INDUSTRIAL AREA IM/IRA SURFACE WATER MONITORING

MONTHLY STATUS REPORT

December 1994

U.S. DEPARTMENT OF ENERGY

Rocky Flats Plant

Golden, Colorado

ENVIRONMENTAL PROTECTION MANAGEMENT DEPARTMENT

SURFACE WATER

01/25/95

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1. INTRODUCTION

The Interim Measure/Interim Remedial Action/Decision Document (IM/IRA/DD) for the Industrial Area at the Rocky Flats Environmental Technology Site (RFETS) was prepared in accordance with the Rocky Flats Plant Interagency Agreement (IAG), dated January 22, 1991, and applicable regulatory guidance documents. The objective of the Industrial Area IM/IRA/DD is to ensure that environmental monitoring is adequate to support decontamination and decommisioning (D&D) and other nonroutine activities within the Industrial Area at RFETS. To achieve this objective, a monitoring safety net approach is used around the RFETS Industrial Area to monitor for, protect against, and respond to any actual or potential contaminant releases.

The following elements relating to surface water monitoring are detailed in the IM/IRA/DD:

- Surface water monitoring in areas of concern, which previously focused on the terminal ponds (and other sites in the Buffer Zone), will be expanded to include the Industrial Area.

- Surface water quality and hydraulic flow conditions will be studied in the Industrial Area to establish baseline conditions.

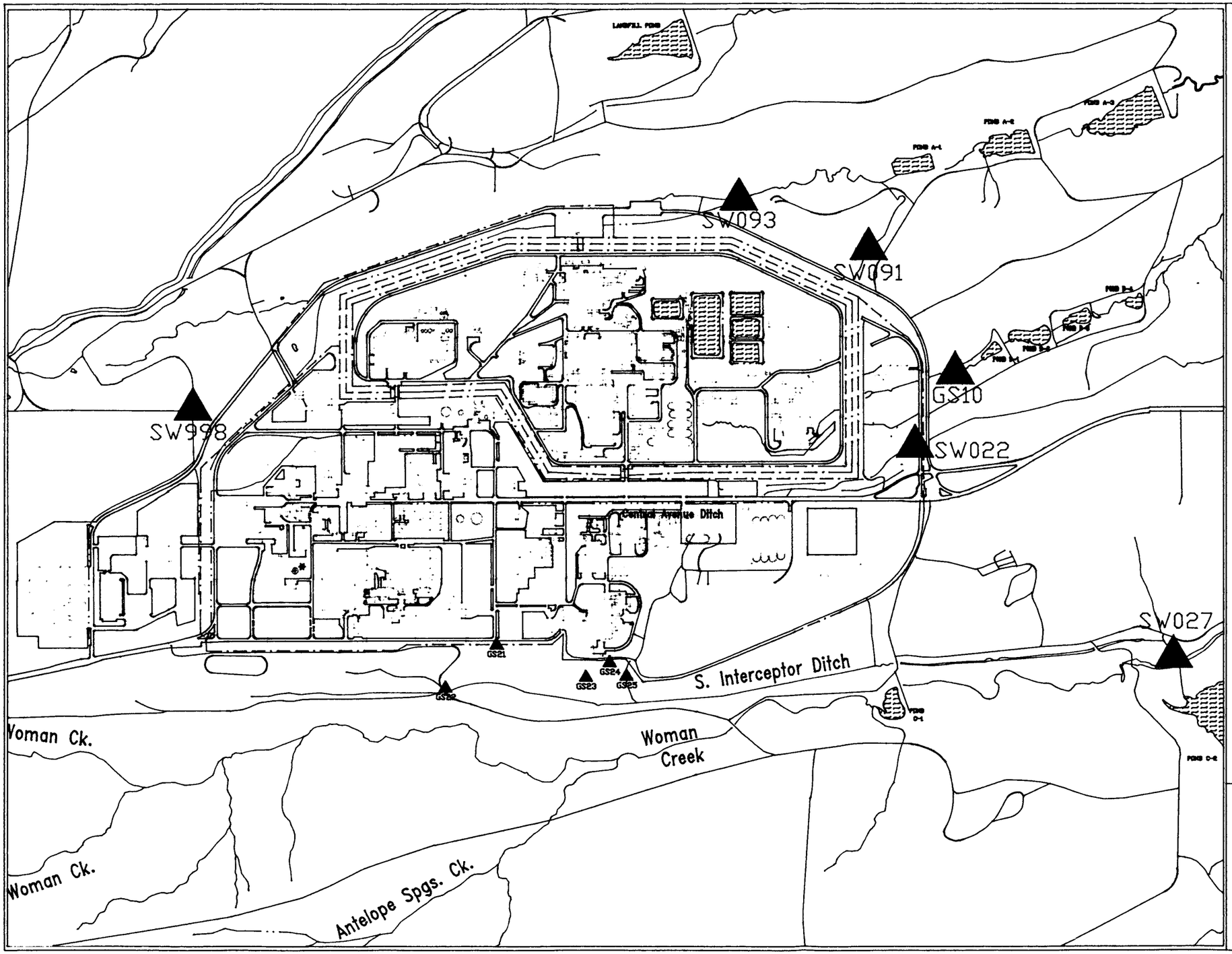
- Monitoring systems for air and surface water use state-of-the-art technologies to accomplish plant transition monitoring objectives. Technical improvements for monitoring building D&D activities will be reviewed regularly in an attempt to improve air and surface water monitoring capabilities.

- Verification monitoring for D&D activities is the second and outer layer of environmental surveillance that will verify that D&D contaminant pathway protection procedures and site-specific monitoring activities are effective.

- The type and extent of verification monitoring will depend on the type of D&D activity being performed and the assessed environmental hazard associated with that activity.

- A statistically based methodology has been identified to develop site-specific baseline conditions for environmental media at D&D activity locations and to determine when pre-programmed response actions are needed.

EG&G, Environmental Protection Department, Surface Water is responsible for the implementation of surface water monitoring activities required by the Industrial Area IM/IRA/DD. The report contained herein provides a monthly summary of the highlights and analytical results of this activity for the month of December 1994. Figure 1-1 shows the location surface water monitoring sites discussed in this report. Figure 1-2 shows the Industrial Area subbasins and hydrologic routing.



