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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-SW  
Procedure No.: Table of Contents, Rev 4  
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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ADMIN RECORD

REVIEWED FOR CLASSIFICATION/UCM

By [Signature]

Date May 18, 1992

[Signature]

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**INDUSTRIAL EFFLUENT DISCHARGE SAMPLING**

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**TITLE:**  
INDUSTRIAL EFFLUENT  
DISCHARGE SAMPLING

Approved By:

*J. B. Reed*  
\_\_\_\_\_  
(Name of Approver)

**MAY 12 1992**  
\_\_\_\_\_  
(Date)

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REVIEWED FOR CLASSIFICATION/UCNI

By *M. King*  
Date *March 9, 1992*

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### 2.0 PURPOSE AND SCOPE

This SOP describes procedures that will be used at the Rocky Flats Plant. It addresses the current National Pollutant Discharge Elimination System (NPDES) industrial effluent discharges but is applicable to all industrial effluent discharges for the Rocky Flats Plant. The purpose of this procedure is to ensure that the collection of representative samples meet applicable regulations, appropriate sampling protocols, and acceptable field measurement methods so that acceptable standards of accuracy, precision, comparability, representativeness and completeness will be attained.

Under the authority of the NPDES established by section 402 of the Clean Water Act (CWA) (33 U.S.C. 1251, et. seq.), the U.S. EPA and the State of Colorado have promulgated regulations for monitoring liquid effluent discharges. By these authorities the RFP has been issued a permit to discharge to the receiving water of South Walnut Creek, North Walnut Creek, and Woman Creek with control on the conditions and limits under which discharge may take place. Permit No. CO-0001333, issued in November 1984, is in the process of revision due to an NPDES Federal Facilities Compliance Agreement (FCAA) entered into pursuant to Executive Order 12088, 43 Federal Regulation 47707 (1978). In addition, the Department of Energy (DOE) Order 5400.1, DOE Environmental Safety and Health Directive (11/09/88), specifies that compliance with NPDES requirements is mandatory for DOE operations. The Order also states DOE policy "to conduct its operations in an environmentally safe and sound manner" and requires monitoring of effluent discharges and ambient water quality.

### 3.0 RESPONSIBILITIES AND QUALIFICATIONS

All personnel performing these procedures are required to have the appropriate health and safety training as specified in the site-specific Health and 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.

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Only qualified personnel will be allowed to perform these procedures. Required qualifications vary depending on the activity to be performed. In general, qualifications are based on education, previous experience, on-the-job training, and supervision by qualified personnel.

#### 4.0 REFERENCES

##### 4.1 SOURCE REFERENCES

The following is a list of references reviewed prior to the writing of this procedure:

MCD-51, NPDES Compliance Inspection Manual. U.S. Environmental Protection Agency.  
May 1988.

Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms. 3rd Edition. USEPA/6000/4/85/013. March 1985.

Region VIII USEPA NPDES Acute Test Conditions-Static Renewal Whole Effluent Toxicity.

Code of Federal Regulations. 40 CFR parts 122, 123, 125, 133, and 136

Methods for Chemical Analysis of Water and Waste. U.S. Environmental Protection Agency 1979.

DOE Order 5400.1. U.S. Department of Energy Environmental Safety and Health Directive. November 1988.

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### 4.2 INTERNAL REFERENCES

Rocky Flats Plant NPDES Permit No. CO-0001333

Rocky Flats Plant NPDES Federal Facilities Compliance Agreement

Related SOPs cross-referenced by this SOP are as follows:

- SOP FO.3, General Equipment Decontamination
- SOP FO.13, Containerizing, Preserving, Handling, and Shipping of Soil And Water Samples
- SOP FO.14, Field Data Management
- SOP SW.2, Field Measurements of Surface Water Field Parameters
- SOP SW.3, Surface Water Sampling
- SOP SW.15, River and Ditch Sampling

### 5.0 METHODS

#### 5.1 SAMPLE COLLECTION AND PRESERVATION

Collection of representative effluent samples requires that a reliable procedure be developed and implemented. Since each effluent location may have conditions or requirements that make it unique, each location must be evaluated on a site-by-site basis. This SOP addresses criteria for effluent sampling, including sampling necessary to meet the requirements of NPDES Permit No. CO-0001333, as modified by the 1990 NPDES FFCA. Surface Water samples will be collected following SOP SW.3, Surface Water Sampling. Composite samples will be collected with an automatic sampler following manufacturer's

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instructions for its operation. Sampling sites will be located at the points specified in the field sampling plan and the NPDES permit. Parameters measured in the field will comply with SOP SW.2, Field Measurements of Surface Water Field Parameters.

