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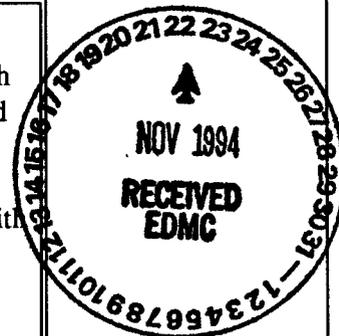
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8/31/94  
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PILOT-SCALE GROUNDWATER TREATMENT SYSTEM  
ACCEPTANCE TEST/OPERATIONAL TEST PROCEDURE  
200-BP-5, Unit #2/BY-Cribs

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## 1.0 GENERAL

- 1.1 The purpose of this procedure is to outline the various steps necessary to verify the operability and completeness of the treatment system equipment, and that the system is installed in accordance with the design drawings, Figures 1 through 3 in the Appendix.
- 1.2 Prior to the Functional Acceptance Test, all available instrumentation, wiring, and controls will have been installed and tested for loop integrity.
- 1.3 The Pilot-Scale Treatment System will commence operations by filling the influent storage tank on a 24 hour/day basis. The treatment system then processes this influent and fills the effluent storage tank for discharge of the treated influent into a disposal well. Performance of this Acceptance Test Procedure/Operational Test Procedure (ATP/OTP) will not test the Optional equipment as noted on the Process Flow Diagram, Figure 1 in Appendix. These optional ATP/OTP operations may be installed after it has been determined that they are required, and this procedure will be revised to provide for their testing.
- 1.4 The Treatment System is operated generally in a manual mode, utilizing interlocks for shutting down the system to protect equipment and prevent overflow of the Influent and Effluent Storage Tanks and other safety concerns. The interlocks are shown on the Electrical Control Ladder Diagrams, Figure 2 in Appendix.
- 1.5 The test shall be performed by at least two individuals, a test director and a verifier. The test director shall be from engineering and shall be familiar with the system, the verifier can be an individual from quality assurance, operations or field engineering. Historically, performance of the ATP/OTP has been used for training of new operators/field personnel by utilizing them as verifiers. If more than one verifier is used, they may also sign as witnessing the test. At completion of the first, or functional, part of the test (before waterflows), Quality Assurance will verify the first part of the testing for completeness. Following completion of the final portion of the test, Quality Assurance will verify testing for completeness.
- 1.6 Acceptable and Not Acceptable as used in this ATP/OTP is defined to mean that the question asked, or function check requested by the inquiry/test procedure is to verify whether a piece of equipment exists (or does not), or that function happens (or does not). For example if the equipment exists, it is Acceptable; if not it is Not Acceptable. If a function performs as it is supposed to do, it is Acceptable; if not it is Not Acceptable. All Not Acceptable Items will be logged on a "Punch List" and attached to this ATP/OTP.

## 2.0 EQUIPMENT SETUP

Set up the Influent and Effluent pump skids, and the Process System skid for performing the Acceptance and Operational Tests per the following.

- 2.1 Position the skids approximately as shown on the site plan and connect between the skids with quick disconnect hoses as follows:
- 2.1.1 Connect the extraction well pump discharge to the influent storage tank inlet;
  - 2.1.2 Connect the influent storage tank outlet to the influent pump skid suction;
  - 2.1.3 Connect the influent pump skid discharge to the process skid influent pipe manifold inlet;
  - 2.1.4 Connect the process skid influent pipe manifold outlet to the first ion exchange column inlet;
  - 2.1.5 Connect the selected first ion exchange column outlet to the selected second ion exchange column inlet;
  - 2.1.6 Connect the second ion exchange column outlet to the process system skid effluent pipe manifold inlet; and
  - 2.1.7 Connect the process system skid effluent pipe manifold discharge to the Effluent Storage Tank inlet.
- 2.2 Verify that the pressure gauges are properly installed and calibrated.  
Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_
- 2.3 Verify that the flow meters and rotameters are properly installed and operable.  
Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_
- 2.4 Verify that all valves are properly installed and operable.  
Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_
- 2.5 Verify that the influent and effluent storage tank sight gages are properly installed and operable.  
Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_
- 2.6 Verify that all instrument cables between sensors and monitors are connected.  
Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_
-

- 2.7 Verify that all electrical power and electrical interconnections are installed per the One-Line Diagram, Figure 3, and the Electrical Control Ladder Diagram, Figure 2, in Appendix.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