LEGEND

- Gaging and Sampling Station
- Streams, Ditches, Drainage Features
- Security Fences
- Paved Roads
- Dirt Roads
- Buildings

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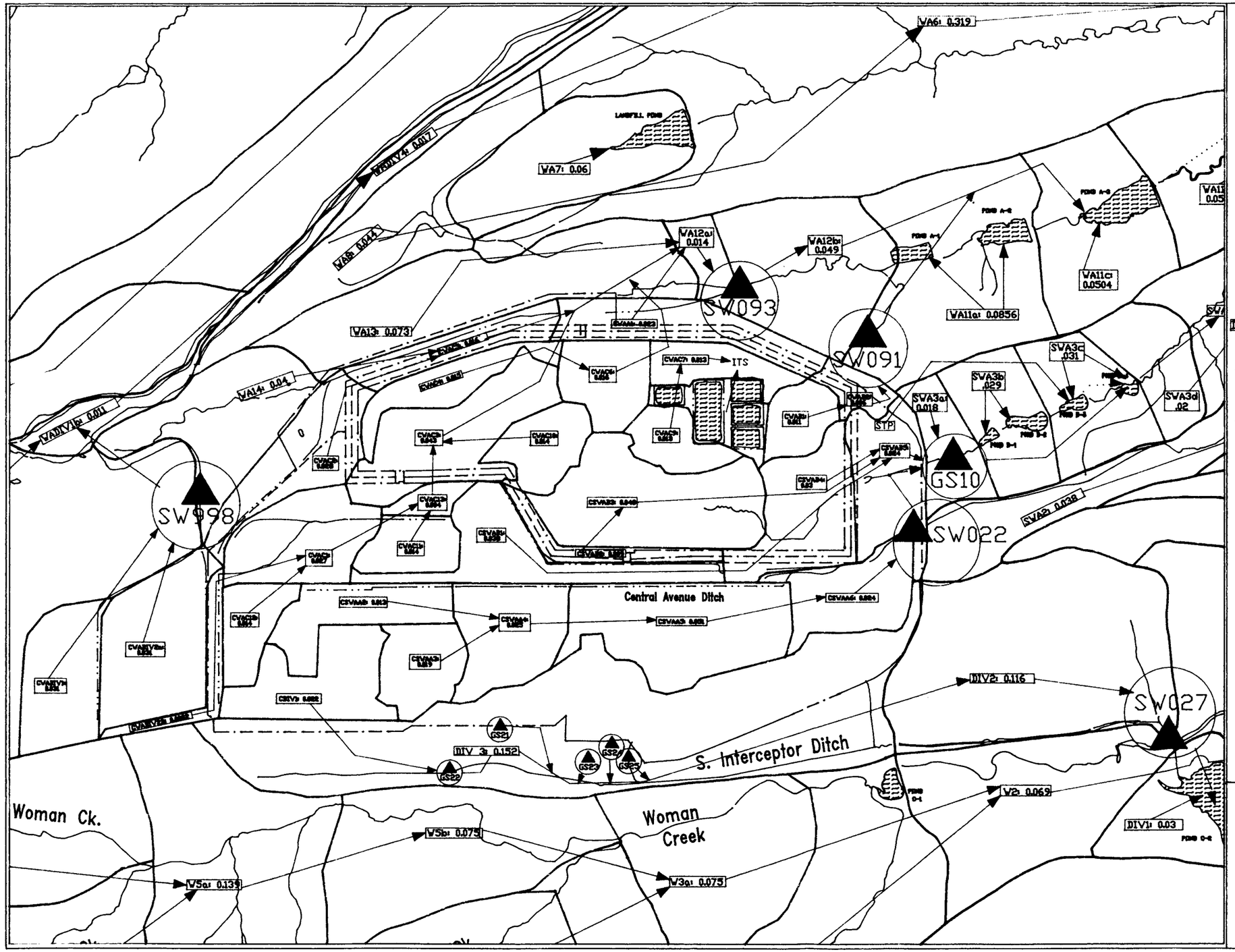
Figure 1-1

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



LEGEND

- Gaging and Sampling Station
- Streams, Ditches, Drainage Features
- Security Fences
- Basin Boundaries
- ID: AREA Basin Areas (sq. mi.)
- Natural Discharge
- Controlled Transfers and Discharges

Figure 1-2

RFETS
Industrial Area IM/IRA
Gaging Station Network:
Surface Water
Routing Diagram

2. HIGHLIGHTS

The following activities occurred during the period from October 1, 1994 to December 31, 1994:

- Determination of currently required monitoring locations was completed. The locations of Tier I and Tier II monitoring sites shown in Figure 1-1 were selected to satisfy IM/IRA/DD requirements and current/planned D&D activities.

- Determination of equipment requirements for all currently scheduled sites was completed.

- Procurement process for all monitoring equipment was initiated in an effort to meet scheduled field deployment by March 15, 1995.

- Up-front planning and managerial activities were completed to facilitate operation of the IA IM/IRA Surface Water Monitoring Network by March 15, 1995. This activity included procurement of miscellaneous supplies, identification of project objectives, creation of report templates to satisfy reporting requirements, identification of personnel requirements, and the identification, detailing, and scheduling of field activities. These activities culminated in the completion of the Industrial Area IM/IRA Surface Water Monitoring Technical Design Document.

- Ecological impacts for projected flow control devices (flumes, weirs, etc) were assessed with the cooperation of EG&G Ecology and Watershed Management.

- A soil disturbance permit was granted for the installation of a flume at gaging station SW022. A 9½" Parshall flume was subsequently installed on December 22, 1994. Instrumentation is scheduled as soon as equipment arrives.

- A soil disturbance permit was submitted for a flume installation at gaging station SW091, and the permit was subsequently waived by Bob Laborde (Construction Management). Coordination with Lee Harsten (EOM) is continuing for SW091 flume installation.

3. DATA SUMMARY

3.1 Tier 1: Industrial Area Outfalls

The objective of the Tier I Industrial Area gaging stations is to monitor and characterize surface water leaving the Industrial Area and determine if D&D activities have impacted surface water. These gaging stations monitor six (6) of the seven (7) major pathways discussed in the Industrial Area IM/IRA/DD.

3.1.1 Gaging Station GS10

Location:

- 39° 53' 35.11"N 105° 11' 26.6"W
- South Walnut Creek, above the Pond B-1 Bypass; co-located with SW023

Drainage Characteristics:

- Pathway 2
- Total and Effective Area: 0.281 $mi.^2$ = 179.8 ac (approximately 78% impervious)
- Sub-basins: CSWAB1, CSWAB2, CSWAB3, CSWAB4, CSWAB5, CSWAA2, CSWAA3, CSWAA4, CSWAA5, CSWAA6 (Figure 1-2)
- Description: GS10 lies on South Walnut Creek just above the B-1 Bypass. The basin consists of the central and southern area of the Industrial Area (total of 140ac 100% impervious).
- Areas draining to this site: 900, 800, 700, 600, 500, 400, 300, 100

Hardware Configuration:

- Primary Device: 9½" Parshall flume
- Flow Meter: ISCO® Model 3230 (bubbler)
- Sampler: ISCO® Model 3700 Portable
- Radio Telemetry: No
- Power: DC solar power system
- Water Quality Parameters: None

