INDUSTRIAL AREA INTERIM MEASURE / INTERIM REMEDIAL ACTION SURFACE-WATER MONITORING TECHNICAL DESIGN DOCUMENT

U.S. DEPARTMENT OF ENERGY

Rocky Flats Environmental Technology Site

Golden, Colorado

PREPARED BY EG&G ROCKY FLATS, INCORPORATED

ENVIRONMENTAL PROTECTION MANAGEMENT DEPARTMENT

SURFACE WATER BRANCH

December 1994

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DRAFT

Estimated FY96 Laboratory Analysis Costs				
	Estimated		Adjusted	
Analysis	Quantity	Cost / Each	Cost / Each	Subtotal
VOAs by 524.2	26	$343	$515	$13,377
Pu-239,240	95	$300	$450	$42,750
Am-241	95	$325	$488	$46,313
U Isotopes	95	$284	$426	$40,470
Gross Alpha / Beta	95	$113	$170	$16,103
Rad Screens	95	$94	$141	$13,395
Total Metals	95	$414	$621	$58,995
P	95	$33	$50	$4,703
NO3/NO2	95	$42	$63	$5,985
pH	95	$15	$23	$2,138
Conductivity	95	$15	$23	$2,138
Alkalinity	95	$30	$45	$4,275
Total Suspended Solids (TSS)	95	$22	$33	$3,135
Total Dissolved Solids (TDS)	95	$22	$33	$3,135
Chloride	95	$26	$39	$3,705
Fluoride	95	$28	$42	$3,990
Sulfate	95	$28	$42	$3,990
Carbonate	95	$22	$33	$3,135
Bicarbonate	95	$22	$33	$3,135
Total Petroleum Hydrocarbons (TPH)	8	$124	$186	$1,488
			Total Cost:	**$276,353**

1. PURPOSE

This technical design document describes the surface-water monitoring program for implementation of the Industrial Area Interim Measure / Interim Remedial Action (IA IM/IRA) at the Rocky Flats Environmental Technology Site (RFETS) in accordance with the IA IM/IRA Decision Document (IM/IRA, DD) (EG&G, 1994a). The IA IM/IRA, DD provides a framework for action in preparation of decontamination and decommissioning (D&D) of the RFETS. This framework includes implementation of a high-resolution surface-water monitoring program that targets stormwater runoff monitoring and monitoring of selected potential point sources of surface water pollution that are uncharacterized to date. This monitoring program is intended to provide:

1. Data for determining baseline water-quality and quantity prior to D&D activities and for establishing warning limits for surface-water constituents in D&D areas; and

2. Provide a network for surface-water monitoring during D&D activities to act as an early warning system for potential releases of materials from D&D areas.

This technical design document was prepared prior to the actual approval of the IM/IRA, DD by the U.S. Environmental Protection Agency (USEPA), the Colorado Department of Public Health and the Environment (CDPHE), and the U.S. Department of Energy in order to achieve milestones proposed in the IM/IRA, DD on schedule. Therefore, this document is a "living" document which will be updated based on future developments in the final IM/IRA,DD.

2. SCOPE

This technical design document includes: a description of the RFETS IA IM/IRA surface-water monitoring program and monitoring network; identification of applicable regulatory and quality assurance requirements, a description of the organizational and functional responsibilities of various agencies and companies involved with the program; and a schedule for program activities and deliverables.

3. SETTING

The RFETS is a government owned, contractor operated facility in the U.S. Department of Energy (DOE) nuclear weapons complex, located in Golden, Colorado. The site is owned by the DOE, managed by the DOE Rocky Flats Field Office (DOE,RFFO), and operated by EG&G Rocky Flats, Inc. (EG&G). The IA IM/IRA is managed by the EG&G Environmental Restoration Management Department, Remediation Programs Division, and the surface-water monitoring portion of the IA IM/IRA is implemented by EG&G Environmental Protection Management Department, Surface Water Branch.

This program will be implemented in and immediately adjacent to the RFETS 398-acre Industrial Area (IA) which is, and continues to be, home to a variety of industrial uses associated with the

fabrication of components for nuclear weapons, nuclear material handling and storage, and waste management. The IA is approximately 74% impervious drainage area consisting of buildings, pavement, and fill. Surface-water monitoring activities described herein will primarily occur in drainage ditches, storm sewers, and building sump / footing drain pipes in and immediately adjacent to the RFETS IA.

Figure 1 shows the locations of the IA IM/IRA surface-water monitoring stations. Monitoring of surface water in natural channels will occur at stations GS10 and SW093 for the IA IM/IRA.

Each surface-water monitoring station will be equipped with a continuously recording flow meter linked to an automatic surface-water sampler. The equipment will be programmed to obtain samples from stormwater runoff or, in the case of a dry ditch, whenever water is detected in the channel. Table 1 lists the equipment that will be used at each location for monitoring flow and collecting water-quality samples as well as the chemical parameter data that will be collected at each station.

4. TECHNICAL DESIGN DOCUMENT COMPLIANCE

This program will be implemented in response to requirements under the DOE / USEPA Interagency Agreement for clean-up of the RFETS under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Superfund Amendments Reauthorization Act and in accordance with the requirements of the RFETS IA IM/IRA, DD. All work performed under this project will be controlled by EG&G Standard Operating Procedures (SOPs) and standard analytical methods. This section identifies and addresses the regulatory and quality assurance (QA) requirements that are applicable to the IA IM/IRA surface-water monitoring program.

4.1 Regulatory Requirements

The IA IM/IRA surface-water monitoring program will be conducted to satisfy the following regulatory requirements.

- CERCLA and DOE / USEPA Interagency Agreement
- DOE Orders 5400.1 and 5400.5

4.2 Quality Assurance Requirements

Quality assurance requirements contained in the EPM Quality Assurance Program Description (QAPD) are applicable to the work activities described herein (EG&G, 1991). The QAPD requires project-specific QA requirements to be addressed in project technical design documents.