- 2.8 Verify that filter bags are installed in influent filter housing pairs F-1 and F-2.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

- 2.9 Verify that filter cartridges are installed in effluent filter housing pairs F-3 and F-4.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

- 2.10 Verify that ion exchange resin is loaded in the IX columns. Record the depths of resin in each column: Column #1 \_\_\_\_\_, Column #2 \_\_\_\_\_, Column #3 \_\_\_\_\_

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

### 3.0 COMPONENT INSPECTION AND DOCUMENTATION

#### 3.1 Mechanical

Refer to Process Flow Diagram, Figure 1, in Appendix. After the equipment has been set up, perform an equipment inspection and verify that all components are installed according to drawings. If the drawings do not represent the actual installation, As-Built the drawings and after approval by engineering, attach to the Appendix of this procedure. Utilize the equipment listed under Section 3.2 below for equipment component check.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

#### 3.2 Documentation

Verify that vendor information is available for the following equipment. The Vendor Information will be placed in the Project Files.

- 3.2.1 Extraction Well Pump
- 3.2.2 Influent Pumps
- 3.2.3 Process Pump
- 3.2.4 Effluent Pumps
- 3.2.5 Filters, Influent and Effluent
- 3.2.6 Ion Exchange Columns
- 3.2.7 Influent/Effluent Storage Tanks
- 3.2.8 Process Water Tank
- 3.2.9 Air Release Valves

- 3.2.10 Flowmeters
- 3.2.11 Flow Switches
- 3.2.12 Rotameters
- 3.2.13 Level Indicators/Controls
- 3.2.14 Pressure Gauges
- 3.2.15 Differential Pressure Indicator/Transmitter
- 3.2.16 Temperature Indicator/Transmitter
- 3.2.17 Dissolved Oxygen Monitor
- 3.2.18 Turbidity Monitor
- 3.2.19 pH Indicator/Transmitter
- 3.2.20 Flex Hose
- 3.2.21 Flexible Connectors
- 3.2.22 Ion Exchange Resin
- 3.2.23 Programmable Logic Controller
- 3.2.24 Annunciator

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

3.3 Electrical

Refer to One Line Electrical Diagram, Figure 3, in Appendix. Verify that electrical installation is complete. Verification includes checking for installation in accordance with the National Electrical Code (NEC).

3.3.1 Verify installation of power feed from generator to main control panel on process treatment system.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

3.3.2 Verify installation of 480-VAC, 3-phase power feed from main control panel on Process Treatment Skid to the following pumps:

- Extraction well pump
- Influent pump station
- Process pump
- Effluent pump station

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

3.3.3 Verify 120-VAC auxiliary/control wiring from main control panel to:

- Extraction well
- Influent storage tank
- Influent pumping station
- Process treatment system
- Effluent storage tank
- Effluent pumping station

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

3.3.4 Verify installation of 240-VAC, single-phase power feed from main control panel to:

- Receptacles for Air Compressor located at influent pumping station, process treatment system, and effluent pumping station.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

3.3.5 Verify signal wiring from transmitters to main control panel.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

3.3.6 Grounding System

- Verify that the Process Treatment System is properly grounded.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

- Verify that the Influent pumping station is properly grounded.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

- Verify that the Influent storage tanks are properly grounded.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

- Verify that the Process water tank is properly grounded.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

- Verify that the Effluent pumping station is properly grounded.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

- Verify that the Effluent storage tanks are properly grounded.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

- Verify that the power generator is properly grounded

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

3.3.7 Power Source Check, Generator - Verify that the generator output is 480 VAC, 3 phase, 60 HZ to ensure compatibility with load.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

3.3.8 Instrument panel - Test annunciators, alarms, and reset for proper operation.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

3.3.9 Check pump motors, Influent Pumps (P-2A, P-2B), Process Pump (P-3), Effluent Pumps (P-5A, P-5B) for proper rotation. Briefly activate each pump pushbutton to bump the motors and visually verify proper rotation as noted by movement of motor fan in direction of rotational arrow.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

#### 4.0 ACCEPTANCE TEST PROCEDURE (ATP)

This portion of the test procedure will establish flow of potable water through process components to verify operability of pumps, verify interlocks and their shutdown capabilities, and test emergency shutdown switch.