Discharge Data

Table 3-1. GS10 Mean Daily Discharge Data

Date	Mean CFS	Min. CFS	Max. CFS	Discharge
12/1/94	0.033	0.025	0.064	2844
12/2/94	0.028	0.023	0.033	2434
12/3/94	0.028	0.024	0.054	2407
12/4/94	0.026	0.022	0.032	2252
12/5/94	0.027	0.022	0.046	2297
12/6/94	0.036	0.022	0.115	3086
12/7/94	0.025	0.023	0.035	2141
12/8/94	BD	BD	BD	BD
12/9/94	BD	BD	BD	BD
12/10/94	BD	BD	BD	BD
12/11/94	0.015	0.012	0.023	1272
12/12/94	*0.013*	*0.009*	*0.014*	*1094*
12/13/94	0.013	0.009	0.018	1122
12/14/94	0.012	0.009	0.017	1075
12/15/94	*0.011*	*0.008*	*0.018*	*953*
12/16/94	0.019	0.008	0.033	1646
12/17/94	0.022	0.014	0.027	1909
12/18/94	0.024	0.017	0.031	2090
12/19/94	0.027	0.021	0.072	2321
12/20/94	0.030	0.009	0.131	2599
12/21/94	0.014	0.012	0.018	1243
12/22/94	BD	BD	BD	BD
12/23/94	BD	BD	BD	BD
12/24/94	BD	BD	BD	BD
12/25/94	BD	BD	BD	BD
12/26/94	BD	BD	BD	BD
12/27/94	BD	BD	BD	BD
12/28/94	BD	BD	BD	BD
12/29/94	BD	BD	BD	BD
12/30/94	BD	BD	BD	BD
12/31/94	BD	BD	BD	BD
Monthly Values				
Mean	0.022	0.016	0.043	1932
Min.	0.011	0.008	0.014	953
Max.	0.036	0.025	0.131	3086

Total Discharge: 34785 Cubic Feet
Partial Month

KEY: BD = bad data; *italics* = estimated data from field observations and discharge record at adjacent gages

Bad data can be attributed to equipment failures and winter freezing conditions.

Figure 3-1. GS10 Monthly Discharge

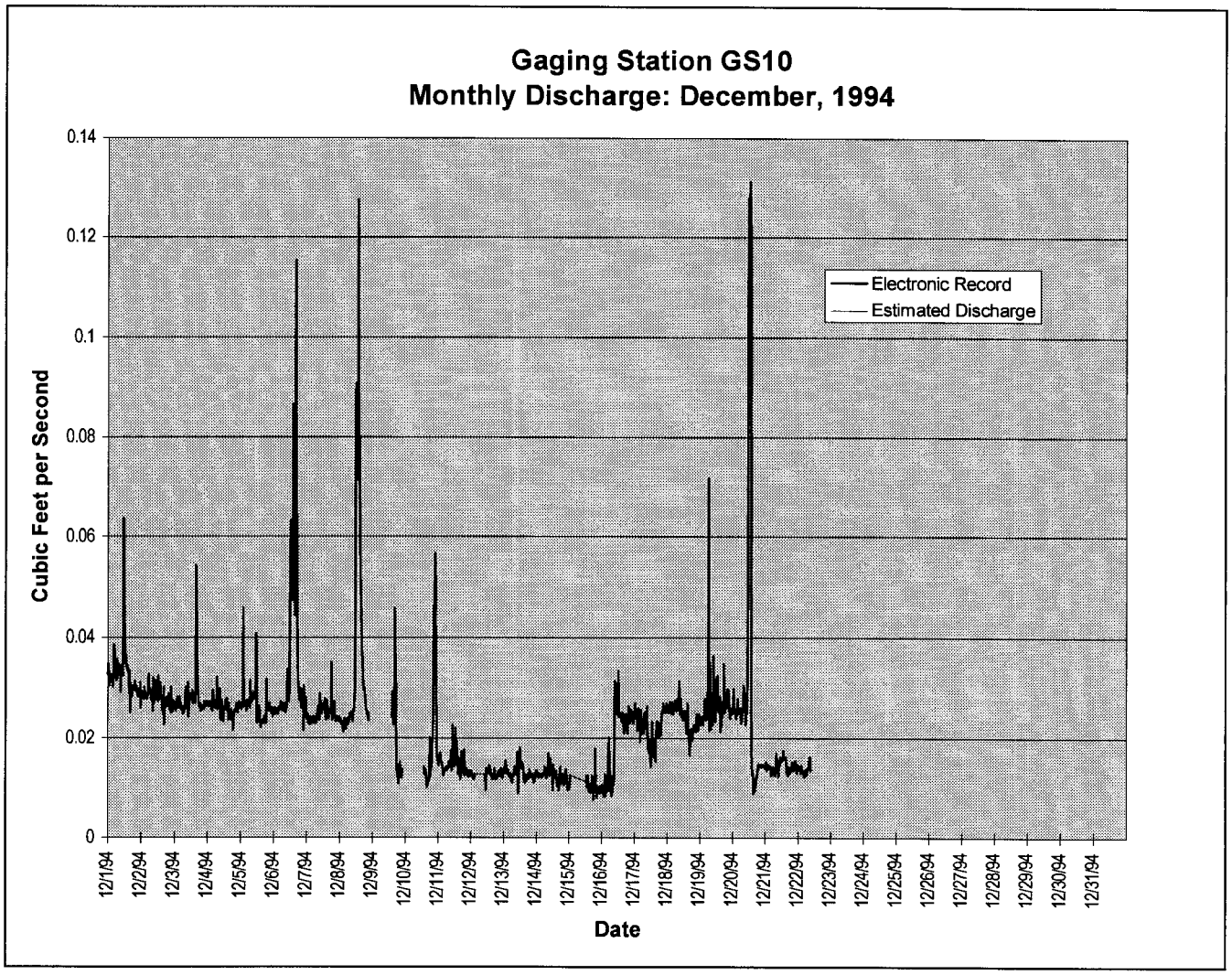
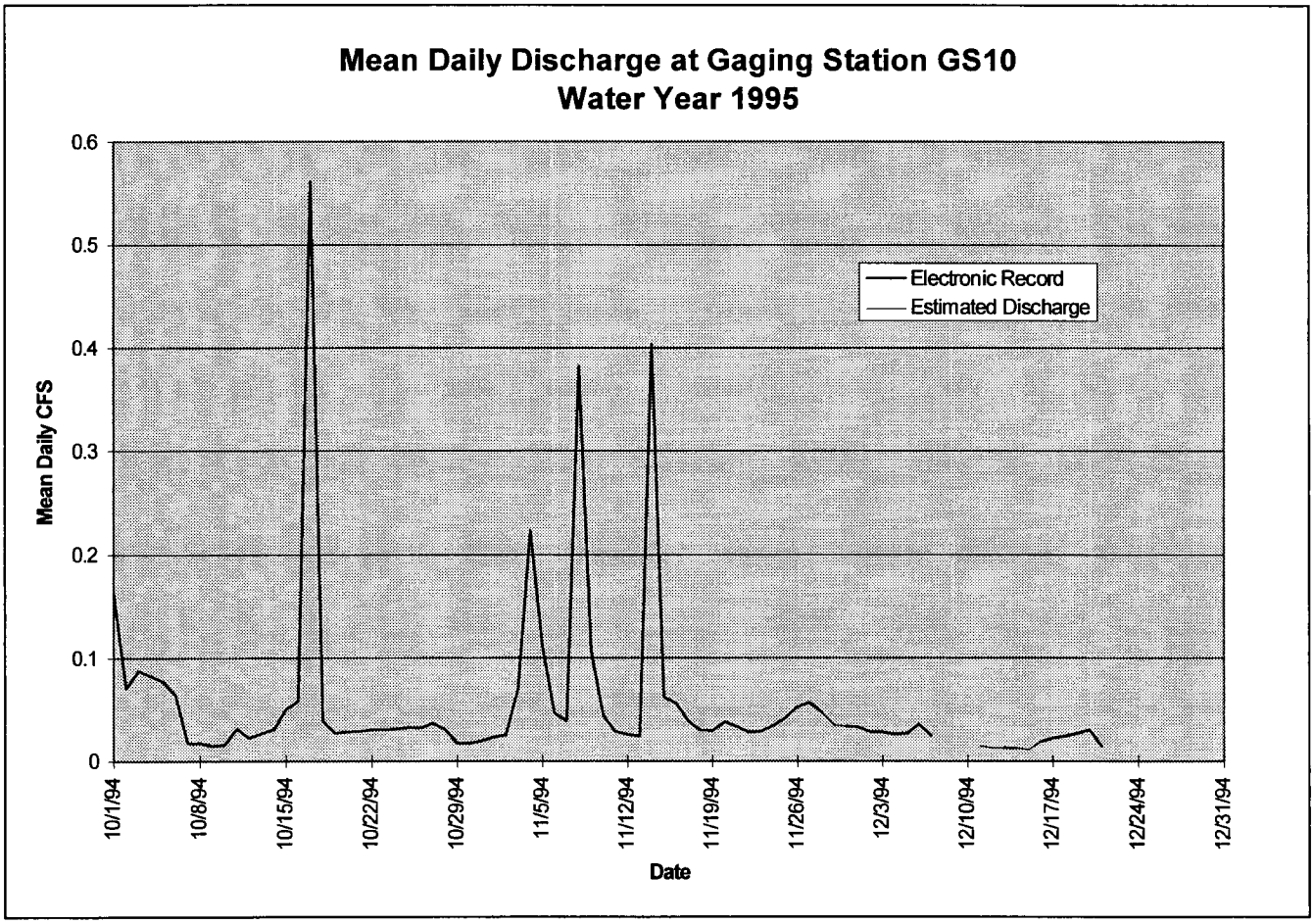