All work shall comply with EG&G SOPs. Log books, as well as U.S. Geological Survey Discharge Measurement Note forms, shall be kept to document equipment installation,

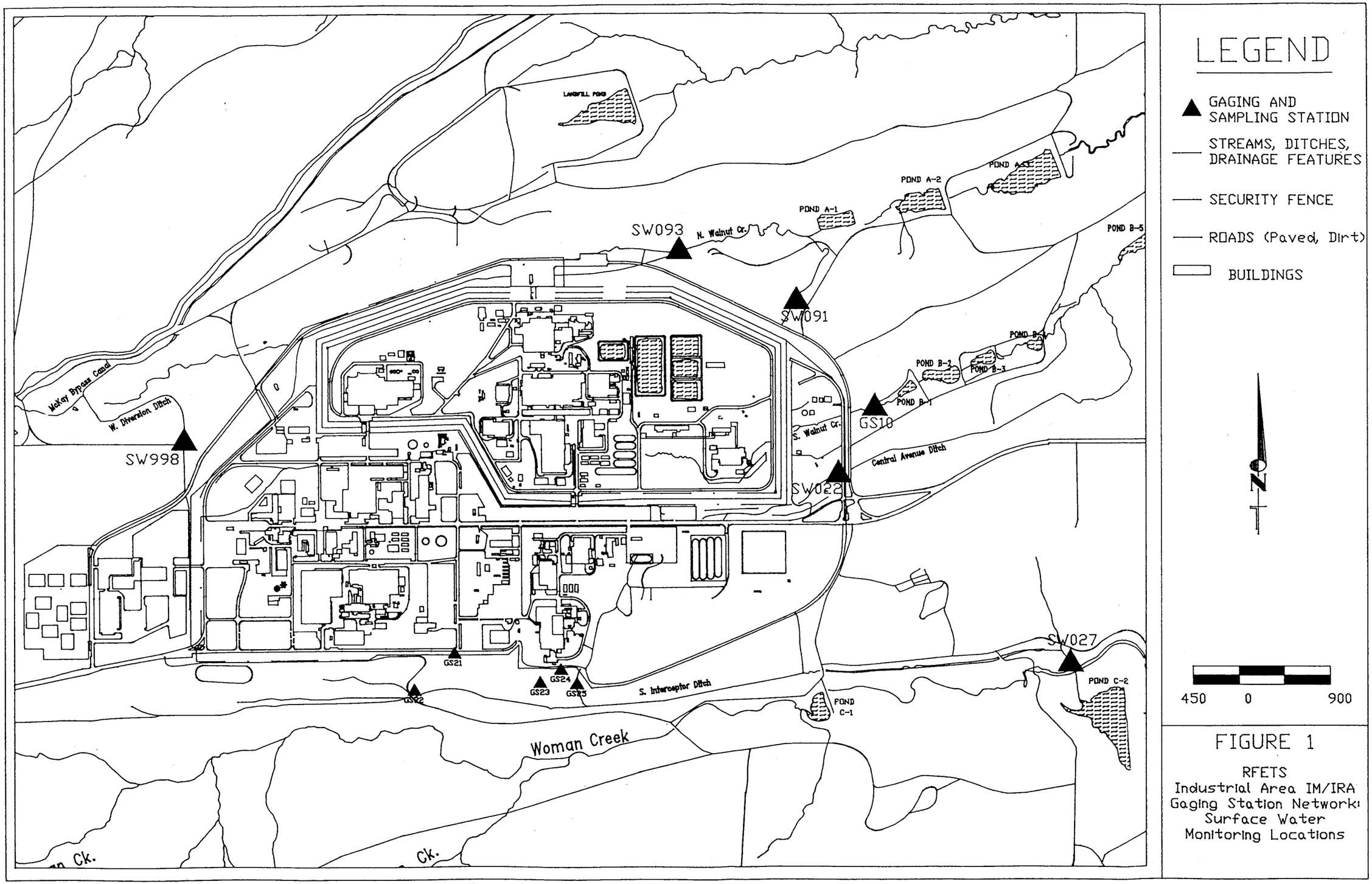

FIGURE 1

RFETS
Industrial Area IM/IRA
Gaging Station Network:
Surface Water
Monitoring Locations

Table 1. IA IM/IRA Surface Water Monitoring Data Collection and Water Sampling

			CONTINUOUS DATA COLLECTION			*WATER QUALITY SAMPLING*		
GAGING STATION	**LOCATION**	**PATHWAY**	**INDICATOR PARAMETERS**	**FLOW MEASUREMENT**	**TELEMETRY INTERFACE**	**RFEDS EVENT-RELATED ANALYTE LIST**	**ORGANICS**	**FREQUENCY**
SW998	West Diversion Ditch north of 130 Area	4	None	9.5" Parshall flume; Continuous Flow/Stage	Sutron Satellite Telemetry	YES	EPA Method 524.2 Complete	Storm Events; Not to exceed 1 sample per month (12 samples per year)
SW093	N. Walnut Creek at 6' cmp north of Solar Ponds	3	None	36" rectangular weir w/o end contractions; Continuous Flow/Stage	Geomation (in place); Sutron Satellite Telemetry	YES	EPA Method 524.2 Complete	Storm Events; Not to exceed 1 sample per month (12 samples per year)
SW091	Small Tributary to N. Walnut Creek ENE of Solar Ponds	6	None	1.0' H-flume; Continuous Flow/Stage	None	YES	EPA Method 524.2 Complete	Storm Events; Not to exceed 1 sample per month (12 samples per year)
SW023/ GS10	S. Walnut Creek 50' Upstream of B-1 Bypass	2	None	9.5" Parshall flume; Continuous Flow/Stage	Sutron Satellite Telemetry	YES	EPA Method 524.2 Complete	Storm Events; Not to exceed 1 sample per month (12 samples per year)