#### 4.1 Pumps

##### 4.1.1 Extraction Well Pump

- Open ball valves BV-1, BV-2, BV-4, BV-6 or BV-7 & BV-8, and BV-9.
- Start Extraction Well Pump.
- Watch for flow at FIT-1 AND FI-1.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

##### 4.1.2 Influent Pumps (Note: The Influent Storage Tank must have liquid in the tank for this test).

###### 4.1.2.1 Pump P-2A

- Open ball valves BV-10, BV-30, BV-32, BV-33, BV-38, BV-39, BV-40, BV-41, BV-45, BV-46, BV-47, BV-48, BV-50, BV-51, BV-56, BV-60, BV-65, BV-69, AND BV-70.
- Start Influent Pump P-2A.
- Watch for flow at FIT-2.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

###### 4.1.2.2 Pump P-2B

- Open ball valves BV-10, BV-30, BV-34, BV-35, BV-38, BV-39, BV-40, BV-41, BV-45, BV-46, BV-47, BV-48, BV-50, BV-51, BV-56, BV-60, BV-65, BV-69, and BV-70
- Start Influent Pump P-2B.
- Watch for flow at FIT-2.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

##### 4.1.3 Process Pump, P-3 (Note: This pump is used for backwashing the IX columns and as a sump pump as required).

- Connect hose from the Process Water Tank (noting that there is water in the Process Water Tank) to the suction of P-3, and hose from the pump discharge to the Effluent Storage Tank.
- Open BV-70.
- Start Pump P-3.

- Watch rate of rise in Effluent Storage Tank sight glass.

4.1.4 Effluent Pumps (Note: The Effluent Storage Tank must have liquid in the tank for this test. In addition, due to the long distance to the disposal well it is planned to pump to an intermediate holding tank. The treated effluent then would be pumped to a tanker truck for transport to the disposal well site. Since a tank may not be available to perform this test, a hose will be connected from the discharge manifold of the Effluent Pump Skid back to the Effluent Storage Tank in a recycle mode.)

- Connect hose from the Effluent Storage Tank (noting that there is water in the Effluent Storage Tank) to the suction of P-5A or 5B, and hose from the pump discharge to the Process Water Tank. And connect hose from the effluent pump discharge back to the Effluent Storage Tank.

4.1.4.1 Pump P-5A (Effluent Pump)

- Open ball valves BV-72, BV-90, BV-92, BV-93, BV-98, BV-99, BV-102, and BV-103.
- Open ball valve on Process Water Tank.
- Start Effluent Pump P-5A.
- Watch for flow at FIT-3.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

4.1.4.2 Pump P-5B (Effluent Pump)

- Open ball valves BV-72, BV-90, BV-94, BV-95, BV-98, BV-99, BV-102, and BV-103.
- Open ball valve on Process Water Tank.
- Start Effluent Pump P-5B.
- Watch for flow at FIT-3.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

4.2 Level Switches

The level switches will be functionally checked by shorting out the input to the level control relay and checking for the proper diagnostic and annunciation of alarms which will indicate actuation of the appropriate level control relay.

- 4.2.1 Open the probe circuits to simulate a low level for the following level switches and verify that both the diagnostic and annunciator lights actuate:

	Accept	Not Accept
LSL-1 (Extraction Well, Low)	_____	_____

LSL-2 (Influent Tank, Low)                    \_\_\_\_\_                    \_\_\_\_\_

LSL-5 (Effluent Tank, Low)                    \_\_\_\_\_                    \_\_\_\_\_

4.2.2 Short the probe circuits to simulate a high level for the following level switches and verify that both the diagnostic and annunciator lights actuate:

	Accept	Not Accept
LSH-1 (Influent Tank, High)	_____	_____
LSHH-1 (Influent Tank, High-High)	_____	_____
LSH-2 (Effluent Tank, High)	_____	_____
LSHH-2 (Effluent Tank, High-High)	_____	_____

4.3 Flow Switches

The flow switches will be functionally tested by manually retracting the paddle to simulate a flowing condition and checking for proper annunciator light actuation which will indicate flow.

