentially contaminated _____

II. Activity History

Where was equipment used? _____

What was equipment used for? _____

Types and volumes of water generated: (check as appropriate)

_____ Purge _____ Gallons

_____ Development _____ Gallons

_____ Decon/Wash _____ Gallons

_____ Rinse _____ Gallons

EQUIPMENT DECONTAMINATION/WASH CHECKLIST AND RECORD

III. Actions At Central Decontamination Station

Yes	No	
_____	_____	The equipment was washed under the provisions of SOP No. FO.3, General Equipment Decontamination
_____	_____	Personnel Decontamination Station established as described in the applicable site-specific health and safety plan
_____	_____	Personal protective equipment (PPE) selected based upon work area PPE level
_____	_____	Specify PPE level utilized: _____ Level B _____ Level C _____ Level D
_____	_____	PPE inspected prior to donning
_____	_____	Wind direction checked prior to using pressurized spray (circle the direction the wind was blowing from) N NE E SE S SW W NW
_____	_____	Was particular attention devoted to equipment parts that contacted potentially contaminated medium?
_____	_____	Was personal decontamination completed as described in the applicable site-specific health and safety plan?