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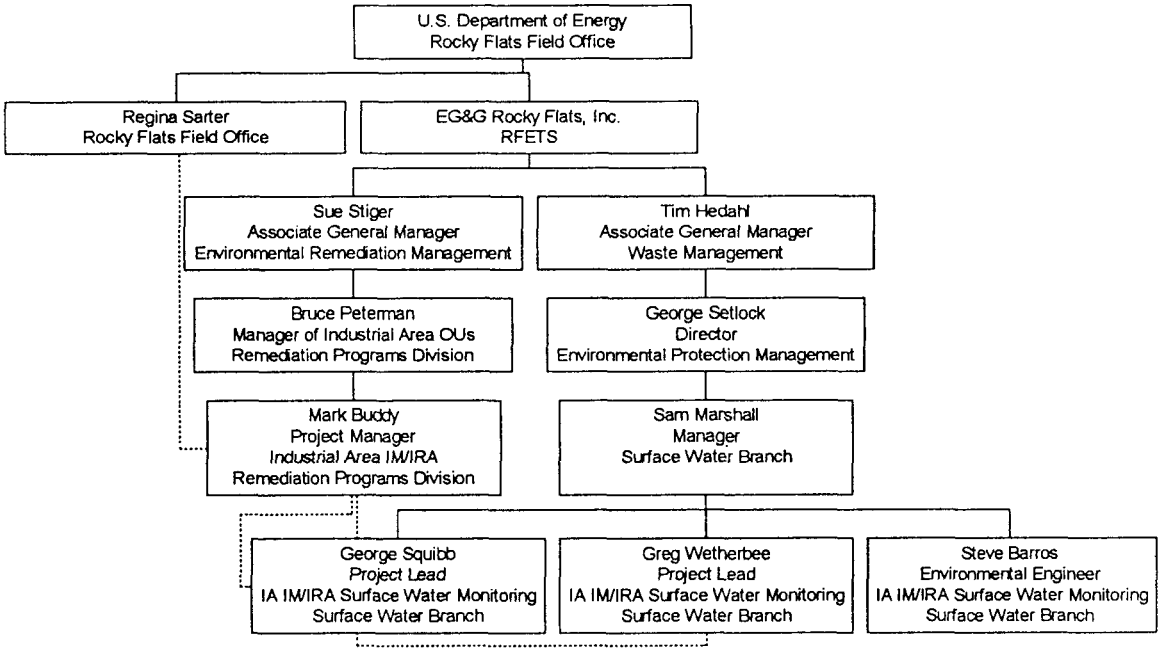
			CONTINUOUS DATA COLLECTION			WATER QUALITY SAMPLING		
GAGING STATION	LOCATION	PATHWAY	INDICATOR PARAMETERS	FLOW MEASUREMENT	TELEMETRY INTERFACE	RFEDS EVENT-RELATED ANALYTE LIST	ORGANICS	FREQUENCY
GS24	CMP Draining Impervious Area South of 881	5	None	1' H-flume; Continuous Flow/Stage	None	YES	EPA Method 524.2 Complete	Storm Events; Not to exceed 1 sample per month (12 samples per year)
GS25	CMP Draining Areas South and East of 881	5	None	1' H-flume; Continuous Flow/Stage	None	YES	EPA Method 524.2 Complete	Storm Events; Not to exceed 1 sample per month (12 samples per year)
Subbasin Verification Sites	Outfalls for Specific Subbasins Depending on Location of D&D Operations	NA	pH; Electrical Conductivity	Primary Devices depend on location and drainage area; Continuous Flow/Stage	Geomation System: Flow; Indicator Parameters	To be determined by COPC analysis for specific D&D locations during implementation phase of project	To be determined by COPC analysis	Storm Events: Not to exceed 1 sample per month; Samples with indicator parameters in exceedence of predetermined limits are all analyzed

5. ORGANIZATIONAL RESPONSIBILITIES AND PERSONNEL QUALIFICATIONS

5.1 Organizational Responsibilities

The structure of the organizations which are directly involved with the implementation of the work described herein are shown in Figure 2. Planning, implementation, and operation of the IA IM/IRA surface-water monitoring network is the responsibility of the Surface Water Branch. Surface Water Branch shall install, calibrate, and operate each monitoring station, including routine, weekly inspection and maintenance of every station. Sample collection and sampler maintenance shall be the responsibility of the Surface Water Branch.

Figure 2. IA IM/IRA Surface Water Monitoring Organizational Chart



Other EG&G departments will provide support to the program through their assigned functional responsibilities. The Remediation Programs Division (RPD) of ERM is responsible for funding and providing project management functions for this activity. Regulatory and programmatic guidance also are provided by RPD.

The Ecology and Watershed Management Branch of EPM will be responsible for species and habitat surveys for compliance with the Threatened and Endangered Species Act, Section 404 of the Clean Water Act and Executive Order 11990 for protection of wetlands, the Migratory Bird Treaty Act, and other laws applicable to potential ecological impacts from the installation of the monitoring equipment.

The Environmental Operations Management Division (EOM) of ERM along with EG&G Construction Management, Industrial Hygiene, Radiological Engineering, and other support organizations, will provide support for excavation (a.k.a. Soil Disturbance) permits, Hazardous Waste Determination, and Readiness Assessment Review.

Subcontracted personnel provided by Jacobs Engineering Group (JEG) shall provide technical support for IA IM/IRA surface-water monitoring tasks. JEG shall provide support for monitoring station installation and sample preparation, shipment, and tracking. Surface Water Branch personnel shall provide JEG with the surface-water samples in 15-Liter carboy containers. JEG shall split this composite sample into discrete bottles with appropriate preservatives for shipment to laboratories for chemical analysis.

5.2 Personnel Qualifications and Training

The qualifications for the Project Leads include at least a B.S. degree in Civil/Environmental Engineering, Chemistry, Geology, Biology, or other related discipline plus a minimum of two years of professional experience in surface-water data collection, compilation, and analysis and/or project management. Training requirements include, at a minimum, current 40-hour OSHA training in compliance with 40CFR 1910.120, knowledge of EG&G SOPs, on-the-job training in stream gaging, water sampling, and the use of ISCO monitoring equipment, personal computer (PC) training/experience, and familiarity with regulatory documents and requirements.

Technical personnel providing assistance to the Project Leads shall have at least five years experience in environmental project work, including at least one year of field data collection experience. Training requirements for technical personnel include a basic understanding of the contents of this technical design document, training in applicable EG&G SOPs, 40-hour OSHA training, PC proficiency, and on-the-job training in the use of automatic data and surface-water sample collection systems.

All subcontracted field and laboratory personnel shall be familiar with EG&G SOPs and laboratory procedures applicable to their assigned tasks. They shall also meet any qualification and additional training requirements listed by the procedures that they use.