	Accept	Not Accept
FS-1	_____	_____
FS-2	_____	_____
FS-3	_____	_____
FS-4	_____	_____
FS-5	_____	_____
FS-6	_____	_____

4.4 Differential Pressure Transmitters, DPTs

For this test, the Filters and IX Columns will each be isolated by closing upstream and downstream valves to allow pressurizing (with air) the DPT's to a pressure higher than the calibrated pressure differential. The differential pressure transmitters will be functionally checked by disconnecting the low pressure side tubing to the differential pressure cell, allowing it to reference atmospheric pressure. Check for the appropriate annunciation and audible alarm indicating high differential pressure. Note: The pressure gauge on the air compressor will not be as accurate as the DP Transmitter, so record the pressure (approx. 30 psi) from the transmitter.

4.4.1 Influent Filters

- Close BV-30.
- Cap quick disconnect at the influent pumping skid outlet.
- Verify BV-42 and BV-43 are open to allow signal to differential pressure transmitter.
- Verify either BV-32 and BV-33 are open or BV-34 and BV-35 are open and BV-31 is closed.
- Open either BV-38 and BV-39, or BV-40 and BV-41, or BV-45 and BV-46, or BV-47 and BV-48.
- Set air compressor at 30 psi, connect air hose to AC-2.
- Start air compressor and allow piping to pressurize to 30 psi.
- Disconnect low pressure side of differential pressure transmitter PDIT-1. Verify actuation of high differential pressure alarm annunciator. Reconnect the tubing to the transmitter before continuing.

Accept                      Not Accept

PDIT-1                      \_\_\_\_\_                      \_\_\_\_\_

4.4.2 IX Columns

- Close inlet and outlet valve to the first IX column (BV-51 and BV-56).
- Set air compressor at 30 psi, connect air hose to AC-3.
- Open ball valve at AC-3.
- Verify that valves BV-52 and BV-55 are closed.
- Verify that BV-53 and BV-54 are open to allow signal to differential pressure transmitter.
- Start air compressor and allow IX column to pressurize to 30 psi.
- Disconnect low pressure side of differential pressure transmitter PDIT-2. Verify actuation of high differential pressure alarm annunciator. Reconnect the tubing to the transmitter before continuing.
  
- Repeat this procedure for the remaining IX columns, closing and opening appropriate ball valves, and connecting to appropriate air connections, and verifying appropriate annunciation of differential pressure alarms.

Accept                      Not Accept

PDIT-2                      \_\_\_\_\_                      \_\_\_\_\_

PDIT-3                      \_\_\_\_\_                      \_\_\_\_\_

PDIT-4                      \_\_\_\_\_                      \_\_\_\_\_

4.4.3 Effluent Filters

- Close BV-90.
- Cap quick disconnect at effluent pumping skid outlet.
- Verify BV-102 and BV-103 are open to allow signal to differential pressure transmitter.
- Verify either BV-92 and BV-93 or BV-94 and BV-95 are open.
- Open either BV-98 and BV-99 or BV-102 and BV-103.
- Set air compressor at 30 psi, connect air hose to AC-9.
- Start air compressor and allow piping to pressurize to 30 psi.
- Disconnect low pressure side of differential pressure transmitter PDIT-5. Verify actuation of high differential pressure alarm annunciator. Reconnect the tubing to the transmitter before continuing.

Accept

Not Accept

PDIT-5

\_\_\_\_\_

\_\_\_\_\_

5.0 OPERATIONAL TEST PROCEDURE

In this portion of the test procedure, the process treatment system will be configured and flow of potable water established to verify operability. Align valves to allow establishing flow from the Extraction Well Pump to the Influent Storage Tank, then from either of the Influent Pumps through either of the Filters and two or three IX Columns in series flow and on to the Effluent Storage Tank. Then when the Effluent Storage Tank contains sufficient water, establish flow via the Effluent Pumps to the Disposal Well.

NOTE: Flow will be established by manually aligning valves, starting pumps. Storage tank levels will be monitored via level indicators with the sight glasses as a backup. Differential pressures of the filters and IX Columns will be monitored via differential pressure indicators/transmitters as well as pressure gages.