Figure 3-2. GS10 Mean Daily Discharge, Water Year 1995



Analytical Results

No analytical results received to date.

3.1.2 Gaging Station SW022

Location:

- State Plane Coordinates: 2086443; 749758
- Central Avenue Ditch at the splitter box near T903A, Inner East Gate

Drainage Characteristics:

- Pathway 1
- Total and Effective Area: 0.132 $mi.^2$ = 84.5 ac (approximately 75% impervious)
- Sub-basins: CSWAA2, CSWAA3, CSWAA4, CSWAA5, CSWAA6 (Figure 1-2)
- Description: SW022 lies on the Central Avenue Ditch at the splitter box near T903A, Inner East Gate. The basin consists of the southern area of the Industrial Area.
- Areas draining to this site: 900, 800, 600, 400, 300, 100

Hardware Configuration:

- Primary Device: 9 ½" Parshall flume
- Flow Meter: Not yet instrumented
- Sampler: Not yet instrumented
- Radio Telemetry: No
- Power: Not yet instrumented
- Water Quality Parameters: None

Discharge Data

No record to date.

Analytical Results

No samples to date.

3.1.3 Gaging Station SW027

Location:

- 39° 53' 11.5"N 105° 11' 4.3"W
- SID Culvert Number 4; outlet of SID to Pond C-2 prior to crossing under Woman Creek

Drainage Characteristics:

- Pathway 5
- Area: 0.29 $mi.^2$ = 185.6 ac (approximately 15% impervious)
- Sub-basins: DIV2, DIV3, CDIV1 (Figure 1-2)
- Description: SW027 lies on the South Interceptor Ditch at the upstream end of dual 66" cmps which convey SID water under Woman Creek and into Pond C-2. The basin consists of the sloping, vegetated area immediately south of the Industrial Area. This basin receives Industrial Area runoff primarily from the 800 and 400 Areas.

Hardware Configuration:

- Primary Device: Dual 66" Parallel cmps
- Flow Meter: ISCO® Model 3230 (bubbler)
- Sampler: ISCO® Model 3700 Portable
- Radio Telemetry: No
- Power: DC solar power system
- Water Quality Parameters: None

Discharge Data

Stage only is provided for SW027 due to an inability to accurately rate the dual 66" cmps at this site.

Table 3-2. SW027 Mean Daily Stage Data

Date	Mean Feet	Min. Feet	Max. Feet
12/1/94	*0.000*	*0.000*	*0.000*
12/2/94	*0.000*	*0.000*	*0.000*
12/3/94	*0.000*	*0.000*	*0.000*
12/4/94	*0.000*	*0.000*	*0.000*
12/5/94	*0.000*	*0.000*	*0.000*
12/6/94	BD	BD	BD
12/7/94	BD	BD	BD
12/8/94	BD	BD	BD
12/9/94	BD	BD	BD
12/10/94	BD	BD	BD
12/11/94	BD	BD	BD
12/12/94	BD	BD	BD
12/13/94	*0.000*	*0.000*	*0.000*
12/14/94	*0.000*	*0.000*	*0.000*
12/15/94	*0.000*	*0.000*	*0.000*
12/16/94	*0.000*	*0.000*	*0.000*
12/17/94	*0.000*	*0.000*	*0.000*
12/18/94	*0.000*	*0.000*	*0.000*
12/19/94	*0.000*	*0.000*	*0.000*
12/20/94	*0.000*	*0.000*	*0.000*
12/21/94	*0.000*	*0.000*	*0.000*
12/22/94	*0.000*	*0.000*	*0.000*
12/23/94	*0.000*	*0.000*	*0.000*
12/24/94	*0.000*	*0.000*	*0.000*
12/25/94	*0.000*	*0.000*	*0.000*
12/26/94	*0.000*	*0.000*	*0.000*
12/27/94	*0.000*	*0.000*	*0.000*
12/28/94	*0.000*	*0.000*	*0.000*
12/29/94	*0.000*	*0.000*	*0.000*
12/30/94	BD	BD	BD
12/31/94	BD	BD	BD
Monthly Values			
Mean	0.000	0.000	0.000
Min.	0.000	0.000	0.000
Max.	0.000	0.000	0.000

KEY: BD = bad data; *italics* = estimated data from field observations and discharge record at adjacent gages

Bad data can be attributed to equipment failures and winter freezing conditions.