6. IA IM/IRA SURFACE-WATER MONITORING TASKS

All tasks completed for this activity shall be in compliance with the requirements of the IA IM/IRA, DD. The IA IM/IRA, DD specifies monitoring locations, data requirements for each location, and the administrative framework for using the data to make management decisions about D&D actions at the RFETS. Generally, there are three fundamental tasks associated with the implementation of the IA IM/IRA surface-water monitoring program. These are: 1) Monitoring station installation; 2) Data collection (monitoring station operation and maintenance); and 3) Data analysis and reporting.

6.1 Monitoring Station Installation

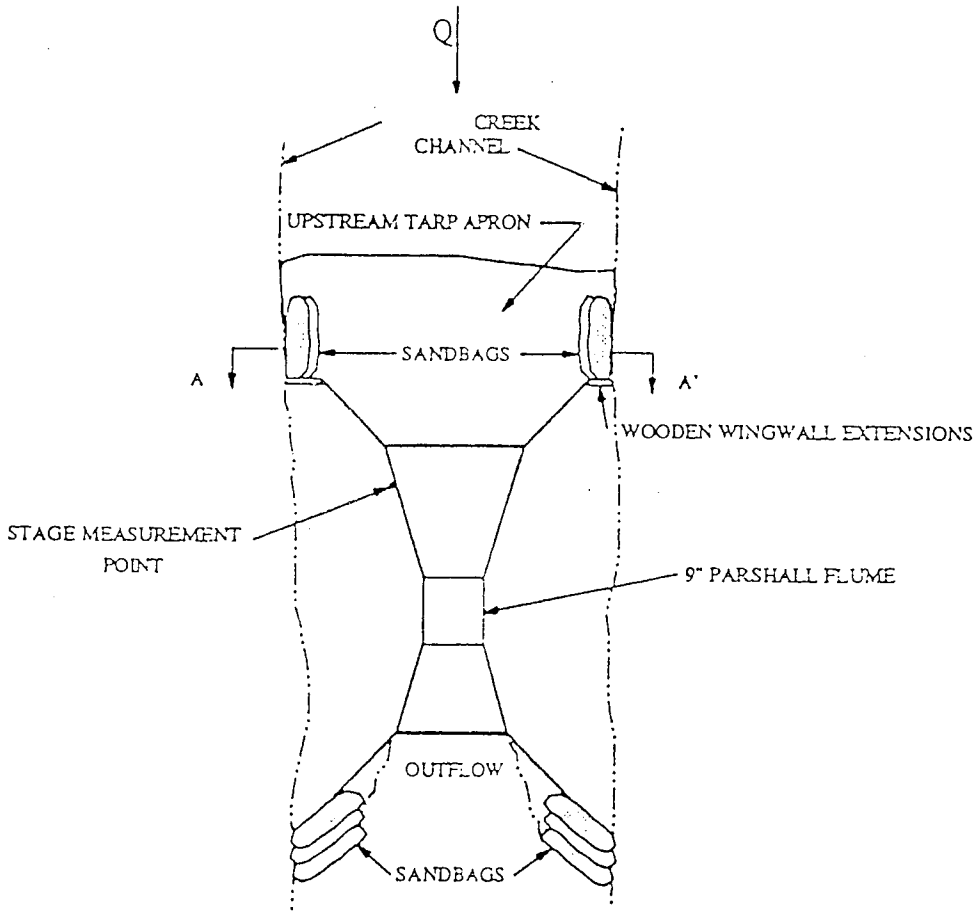
6.1.1 Task Description

Surface Water Branch will install and/or upgrade instrumentation at the monitoring locations shown in Figure 1. Each station will consist of an ISCO Model 4230 Bubbler Flow Meter linked to an ISCO Model 3700 Portable sampler and an ISCO Model 6000 VOC sampler. A Geomation Model 2370 remote measurement and control radio-telemetry system will be used to transmit data in real time from stations installed closest to D&D areas to the Surface Water Branch and other potential receivers of the telemetered data. Power for the instrumentation will be provided by AC line power where available, but this is anticipated to be rare. Therefore, a Remote Power solar/DC power supply will power most, and possibly all, of the stations. Each station will have a primary flow-control structure. The flow-control structures may be existing culverts or concrete stormwater conveyance structures. However, in most cases, H-flumes or weirs will be purchased and/or fabricated for installation in either natural stream channels, ditches, or fastened to existing concrete or metal stormwater conveyance structures.

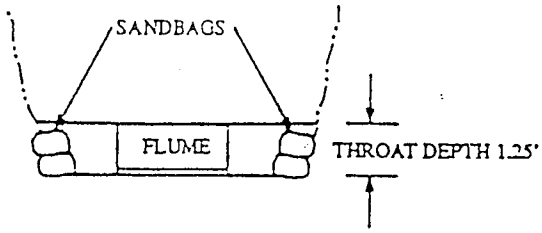
The installation task might involve minor hand excavation of channel banks and beds for installation of the flow-control structure in ditches or natural channels. For fastening of flow-control structures to existing structures, a rotary hammer or carbide-tip steel drill might be used to drill holes in the structures for attachment of the flow-control structure by either lag screws or expansion bolts. Alternatively, some flow-control structures might be installed by simply using tarps and sandbags to secure a flume in a channel and ensure that all runoff enters the flume. Each station will require a different application of flow-control structure and means for securing the structure in place. For excavation applications, an areal impact of no more than 15 square feet is expected per site. An example of a flow-control structure installation is shown in Figure 3.

Figure 3. Schematic Diagram of a Typical Parshall Flume Installation

NOT TO SCALE



CROSS-SECTION A-A'



After the flow-control structure is in place, it will be instrumented with the ISCO equipment. Then the ISCO equipment is programmed and calibrated to complete the installation.

6.1.2 Types of Data Collected

Field notes documenting the specifications for each monitoring station shall be recorded in a field log book. Instrument programming information and calibration records shall also be recorded in a field log book.