5.1 Starting Extraction Well Pump

5.1.1 Open ball valves BV-1, BV-2, BV-4, BV-6 or BV-7 & BV-8, and BV-9.

5.1.2 Start the Extraction Well Pump by holding in the "Start" pushbutton until flow is established. Watch for flow on FIT-1 and makeup of Flow Switch FS-1, then release the pushbutton.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

5.1.3 Verify that the following annunciator and diagnostic lights are not illuminated:

Influent Storage Tank Level High, LSH-1  
Extraction Well Level Low, LSL-1

No Flow From Extraction Well Pump, FS-1  
Influent Storage Tank Level High-High, LSHH-1

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

5.1.4 Stop Extraction Well Pump P-1 by pushing the "Stop" pushbutton.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

5.2 Establishing Flow from the Influent Storage Tank -- Pump P-2A

5.2.1 When the Influent Storage Tank is at an appropriate level open ball valves BV-10, BV-30, BV-32, BV-33. Then open BV-38 and BV-39, or BV-40 and BV-41, or BV-45 and BV-46, or BV-47 and BV-48. Open BV-50, BV-51, BV-56, BV-59, BV-69, and BV-70.

5.2.2 Verify ball valves BV-31 and BV-37 are closed.

5.2.3 Start Influent Pump P-2A by holding in the "Start" pushbutton until flow is established. Watch for flow on FIT-2 and makeup of FS-2, FS-3, and FS-4.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

5.2.4 Verify that the following annunciator and diagnostic lights are not illuminated.

- No Flow to Influent Pumps, FS-2
- Loss of Flow in Hose to Pipe Manifold, FS-3
- Loss of Flow in Hose to Effluent Storage Tank, FS-4
- Influent Storage Tank Level Low, LSL-2
- Effluent Storage Tank Level High, LSH-2
- Effluent Storage Tank Level High-High, LSHH-2

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

5.2.5 When flow has been established through the system and is at steady state, take readings of: flow, pressure and pressure differential on filters and IX Columns.

Flow Readings: \_\_\_\_\_

Pressure Readings: \_\_\_\_\_

Differential Pressure Readings: \_\_\_\_\_

\_\_\_\_\_

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

5.2.6 Stop Influent Pump P-2A by pushing the "Stop" pushbutton.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

5.3 Establishing Flow from the Influent Storage Tank -- Pump P-2B

5.3.1 When the Influent Storage Tank is at an appropriate level open ball valves BV-10, BV-30, BV-34, BV-35. Then open BV-38 and BV-39, or BV-40 and BV-41, or BV-45 and BV-46, or BV-47 and BV-48. Open BV-50, BV-51, BV-56, BV-59, BV-69, and BV-70.

5.3.2 Verify ball valves BV-31 and BV-37 are closed.

5.3.3 Start Influent Pump P-2B by holding in the "Start" pushbutton until flow is established. Watch for flow on FIT-2 and makeup of FS-2, FS-3, and FS-4.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

5.3.4 Verify that the following annunciator and diagnostic lights are not illuminated.

- No Flow to Influent Pumps, FS-2
- Loss of Flow in Hose to Pipe Manifold, FS-3
- Loss of Flow in Hose to Effluent Storage Tank, FS-4
- Influent Storage Tank Level Low, LSL-2
- Effluent Storage Tank Level High, LSH-2
- Effluent Storage Tank Level High-High, LSHH-2

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

5.3.5 When flow has been established through the system and is at steady state, take readings of: flow, pressure and pressure differential on filters and IX Columns.

Flow Readings: \_\_\_\_\_

Pressure Readings: \_\_\_\_\_

Differential Pressure Readings: \_\_\_\_\_

\_\_\_\_\_

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

5.3.6 Stop Influent Pump P-2B by pushing the "Stop" pushbutton.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

5.4 Starting Effluent Pump -- Pump P-5A (Note: For this portion of the test the effluent pump discharge must be connected with a hose back to the Effluent Storage Tank, see 4.1.4, above).

5.4.1 Open ball valves BV-72, BV-90, BV-92, BV-93. Open valves BV-98 and BV-99 or BV-102 and BV-103. Open ball valve on process water tank.

5.4.2 Start Pump P-5A by holding in the "Start" pushbutton until flow is established. Watch for flow on FIT-3 and makeup of FS-5 and FS-6.

5.4.3 Verify that the following annunciator lights on the annunciator panel are not illuminated:

Disposal Well Level High-High, LSHH-3  
Effluent Storage Tank Level Low, LSL-3  
No Flow to Effluent Pumps, FS-5  
No Flow to Disposal Well, FS-6

5.4.4 When flow has been established though the system and is at steady state, take readings of: flow, pressure and pressure differential, on the filters.