### 5.2 SAMPLE CUSTODY, PRESERVATION AND HANDLING

Sample containers used for sampling will be prepared and handled as described in SOP FO.13, Containerizing, Preserving, Handling and Shipping of Soil and Water Samples. Pre-cleaned sample containers will be purchased by EG&G from a commercial laboratory supplier. If not purchased pre-cleaned, the containers will be sanitized according to Contract Laboratory Program (CLP) procedures. Table 1 lists containers, preservatives, and holding times for NPDES samples. These requirements are based on 40 CFR 136 and regulations governing the collection of NPDES samples, which will take precedence over any conflicting information given in other guidance or SOP when collecting NPDES samples. Refer to NPDES/FFCA Operations Sampling Plan for a list of NPDES parameters.

### 5.3 GRAB AND COMPOSITE SAMPLING

Samples will be collected as either grab or composite samples, as specified by the NPDES permit, and/or the NPDES FFCA. Refer to the NPDES/FFCA Operations Sampling Plan for a list of composite sampling sites.

Surface water grab samples will be collected as required by SOP SW.3, Surface Water Sampling with attention given to certain parameters, such as oil and grease, which must be collected by sample container immersion, while others may be collected by the "dip and transfer" method. Volatile organics and fecal coliform will be collected by sample container immersion whenever possible. Discrete grab samples will be collected upstream of the point where the sample technician is standing.

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To comply with the permit, flow proportional composites will be collected as required. The composites will be collected as described in SOP SW.15, River and Ditch Sampling. It is anticipated that some revisions to this SOP or the field sampling plan will be required when a renewal NPDES permit is issued.

A major effort is underway at the RFP to install Parschall flumes and other structures to enable more accurate flow measurements at industrial effluent points, pond discharge locations, and on streams within the RFP boundary. This will also facilitate the collection of representative samples through the use of the automatic flow-proportional composite samplers.

When completed, most samples will be collected by automatic samplers. Until installation of the upgraded network is complete, some locations will require manual compositing of samples proportional to flow.

Manually composited individual grab samples will be thoroughly mixed prior to removing an aliquot to ensure that a representative sample is transferred to a container for analysis. Sample manipulation will be minimized to reduce the possibility of contamination.

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**TABLE SW.9-1  
CONTAINERS, SAMPLE PRESERVATION AND SAMPLE HOLDING TIMES**

<u>Parameter</u>	<u>Container</u>	<u>Preservatives</u>	<u>Holding Time (Hrs or Days)</u>
HSL-VOAs	2x40mL vials with teflon	Cool 4°C <sup>(a)</sup> or	7 days
	lined septum lids	with HCl to pH<2	14 days
Total Organic Carbon (TOC)	125mL - glass bottle	H <sub>2</sub> SO <sub>4</sub> to pH<2	28 days
Biochemical Oxygen Demand <sub>5</sub> (BOD <sub>5</sub> )	1L-glass <sup>(b)</sup>	Cool 4°C	48 hours
Biochemical Oxygen Demand Carbonaceous <sup>5</sup> (CBOD <sub>5</sub> )	1L-glass <sup>(b)</sup>	Cool 4°C	48 hours
Fecal Coliform	500mL-glass or poly (sterile)	Cool 4°C <sup>(a)</sup>	6 hours

- Add 0.008% Sodium thiosulfate (Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>) in the presence of residual chlorine
- <sup>b</sup> Poly bottles may be substituted if glass are not available
- <sup>c</sup> Glass bottles may be substituted if polyethylene bottles are not available
- <sup>d</sup> Holding Time for mercury is 28 days
- <sup>e</sup> Amount is for Ceriodaphnia and Pimephales promelas test

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**TABLE SW.9-1 (continued)**  
**CONTAINERS, SAMPLE PRESERVATION, AND SAMPLE HOLDING TIMES**

<u>Parameter</u>	<u>Container</u>	<u>Preservatives</u>	<u>Holding Time (Hrs or Days)</u>
Oil and Grease	2x1-L-widemouth glass with teflon liner	Cool 4°C;H <sub>2</sub> SO <sub>4</sub> to pH<2	28 days
Solids-Total	500mL-Poly <sup>(c)</sup>	Cool 4°C	7 days
Nitrate/Nitrite (as N)	500mL-Poly	Cool 4°C;H <sub>2</sub> SO <sub>4</sub> to pH<2	28 days
HSL Metals-Total	1L-Poly	HNO <sub>3</sub> to pH<2	6 months <sup>(d)</sup>
Chromium-total	1L-Poly	HNO <sub>3</sub> to pH<2	6 months

- \* Add 0.008% Sodium thiosulfate (Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>) in the presence of residual chlorine
- <sup>b</sup> Poly bottles may be substituted if glass are not available
- <sup>c</sup> Glass bottles may be substituted if polyethylene bottles are not available
- <sup>d</sup> Holding Time for mercury is 28 days
- \* Amount is for Ceriodaphnia and Pimephales promelas test