6.1.3 Records Produced

Quality Assurance records produced as part of this activity are:

1. Field log books
2. Photographs of station installations

6.1.4 Applicable Instructions and Methods

All flow-control structures and ISCO, and Remote Power equipment shall be installed per the manufacturer's instructions. Programming and calibration of the ISCO equipment shall be done in accordance with the manufacturer's instructions which also are reproduced in EG&G SOPs 5-21000-OPS-SW: SW10 and SW11.

6.1.5 Required Resources

Two qualified people (Section 5) will be required to install each monitoring station. Common hand tools, power tools, and supplies will be required to install the flow-control structures. Examples of these are:

rubber tarp material
1/2" neoprene rubber gasket material
50 lb - 70 lb sand bags
1/4" to 3/8" nuts, bolts, and washers
1/4" plywood
2"X2" lumber
4"X4" lumber
hose clamps
plastic wire ties
plumber's putty
hand level
tape measure
saw
cordless drill
screw drivers
wrenches / pliers
shovels
pick-ax

Installation of the ISCO equipment usually is accomplished using screwdrivers, wrenches, and pliers with little need for other equipment.

6.1.6 Data Quality

Data collected pertaining to the installation of the monitoring stations must be of sufficient quality to document how the flow-control structure is installed so as to validate the flow-record quality. Written notes documenting the specifications for each flow-control structures, including dimensions, and photographs showing the completed monitoring station are required to document that the monitoring station record is scientifically defensible.

6.1.7 Work Product Objectives

The product of this task is a network of fully functional automated surface-water monitoring stations. Fifteen stations currently (11/94) are scheduled for installation in Fiscal Year 1995. These include instrumentation of five NPDES stormwater outfalls, eight outfalls to the South Interceptor Ditch on and around the Building 881 Hillside, and two stations located around the first D&D area which is to be determined.

6.1.8 Acceptable Criteria

The monitoring stations must be properly installed and fully functional in time for data collection during the spring of 1995 in order to comply with the IA IM/IRA, DD schedule. Flow control structures must be level, plumb, and leak free. Instrumentation must be powered, calibrated, and recording representative data. Sampler intakes must be positioned such that representative samples are collected at each station. The equipment must be secured to prevent damage to the equipment and the potential for tampering.

6.1.9 Applicable Software

The ISCO monitoring equipment operates on its own software which is called "Flowlink." The most current version of Flowlink is Version 3.9, but Surface Water Branch prefers Version 2.0 which will be used to program the station instrumentation. This software will operate on a 486 lap-top computer which will be used to program the instrumentation and download data from the dataloggers.

6.2 Data Collection

6.2.1 Task Description

The monitoring stations will begin collecting data immediately upon installation. The flow meters shall log stream stage continuously, storing data points on five-minute intervals. The automatic samplers shall be programmed to collect 15-Liter composite samples on a flow-paced basis. Therefore, each station will be set up to collect a discrete volume of water per a specified number of cubic feet of water measured by the flow meter. The flow pacing will vary from station to

station based on the volume and discharge (rate) that is anticipated for average storm depths and intensities.

After a storm, each station will be visited to determine whether or not a sample has been collected. If a sampler has a full sample, the data from the flow meter will be recorded and downloaded electronically to a lap-top PC to obtain the sampling interval information. Then the sample shall be removed from the sampler, capped, and taken to JEG for sample preparation, shipment, and tracking. The sampler will be replenished with a clean 15-Liter carboy and reset to sample the next storm event. Two carboys will be dedicated to each station to minimize cross-contamination problems for sample waters. One carboy will be clean and waiting for deployment while the other will reside in the sampler. Carboys shall be kept in either T891I or T891R depending on space limitations in these trailers.

Routine weekly inspection and maintenance of the monitoring stations is required to detect leaks or damage to the flow-control structures, troubleshoot problems with the instrumentation, and provide calibration notes for subsequent computation of the discharge records for each station. At least once a month, the flow data shall be downloaded from the flow meters to a lap-top PC. These data shall then be transferred to a PC in T893A for computation of the discharge records using EXCEL Version 5.0.

At the D&D subbasin stations (to be determined), continuous records of pH and conductivity are required by the IA IM/IRA, DD. The ISCO flow meters can accommodate a pH probe for continuous pH record collection, however the conductivity instrumentation has not yet been selected. Surface Water Branch expects to use either Hydrolab or Campbell Scientific instrumentation to continuously log conductivity. Both the pH and conductivity meters shall be calibrated weekly, and the pH probes shall be kept wet using carboys of water located on the bank next to the station. The carboys shall be connected to instream sumps where the probes are placed. Stormwater flow will flush the sumps to allow for measurement of pH and conductivity of the runoff.

6.2.2 Types of Data

The types of data that the stations shall collect are as follows.

1. Continuous record of stream stage (later converted to discharge) on five-minute intervals.

2. Stormwater runoff sample record, indicating date and time of the collection of individual samples that are composited in the 15-Liter carboy.

3. Routine, weekly inspection notes on USGS Discharge Measurement Note forms and in log books.

4. Continuous record of pH and electrical conductivity for D&D subbasin locations.

5. After sample analyses are returned from the laboratories, data retrievals from the Rocky Flats Environmental Data System (RFEDS) shall be obtained on magnetic media for subsequent analysis and reporting. The analytical methods that shall be used for the IA IM/IRA, DD surface-water monitoring program are shown in Table 2.

Table 2. RFETS Event-Related Analyte List, Preservation and Containerization Requirements, and Laboratory Assignments.

Class of Analytes	Volume Required for Analysis	Preservative	Container	Contract Laboratory
Total Metals ICPMS	1 Liter	Nitric Acid to pH<2.0	Polyethylene	ACZ
Dissolved Metals ICPMS	1 Liter	Nitric Acid to pH<2.0	Polyethylene	ACZ
Total Radionuclides (Pu, U, Am) Alpha Spectrometry	7.5 Liters	Nitric Acid to pH<2.0	Polyethylene	TMA NORCAL
Radiation Screen	125 mL	None	Polyethylene	Weston Lionville
Water-Quality Parameters (Anions, Alkalinity, pH, TSS, TDS)	1 Liter	Chill to 4°C		Weston Gulf Coast
Nitrate/Nitrite as N Colorimetrically	500 mL	Sulfuric Acid	Polyethylene	Weston Gulf Coast
Total Phosphorous Colorimetrically	500 mL	Chill to 4°C	Polyethylene	Building 881 General Labs
Volatile Organic Analytes Method 524.2	120 mL	Chill to 4° HCl to pH<2.0	Glass, 40 mL VOA Vial	Weston Gulf Coast
Semi-Volatile Organic Analytes Method 625	2 Liters1	Chill to 4°C	Amber Glass	Weston Gulf Coast
Pesticides/PCBs CLP Method	350 mL	Chill to 4°C	Amber Glass	Weston Gulf Coast
Total Organic Carbon	120 mL	Sulfuric Acid	Amber Glass	Weston Gulf Coast

6.2.3 Records Produced

Tangible records produced from the data-collection task shall be kept by Surface Water Branch in building T893A. These records include the following items.