Figure 3-3. SW027 Monthly Stage

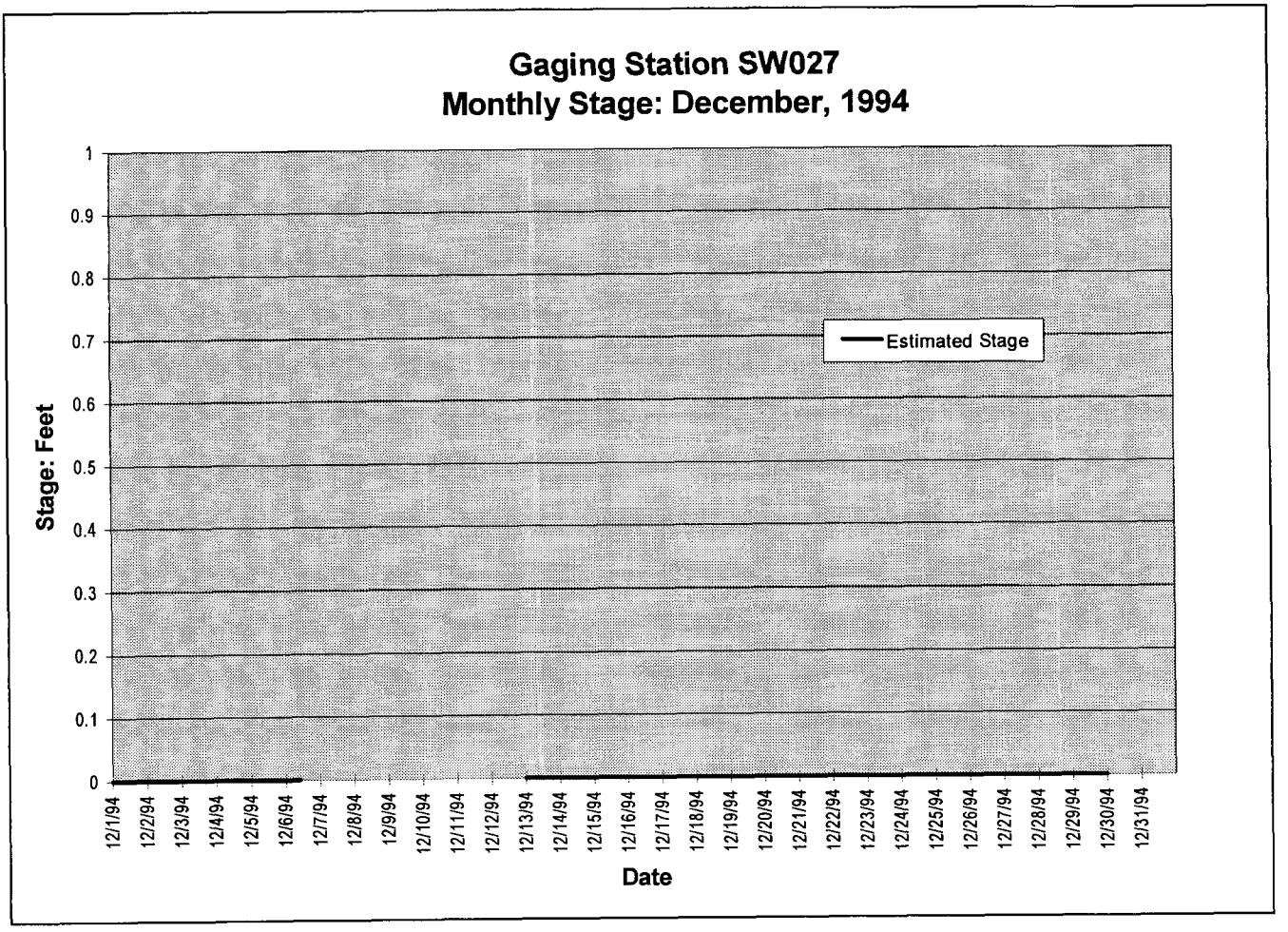
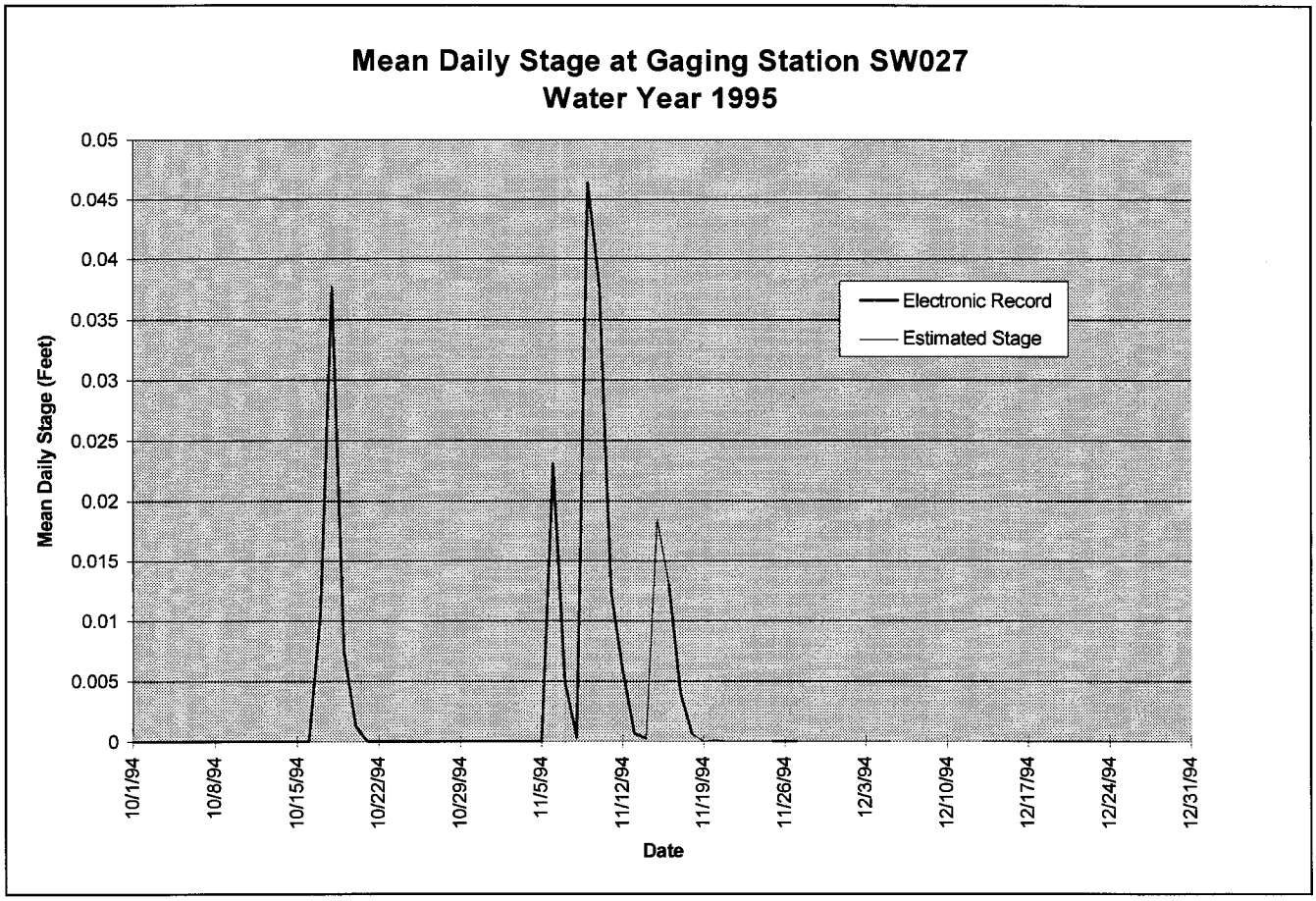


Figure 3-4. SW027 Mean Daily Stage, Water Year 1995



Analytical Results

No analytical results received to date.