Flow Readings: \_\_\_\_\_

Pressure Readings: \_\_\_\_\_

Differential Pressure Readings: \_\_\_\_\_

\_\_\_\_\_

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

5.4.5 Stop Effluent Pump P-5A by pushing the "Stop" pushbutton.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

5.5 Starting Effluent Pump -- Pump 5B (See Note at 5.4, above)

5.5.1 Open ball valves BV-72, BV-90, BV-94, BV-95. Open valves BV-98 and BV-99 or BV-102 and BV-103. Open ball valve on process water tank.

5.5.2 Start Pump P-5B by holding in the "Start" pushbutton until flow is established. Watch for flow on FIT-3 and makeup of FS-5 and FS-6.

5.5.3 Verify that the following annunciator lights on the annunciator panel are not illuminated:

Disposal Well Level High-High, LSHH-3  
Effluent Storage Tank Level Low, LSL-3

No Flow to Effluent Pumps, FS-5  
No Flow to Disposal Well, FS-6

5.5.4 When flow has been established through the system and is at steady state, take readings of: flow, pressure and pressure differential, on the filters.

Flow Readings: \_\_\_\_\_

Pressure Readings: \_\_\_\_\_

Differential Pressure Readings: \_\_\_\_\_

\_\_\_\_\_

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

5.5.5 Stop Effluent Pump P-5B by pushing the "Stop" pushbutton.

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

## 6.0 INSTRUMENT AND PROCESS CONTROL TEST

6.1 This portion of the test procedure will test the control system interlocks.

6.2 Each interlock will be tested by shorting out the appropriate level relays, or by filling and emptying tanks with water (if available), and verify that each will stop the appropriate pump or close the appropriate motor operated valve.

6.3 Start extraction well pump, restart after each test.

- LSL-1 (Low Level, Extraction Well), Action: Stop P-1

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

- LSH-1 (High Level, Influent Tank), Action: Alarm (check this)

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

- LSHH-1 (Hi-Hi Level, Influent Tank), Action: Stop P-1

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

- FS-1 (No Flow, hose to Influent Tank), Action: Stop P-1

Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

6.4 Start Influent Pump P-2A or P-2B, restart after each test.

- LSL-2 (Low Level, Influent Tank), Action: Stop P-2A/B  
Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_
- LSH-2 (High Level, Effluent Tank), Action: Alarm (check this)  
Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_
- LSHH-2 (Hi-Hi Level, Effluent Tank), Action: Stop P-2A/B  
Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_
- FS-2 (No Flow, to Influent Pumps), Action: Stop P-2A/B  
Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_
- FS-3 (No Flow, Hose to Process Skid), Action: Stop P-2A/B  
Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_
- FS-4 (No Flow, Hose to Effluent Tk), Action: Stop P-2A/B  
Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