1. Field log books
2. USGS Discharge Measurement Note forms
3. Paper strip charts from flow meters

4. Electronic data from the flow meters on magnetic media
5. Chain of Custody forms for sample shipment/disposition
6. Sample Collection forms (RFEDS)

6.2.4 Applicable Instructions and Methods

Data collection procedures are outlined in EG&G SOPs and instrumentation manufacturer instruction manuals. The applicable EG&G SOPs are as follows.

Manual 5-21000-OPS-SW

1. SW.02 - Field Parameter Measurement
2. SW.03 - Surface Water Sampling
3. SW.04 - Discharge Measurement
4. SW.05 - Base Laboratory Work
5. SW.10 - Event-Related Surface-Water Sampling
6. SW.11 - Operation and Maintenance of Stream-Gaging and Sampling Stations

Manual 5-21000-OPS-FO

1. FO.03 - General Equipment Decontamination
2. FO.06 - Handling of Personal Protective Equipment
3. FO.07 - Handling of Decontamination Water and Wash Water
4. FO.11 - Field Communications
5. FO.13 - Containerization, Preserving, Handling, and Shipping of Soil and Water Samples
6. FO.14 - Field Data Management
7. FO.19 - Base Laboratory Work

6.2.5 Required Resources

Three qualified field personnel shall be available within Surface Water Branch to operate and maintain the monitoring stations. Two people are needed to perform routine, weekly inspection of the stations. One additional person is needed to be an alternate station inspector and to provide support for sampling events which require a significant amount of work to pull samples from the samplers and replace the samplers with clean carboys. Subcontracted personnel are required to containerize and ship samples obtained from the 15-Liter carboys and enter the sample collection information into the RFEDS sample tracking system (DATACAP).

The use of government vehicles and two-way radios will be required for routine, weekly station inspection and maintenance. Vehicles and two-way communication equipment shall be provided by the ERM OPS Division.

Equipment requirements for the data-collection task are as follows.

1. ISCO equipment supplies: desiccant cartridges, strip chart paper, fuses
2. 486 Lap-top PC with Flowlink software and interrogator cable
3. Field log books, pens, pencils, markers
4. 2, 15-Liter Nalgene carboys (with lids) per station
5. Personal protective equipment (latex gloves, steel-toe shoes, coveralls)
6. Voltage meter
7. Chain-Of-Custody forms
8. Labels / labeling tape
9. Tape measure
10. Hand level
11. 3.5-inch diskettes (magnetic media for electronic format data)
12. 486 PC with EXCEL 5.0 software and a laser printer
13. Pressurizing water sprayer
14. Deionized water
15. pH buffers and conductivity standards for meter calibration.
16. Field pH and conductivity meters.
17. Office and base laboratory space.

Many of the above items are already available, such as office and base laboratory space, computers, software, and office supplies. Only field equipment and supplies will need to be procured for this program.

6.2.6 Data Quality

Data collected for this task must be of sufficient quality to withstand scrutiny by the DOE, USEPA, and CDPHE in their evaluation of the data to make decisions about the impacts of D&D activities. The data must be scientifically defensible and consistent with sound scientific principles and standards for data collection.

The analytical methods that will be used to obtain data for chemical constituent concentration or activity are shown in Table 2. These methods imply detection limits which are of the appropriate degree of sensitivity to determine if the presence and concentration of constituents in the surface water samples are indicative of influence of D&D activities on water quality. All metals, radionuclide, and organic analyte data will be validated by an independent data validator through the EG&G Sample Management Office unless the users of the data specifically request in writing to Surface Water Branch to forego validation.

At least 10% of the chemical analysis data shall be quality control samples to ascertain reproducibility of analytical results and evaluate the potential for cross-contamination between samples collected by the automatic samplers and composited in the dedicated carboy containers. Duplicate samples shall be submitted to ascertain field and analytical reproducibility. Equipment rinseate samples will be analyzed to evaluate potential cross-contamination.

6.2.7 Work Product Objectives

The work products resulting from this task are as follows.

1. Continuous record (electronic and hard copy) of stream stage and discharge.

2. Continuous record of pH and electrical conductivity at D&D subbasin stations.

3. Calibration / inspection notes for monitoring equipment

4. Chemical analysis data for water-quality constituents (Table 2)

6.2.8 Acceptable Criteria

Surface Water Branch personnel and RPD personnel will evaluate the data to determine the reliability of the data. Criteria applicable to acceptable data collected under this task are as follows.

1. Less than 5% missing continuous record of stream stage and/or discharge, pH, and electrical conductivity.

2. Less than 5% missing calibration and inspection notes for computation of stream stage and/or discharge, pH, and electrical conductivity.

3. Analytical data should be "non-rejected" data as determined by the data validator, and hold-times form sample analysis should not be exceeded.

4. There should be no question about the meaning of recorded field notes.

6.2.9 Applicable Software

As mentioned previously, there are software requirements for the data-collection task. ISCO Flowlink, Version 2.0 will be needed for operation of the ISCO equipment. EXCEL 5.0 is needed to perform data-reduction tasks for the stream stage / discharge data. Statistical Analysis System (SAS) software also is required to work with the chemical analysis data obtained from RFEDS.