3.1.4 Gaging Station SW091

Location:

- State Plane Coordinates: 2086064; 751322
- small tributary of North Walnut Creek, which drains the northeast corner of Industrial Area near the Solar Ponds

Drainage Characteristics:

- Pathway 6
- Area: 0.019 $mi.^2$ = 12.2 ac (approximately 45% impervious)
- Sub-basins: CWAB1, CWAB2, portion of WA11 (Figure 1-2)
- Description: SW091 lies on a small tributary of North Walnut Creek, which drains the northeast corner of Industrial Area near the Solar Ponds. The basin consists of 10.9 acres of the Industrial Area. This basin receives Industrial Area runoff primarily from the open area immediately east of the Solar Ponds.

Hardware Configuration:

- Primary Device: Not yet equipped
- Flow Meter: Not yet instrumented
- Sampler: Not yet instrumented
- Radio Telemetry: Not yet instrumented
- Power: Not yet instrumented
- Water Quality Parameters: Not yet instrumented

Discharge Data

No record to date.

Analytical Results

No samples to date.

3.1.5 Gaging Station SW093

Location:

- State Plane Coordinates: 2085009; 751710
- North Walnut Creek below 6' cmp draining Industrial Area; directly north of Solar Pond C

Drainage Characteristics:

- Pathway 3
- Area: 0.362 $mi.^2$ = 231.7 ac (approximately 46% impervious)
- Sub-basins: WA12a, WA13, WA14, CWAA1, CWAC6, CWAC5, CWAC2, CWAC4, CWAC3, CWAC10, CWAC13, CWAC11, CWAC1, CWAC12, CWADIV2b (Figure 1-2)
- Description: SW093 lies on North Walnut Creek, which drains the north and northwest areas of Industrial Area. The basin consists of 150.4 acres of the Industrial Area. This basin receives Industrial Area runoff from the 700, 500, 300, and 100 Areas.

Hardware Configuration:

- Primary Device: 36" Parshall Flume w/ a 36" Rectangular Weir
- Flow Meter: ISCO® Model 3230 (bubbler)
- Sampler: ISCO® Model 3700 Portable
- Radio Telemetry: Yes
- Power: DC solar power system
- Water Quality Parameters: None

Discharge Data

Table 3-3. SW093 Mean Daily Discharge Data

Date	Mean CFS	Min. CFS	Max. CFS	Discharge
12/1/94	0.051	0.037	0.065	4397
12/2/94	0.045	0.034	0.058	3886
12/3/94	0.042	0.032	0.053	3617
12/4/94	BD	BD	BD	BD
12/5/94	BD	BD	BD	BD
12/6/94	BD	BD	BD	BD
12/7/94	BD	BD	BD	BD
12/8/94	BD	BD	BD	BD
12/9/94	BD	BD	BD	BD
12/10/94	BD	BD	BD	BD
12/11/94	BD	BD	BD	BD
12/12/94	BD	BD	BD	BD
12/13/94	BD	BD	BD	BD
12/14/94	BD	BD	BD	BD
12/15/94	BD	BD	BD	BD
12/16/94	BD	BD	BD	BD
12/17/94	BD	BD	BD	BD
12/18/94	BD	BD	BD	BD
12/19/94	BD	BD	BD	BD
12/20/94	BD	BD	BD	BD
12/21/94	0.012	0.003	0.036	998
12/22/94	BD	BD	BD	BD
12/23/94	BD	BD	BD	BD
12/24/94	BD	BD	BD	BD
12/25/94	BD	BD	BD	BD
12/26/94	BD	BD	BD	BD
12/27/94	BD	BD	BD	BD
12/28/94	BD	BD	BD	BD
12/29/94	BD	BD	BD	BD
12/30/94	BD	BD	BD	BD
12/31/94	BD	BD	BD	BD
Monthly Values				
Mean	0.037	0.027	0.053	3225
Min.	0.012	0.003	0.036	998
Max.	0.051	0.037	0.065	4397

Total Discharge: 12898 Cubic Feet
Partial Month

KEY: BD = bad data; *italics* = estimated data from field observations and discharge record at adjacent gages

Bad data can be attributed to equipment failures and winter freezing conditions.