6.5 Start Effluent Pump P-5A or P-5B, restart after each test.

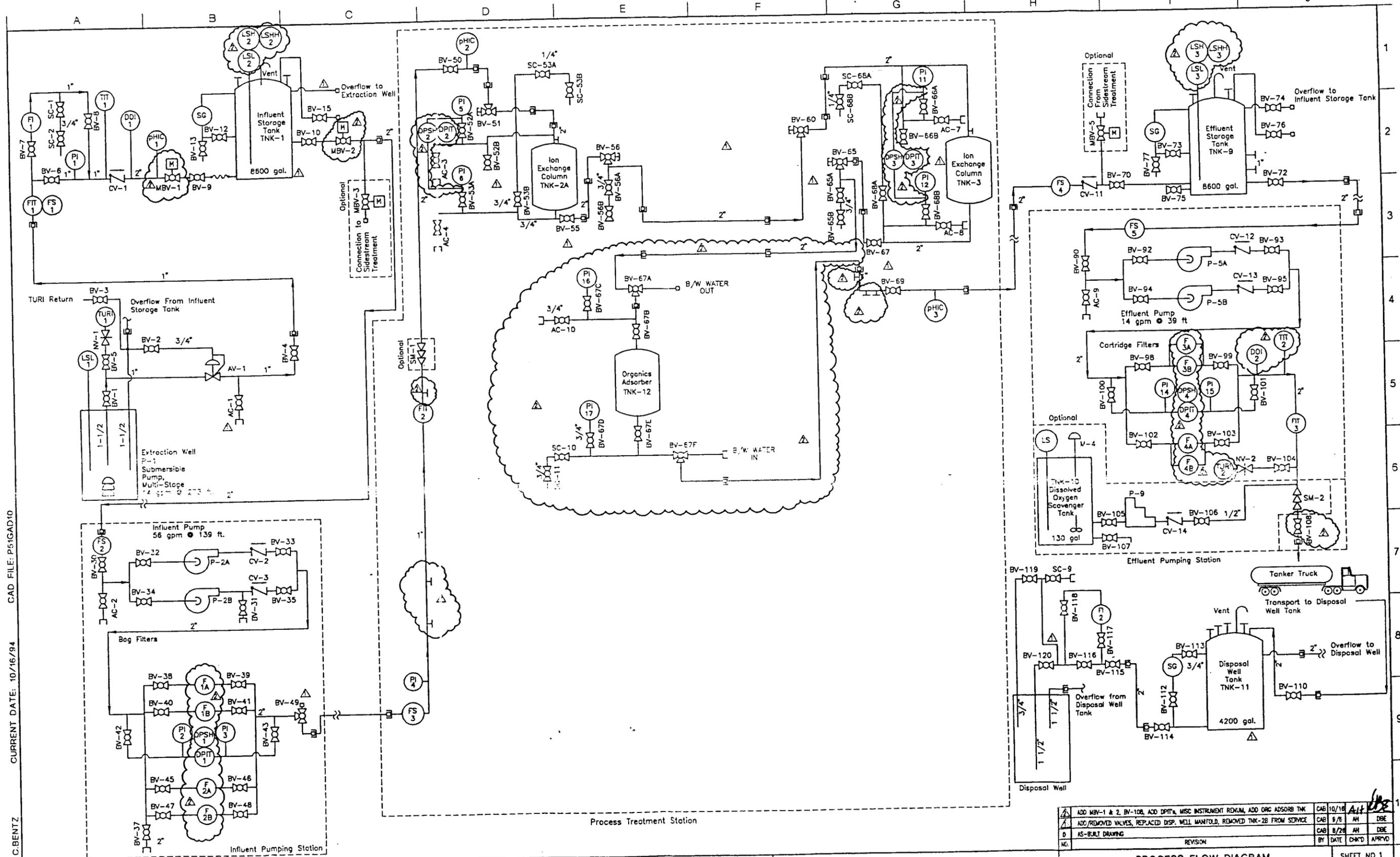
- LSL-3 (Low Level, Effluent Tank), Action: Stop P-5A/B  
Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_
- LSH-3 (High Level, Disposal Well), Action: Stop P-5A/B  
Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_
- FS-5 (No Flow, Hose to Effluent Skid), Action: Stop P-5A/B  
Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_
- FS-6 (No Flow, Hose to Well), Action: Stop P-5A/B  
Acceptable \_\_\_\_\_ Not Acceptable \_\_\_\_\_

7.0 EMERGENCY SHUTDOWN SWITCHES

- 7.1 The emergency shutdown switch (or switches) will shutdown the Treatment System down in case of an emergency. Items included in this emergency shut include the Well Pump, Influent Pumps, and Effluent Pumps.
- 7.2 Verify system is operating: Well Pump P-1, Influent Pump (P-2A or 2B), and Effluent Pump (P-5A or 5B) are operating.
- 7.3 Actuate Emergency Shutdown Switch(es) and verify shutdown of pumps and closure of valves.

	Acceptable	Not Acceptable
P-1	_____	_____
P-2A/2B	_____	_____
P-5A/5B	_____	_____

**APPENDIX**



CURRENT BY: C.BENTZ  
 CURRENT DATE: 10/16/94  
 CAD FILE: P51GAD10

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DRAFT CHK	J.OLSON	8/26/94
ENG CHK	A.HUEGEL	8/26/94
PROJECT LEAD	DERB	8/26/94
BHI REVIEW	<i>[Signature]</i>	10/17/94