6.3 Data Analysis and Reporting

6.3.1 Task Description

The data analysis and reporting task involves data compilation, evaluation, and reporting of the data collected in the data collection task. This task is completed in the office on personal computers. The data will be evaluated for quality assurance and consistency, and then characteristics of the data will be statistically quantified using SAS. The statistical analysis results

shall be published in a report by Surface Water Branch, and the report shall be submitted to the RPD project manager approximately 20 months after commencement of the monitoring activities. This schedule is consistent with the requirements of the IA IM/IRA, DD. An expedited D&D schedule shall force earlier publication of a report to accommodate commencement of D&D.

Currently (11/94) the format of the data reports has not been determined. There are several ways in which the data may be reported. The IA IM/IRA, DD requires specific tasks for computing warning and action concentrations or activities for individual chemical constituents. This will require performing statistical analysis of the data collected for each chemical constituent at each monitoring location to determine characteristics of the distribution of the chemical constituent data. The mean and standard deviation of the data distributions for chemical constituents will be used to arrive at warning and action limits for water discharged from D&D areas, where one standard deviation from the mean will be a warning limit and two standard deviations from the mean will be an action limit.

6.3.2 Types of Data

A description of the data collected for this task can be found in section 6.2.2 of this technical design document. These data will be the subject of interpretive reports that will be written by Surface Water Branch and delivered to RPD. The report(s) shall at least contain the following material.

1. Continuous record of daily mean discharge for each station

2. Continuous record of daily mean pH and electrical conductivity for each D&D subbasin station

3. Summary statistics for each chemical constituent, including computation of warning and action limits for each station.

4. Summary of significant findings and conclusions drawn from evaluation of the data.

6.3.3 Records Produced

The records produced for this task include reports containing the items listed in section 6.2.2 of this report. Letters of transmittal of the reports to RPD also are records produced by this task.

6.3.4 Applicable Instructions and Methods

There are not citeable materials that proceduralize or otherwise document instructions or methods for this task.

6.3.5 Required Resources

At least one Environmental Engineer or Environmental Scientist is required to produce the required reports for this activity. A 486 PC equipped with SAS, EXCEL 5.0, and a word processor (e.g. Microsoft Word) is needed for this task.

6.3.6 Data Quality

Data quality will be evaluated as part of the data analysis and reporting task. Duplicate chemical analysis data will be compared to determine reproducibility of analytical results. Equipment rinseate samples will be examined to determine whether or not cross-contamination from automatic sampling equipment is occurring. Cation / anion balancing will be done to ascertain the quality of metals analyses and anion analyses. Examination of the data for outlier data values will also be done using box and whisker plots.

The stream discharge data will be evaluated to provide descriptive qualification of the discharge record quality. For example, if flow-control device leakage is observed, an estimation of the relative quantity of flow not measured will be provided.

6.3.7 Work Product Objectives

The work products for this task are reports that summarize the data and provide warning and action limits for D&D. The report(s) shall at least contain the following material.

1. Continuous record of daily mean discharge for each station

2. Continuous record of daily mean pH and electrical conductivity for each D&D subbasin station

3. Summary statistics for each chemical constituent, including computation of warning and action limits for each station.

4. Summary of significant findings and conclusions drawn from evaluation of the data.

6.3.8 Acceptable Criteria

The reports shall be scientifically defensible, understandable to a non-technical audience, and have a professional appearance. The reports shall contain all available data. The reports shall be prepared in a timely fashion so as to meet IM/IRA, DD schedules and/or future D&D schedules.

6.3.9 Applicable Software

As mentioned earlier, a 486 PC equipped with SAS, EXCEL 5.0, and a word processor (e.g. Microsoft Word) is needed for this task.

7. ENVIRONMENTAL SAFETY AND HEALTH COMPLIANCE

Compliance with either an existing or new Health and Safety Plan will be required to perform the work in the field. An appropriate existing Health and Safety Plan currently (11/94) has not been identified. However, several existing Health and Safety Plans cover similar work at RFETS, including a plan that the USGS uses for their stream gaging work at RFETS. An existing plan will be modified to suit IA IM/IRA needs if an existing plan doesn't already accommodate those needs.

8. SCHEDULE

The schedule of tasks/activities for this program are shown in a Gantt chart in Figure 4 and in a PERT chart in Figure 5. Implementation of the IA IM/IRA, DD surface-water monitoring requirements began on October 3, 1994. The current (11/94) schedule for installation of the monitoring stations calls for completion of all installations by March 15, 1995. This early completion date is desired to facilitate spring record collection at stations that rarely flow at any other time of the year. Commencement of monitoring is scheduled for March 30, 1995. This schedule is somewhat tentative because at the time of this writing, the IA IM/IRA, DD is not yet approved by the regulatory agencies.

9. FUNDING

Funding for this program comes from two sources within the RPD and Surface Water Branch organizations. Work Package number 12196 is funded by Budget and Reporting Code (B&R Code) EW2010302 by DOE Environmental Restoration. Work Package 12196 funds the installation of the monitoring stations, including procurement of all equipment. Work Package number 61207 is funded by B&R Code EW7030000 by DOE Transition Management. Work Package 61207 will ultimately take over the responsibility for the operation and maintenance of the monitoring stations as an activity for the transition of the RFETS facility to a D&D mode of operation. Fiscal Year 1995 funding for the program is approximately $500,000.

10. REFERENCES

EG&G, 1994a, "Industrial Area Interim Measure / Interim Remedial Action Decision Document," EG&G Rocky Flats, Inc., Rocky Flats Environmental Technology Site, Golden, Colorado, Section 5.

EG&G, 1992, "Rocky Flats Plant Drainage and Flood Control Master Plan, Woman Creek, Walnut Creek, Upper Big Dry Creek, and Rock Creek, " EG&G Rocky Flats, Inc., Rocky Flats Plant, Golden, Colorado, Section VII.

EG&G, 1991, "Quality Assurance Program Planning," EG&G manual number 1-50000-ADM-02.01, EG&G Rocky Flats, Inc., Rocky Flats Plant, Golden, Colorado.

Figure 4. Industrial Area IM/IRA Surface Water Monitoring Program Schedule: Gantt Chart.