Figure 3-5. SW093 Monthly Discharge

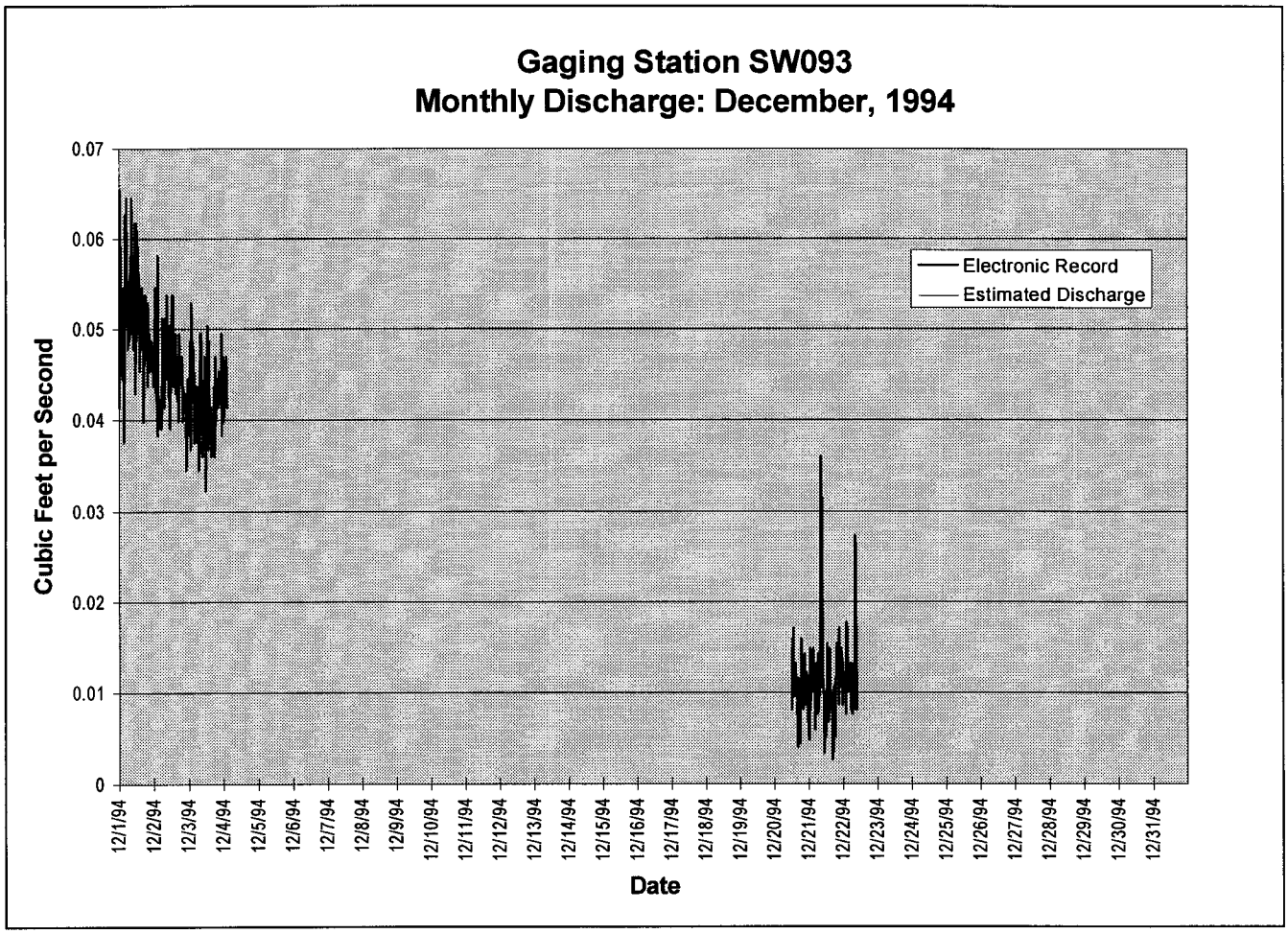
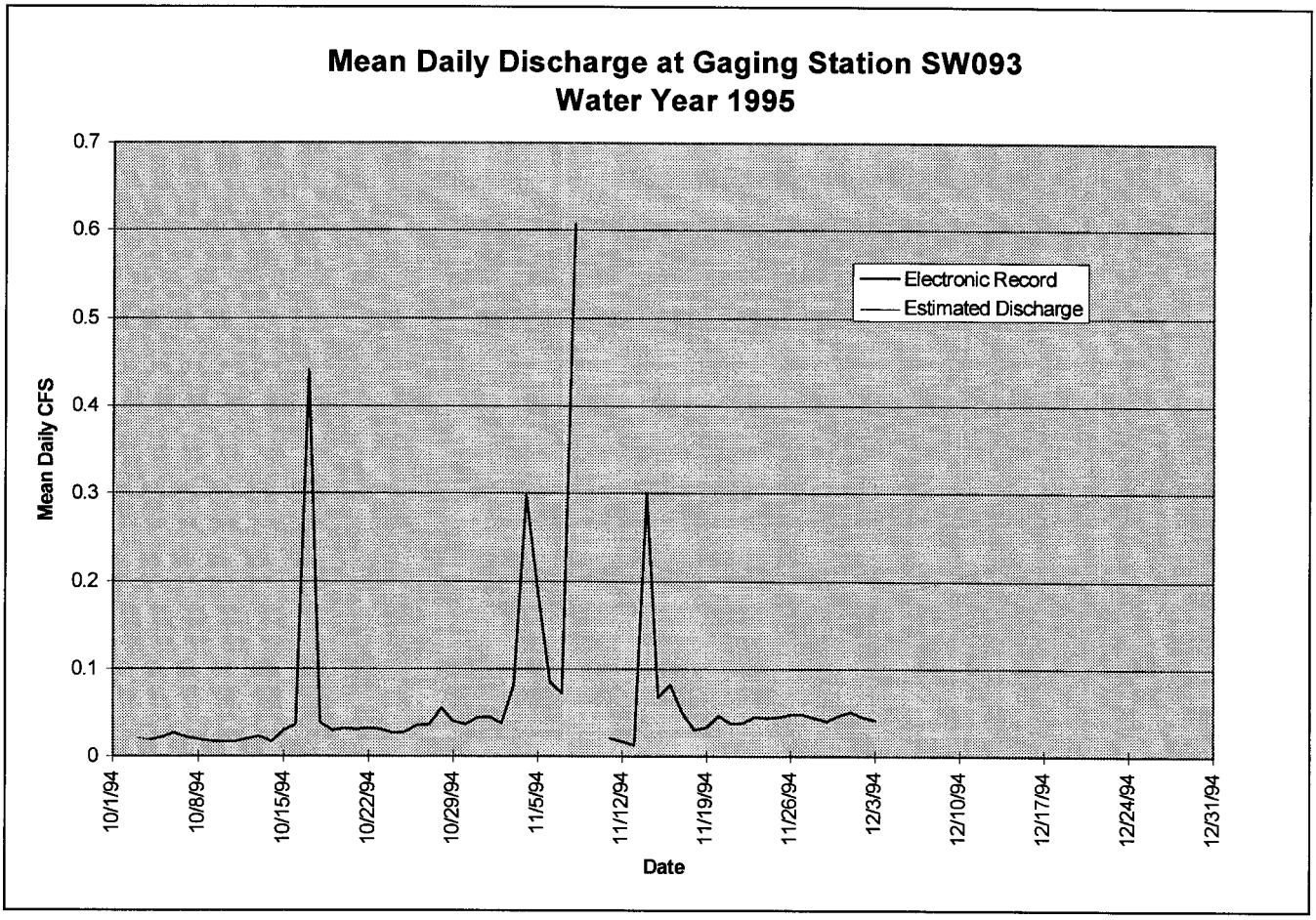


Figure 3-6. SW093 Mean Daily Discharge, Water Year 1995



Analytical Results

No analytical results received to date.

3.1.6 Gaging Station SW998

Location:

- State Plane Coordinates: 2080608; 749863
- West Diversion Ditch north of 130 buildings

Drainage Characteristics:

- Pathway 4
- Area: 0.069 $mi.^2$ = 44.2 ac (approximately 90% impervious)
- Sub-basins: CWADIV1, CWADIV2a (Figure 1-2)
- Description: SW998 lies on the West Diversion Ditch north of 130 area. This basin receives Industrial Area runoff from the 130 areas only.