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**TABLE SW.9-1 (continued)**  
**CONTAINERS, SAMPLE PRESERVATION AND SAMPLE HOLDING TIMES**

<u>Parameter</u>	<u>Container</u>	<u>Preservatives</u>	<u>Holding Time (Hrs or Days)</u>
Phosphorus-Total	250mL-glass	Cool 4°C; H <sub>2</sub> SO <sub>4</sub> to pH < 2	28 days
Static Bioassay	1 gallon Poly <sup>(e)</sup>	Cool 4°C	48 hours
pH, temperature, Total Residual Chlorine	In-situ; poly, glass or metal container	None	Analyze immediately

- Add 0.008% Sodium thiosulfate (Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>) in the presence of residual chlorine
- Poly bottles may be substituted if glass are not available
- Glass bottles may be substituted if polyethylene bottles are not available
- Holding Time for mercury is 28 days
- Amount is for Ceriodaphnia and Pimephales promelas test

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### 5.4 STATIC BIOASSAY

Whole effluent toxicity monitoring will be conducted at several effluent locations as required by the NPDES FFCA. Acute replacement static toxicity tests will be conducted in conformity with "Methods for Measuring the Acute Toxicity of Effluent to Freshwater and Marine Organisms", USEPA 600/4-85/013 (revised March 1985) and the Region VIII USEPA "NPDES Acute Test Conditions - Static Renewal Whole Effluent Toxicity". USEPA Region VIII procedures will take precedence in case of any conflicts.

Acute 48-hour replacement static tests using Ceriodaphnia and acute 96-hour replacement static tests using Pimephales promelas will be conducted from a 2-gallon flow-proportioned composite sample collected for this analysis. Pimephales promelas used in the test will be  $5 \pm$  days of age.

### 6.0 QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

Quality Assurance (QA) and Quality Control (QC) will be accomplished according to applicable project plans as well as quality requirements presented in this SOP. Additional QA/QC requirements may be added if it is determined they are needed to ensure the quality of the data.

The most common monitoring errors are typically the result of improper sampling, improper preservation, and exceeding sample holding times. Errors of this type will be minimized by the use of this SOP which addresses all of these issues and through the training provided for the technicians.

The three types of QC samples to be collected are:

- Duplicate
- Rinsate samples
- Split samples

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### 6.1 FIELD DUPLICATE SAMPLES

Field duplicate samples are independent samples collected from the same source, so they are, to the extent possible, equally representative of the parameter(s) of interest at a given point in time.

### 6.2 EQUIPMENT RINSATE SAMPLES

Equipment rinsate samples are samples that are obtained by pouring analyte-free distilled water through decontaminated sample collection equipment (dipper, compositing container, pump, etc.) and collecting the rinsate in the appropriate container for chemical analysis. These samples are used to determine the effectiveness of the decontamination procedures.

### 6.3 SPLIT SAMPLES

Split samples involve collecting a single sample and dividing the sample into two containers for analysis by separate laboratories. While infrequently employed, split samples are beneficial in identifying problems and discrepancies within the analytical laboratories.

### 6.4 QA/QC SAMPLE FREQUENCIES

Matrix spike and matrix spike duplicate analyses are run as internal lab checks and frequencies will be determined by analytical laboratory procedures. Equipment rinsates and sample duplicates will be collected at a minimum frequency of one per 20 field samples. Split samples should be collected at a frequency of one per 100 samples or at least once each year. Refer to the NPDES/FFCA Operations Sampling Plan for specific QA/QC requirements.

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### 6.5 FIELD INSTRUMENT CALIBRATION

Field instruments will be calibrated in accordance with SOP SW.2, Field Measurement of Surface Water Field Parameters.

### 7.0 DOCUMENTATION

Proper chain of custody and documentation will be maintained at all times by following SOP FO.13, Containerizing, Preserving, Handling, and Shipping of Soil and Water Samples. A permanent record of the implementation of this SOP will be kept by documenting field observations and data. Observations and data will be recorded on daily NPDES logsheets that identify the required data entries or in a bound field notebook with consecutively numbered pages. Field logbooks will generally be utilized to summarize the daily field activities and to document project information not required by the field forms.

Permanent ink will be used for all entries in the logbooks and on the field forms. Mistakes will be crossed out with a single line, initialed, and dated. Unused pages or partial pages will be voided by drawing a line through the blank sections and initialing. Any deviation from this SOP requires documentation in the site supervisor's logbook.

The field activity daily log narrative should create a chronological record of the media team's activities, including the time and location of each activity. Any descriptions of problems encountered, personnel contacted, deviations from the SOP, and visitors on site should also be included. The weather conditions, date, signature of the person responsible for entries, and the number of field activity daily log sheets used to record media team activities for a given day will also be included.

Sample identification and data handling will conform to SOP FO.14, Field Data Management.