Industrial Area Interim Measure / Interim Remedial Action Surface Water Monitoring Program Schedule

ID	Name	Duration
1	Evaluate Equipment Needs	25d
2	Complete Draft Work Plan	30d
3	Deliver Procurement Packages	14d
4	Submit Land Use/Excavation Re	5d
5	Complete NEPA Ck List	5d
6	Coordinate T&E Migr. Birds, Etc.	5d
7	Install ISCO Samplers at Tier I S	4d
8	Install flow-control devices	20d
9	Instrument flow-cntrl devices	16d
10	Complete Station Installations	0d
11	Commence Monitoring at Statio	0d

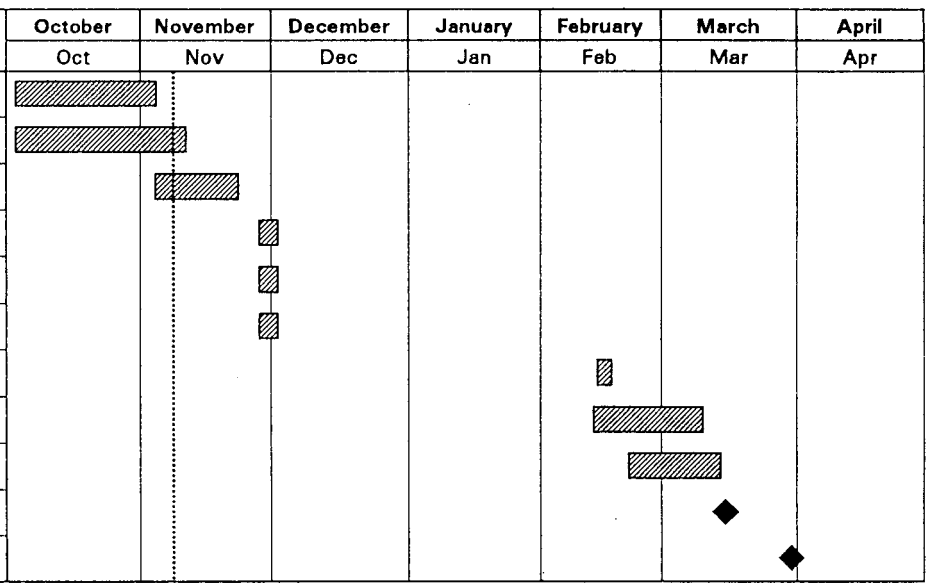
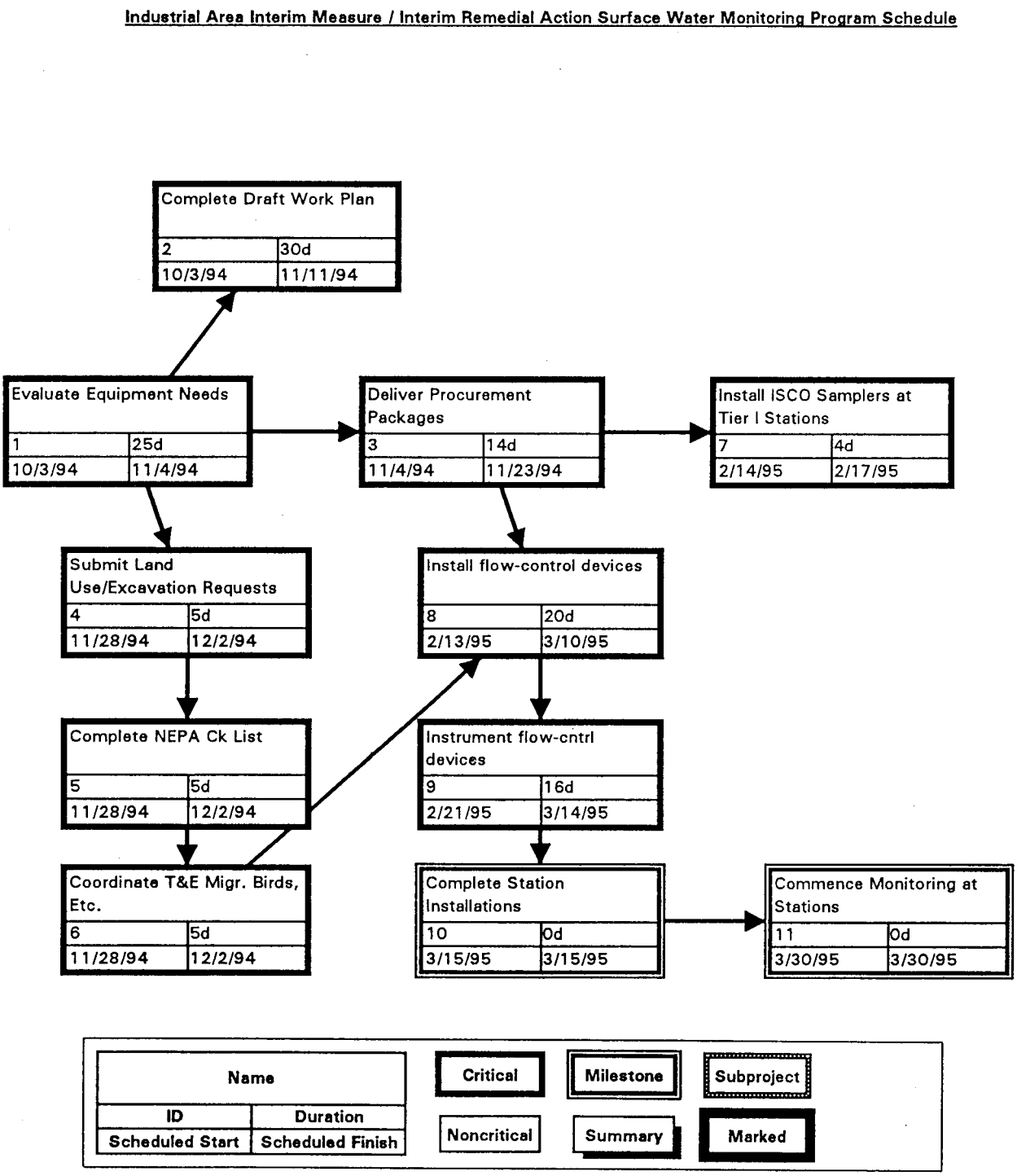


Figure 5. Industrial Area IM/IRA Surface Water Monitoring Program Schedule: PERT Chart.



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