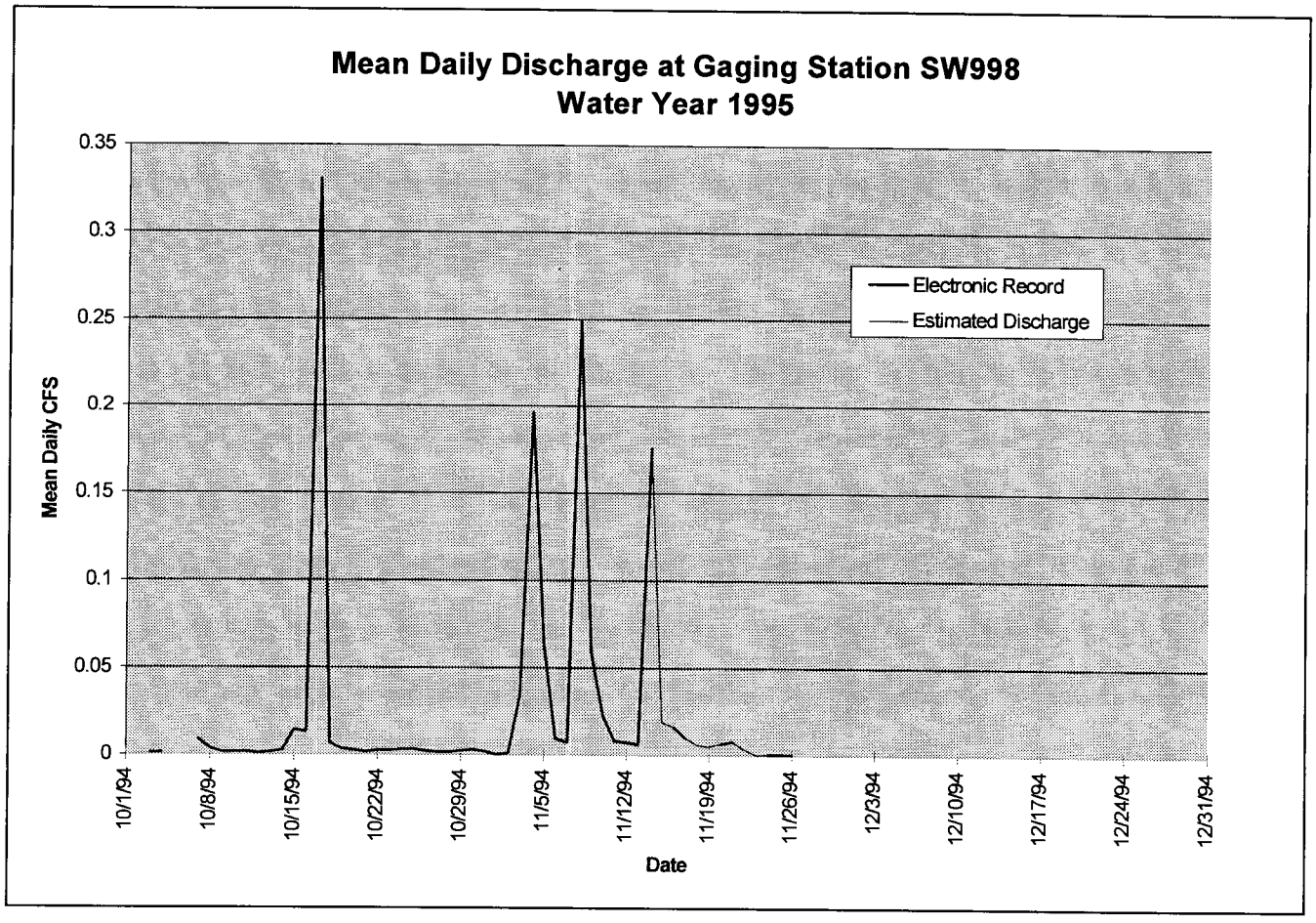
Hardware Configuration:

- Primary Device: 9.5" Parshall Flume
- Flow Meter: ISCO® Model 3230 (bubbler)
- Sampler: ISCO® Model 3700 Portable
- Radio Telemetry: No
- Power: AC line power
- Water Quality Parameters: None

Discharge Data

No discharge data for SW998 for December 1994 due to winter icing conditions.

Figure 3-7. SW998 Mean Daily Discharge, Water Year 1995



Analytical Results

No analytical results received to date.

3.2 Tier II: D&D Subbasin Outfalls

The objective of the Tier II Industrial Area gaging stations is to monitor surface water at the outlet of the subbasins where D&D activities are located. This tier provides a more detailed monitoring approach to identify potential releases and to evaluate the effectiveness of the engineering controls being employed at the specific D&D location.

3.2.1 Gaging Station GS21

Location:

- State Plane Coordinates: 2083061; 748147
- concrete spillway near intersection of Seventh St. and Cactus Avenue

Drainage Characteristics:

- Pathway 5
- Buildings: T664A, 664
- Sub-basins: DIV3 (Figure 1-2)
- Description: GS21 lies on the concrete spillway near intersection of Seventh St. and Cactus Avenue, at the southwest corner of the 850 parking lot. This basin receives Industrial Area runoff principally from the roads, parking lots and storage area south of Building 664.

Hardware Configuration:

- Primary Device: Not yet equipped
- Flow Meter: Not yet instrumented
- Sampler: Not yet instrumented
- Radio Telemetry: No
- Power: Not yet instrumented
- Water Quality Parameters: None

Discharge Data

No record to date.

Analytical Results

No samples to date.

3.2.2 Gaging Station GS22

Location:

- State Plane Coordinates: 2082646; 747799
- concrete apron at 400 Area outfall to SID

Drainage Characteristics:

- Pathway 5
- Buildings: T124A, 440, 444, T444A, 447, 451, 457, 460, 461, 462
- Sub-basins: CDIV1 (Figure 1-2)
- Description: GS22 lies at the concrete apron at the 400 Area outfall to SID. This basin receives Industrial Area runoff principally from the roads, parking lots and buildings of the 400 Area.

Hardware Configuration:

- Primary Device: Not yet equipped
- Flow Meter: Not yet instrumented
- Sampler: Not yet instrumented
- Radio Telemetry: No
- Power: Not yet instrumented
- Water Quality Parameters: None

Discharge Data

No record to date.

Analytical Results

No samples to date.

3.2.3 Gaging Station GS23

Location:

- State Plane Coordinates: 2083781; 747885
- Building 881 septic lift station overflow outfall south of 881

Drainage Characteristics:

- Pathway 5
- Buildings: unknown surface water flow
- Sub-basins: unknown surface water contributions (Figure 1-2)
- Description: GS23 monitors a 5.5" metal pipe which outfalls on the hillside south of the southwest corner of Building 881. The pipe is thought to be the outfall for the overflow from the Bldg. 881 septic lift station. The sources of any surface water seen at this site is unknown.

Hardware Configuration:

- Primary Device: Not yet equipped
- Flow Meter: Not yet instrumented
- Sampler: Not yet instrumented
- Radio Telemetry: No
- Power: Not yet instrumented
- Water Quality Parameters: None

Discharge Data

No record to date.

Analytical Results

No samples to date.

3.2.4 Gaging Station GS24

Location:

- State Plane Coordinates: 2083973; 747999
- 12" cmp south of 881

Drainage Characteristics:

- Pathway 5
- Buildings: 869, 881, T881G, 887, 885
- Sub-basins: DIV3 (Figure 1-2)
- Description: GS24 monitors a 12" cmp which outfalls on the hillside south of Building 881. Surface water originates as runoff from the areas south and west of Building 881.

Hardware Configuration:

- Primary Device: Not yet equipped
- Flow Meter: Not yet instrumented
- Sampler: Not yet instrumented
- Radio Telemetry: No
- Power: Not yet instrumented
- Water Quality Parameters: None

Discharge Data

No record to date.

Analytical Results

No samples to date.

3.2.5 Gaging Station GS25

Location:

- State Plane Coordinates: 2084114; 747891
- 18.5" cmp southeast of 881

Drainage Characteristics:

- Pathway 5
- Buildings: 883, T883, T881A, -B, 890, 881, 881F, 882, 830, T881G, 887, 885
- Sub-basins: DIV3 (Figure 1-2)
- Description: GS25 monitors a 18.5" cmp which outfalls on the hillside southeast of Building 881. Surface water at this site originates as runoff from the areas east, north, and northeast of 881.

Hardware Configuration:

- Primary Device: Not yet equipped
- Flow Meter: Not yet instrumented
- Sampler: Not yet instrumented
- Radio Telemetry: No
- Power: Not yet instrumented
- Water Quality Parameters: None

Discharge Data

No record to date.

Analytical Results

No samples to date.