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 PROJECT NO. P51GA

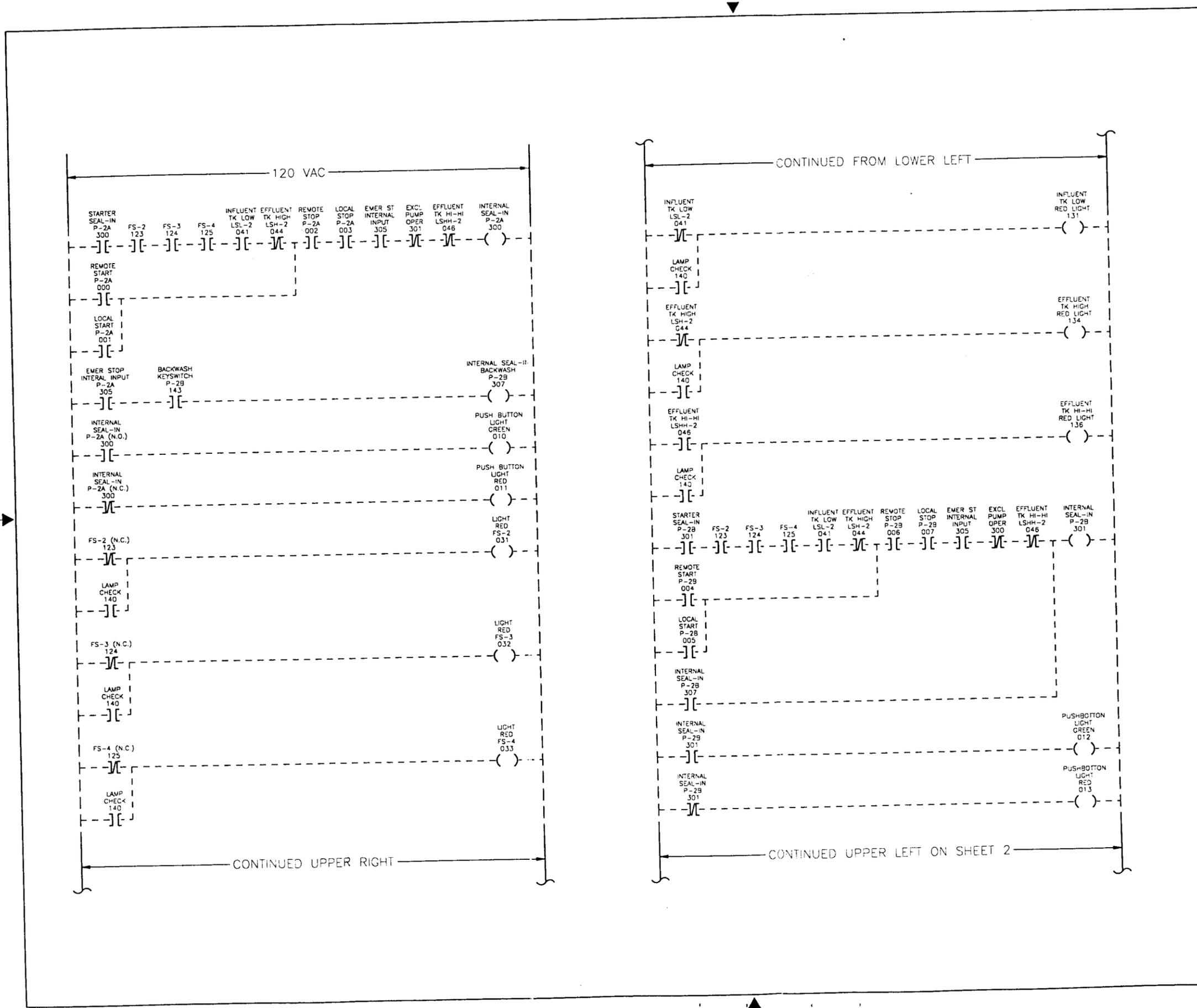


UNDER CONTRACT TO  
**BECHTEL HANFORD, INC.**  
 RICHLAND, WASHINGTON

ADD MBV-1 & 2, BV-108, ADD DPTF's, MISC INSTRUMENT ROOM, ADD ORG ADSORB TKN	CAB	10/18	AM	DSE	
ADD/REMOVED VALVES, REPLACED DISP. WELL MANIFOLD, REMOVED TKN-2B FROM SERVICE	CAB	8/26	AM	DSE	
AS-BUILT DRAWING	CAB	8/26	AM	DSE	
NO.	REVISION	BY	DATE	CHK'D	APPROV

PROCESS FLOW DIAGRAM  
**BY-CRIBS**  
 PILOT GROUNDWATER TREATMENT SYSTEM  
 200-BP-5 PLUME NO. 2  
 HANFORD SITE

SHEET NO 1  
 DRAWING NO.  
 P51GA-D10  
 REVISION 2



NOTES

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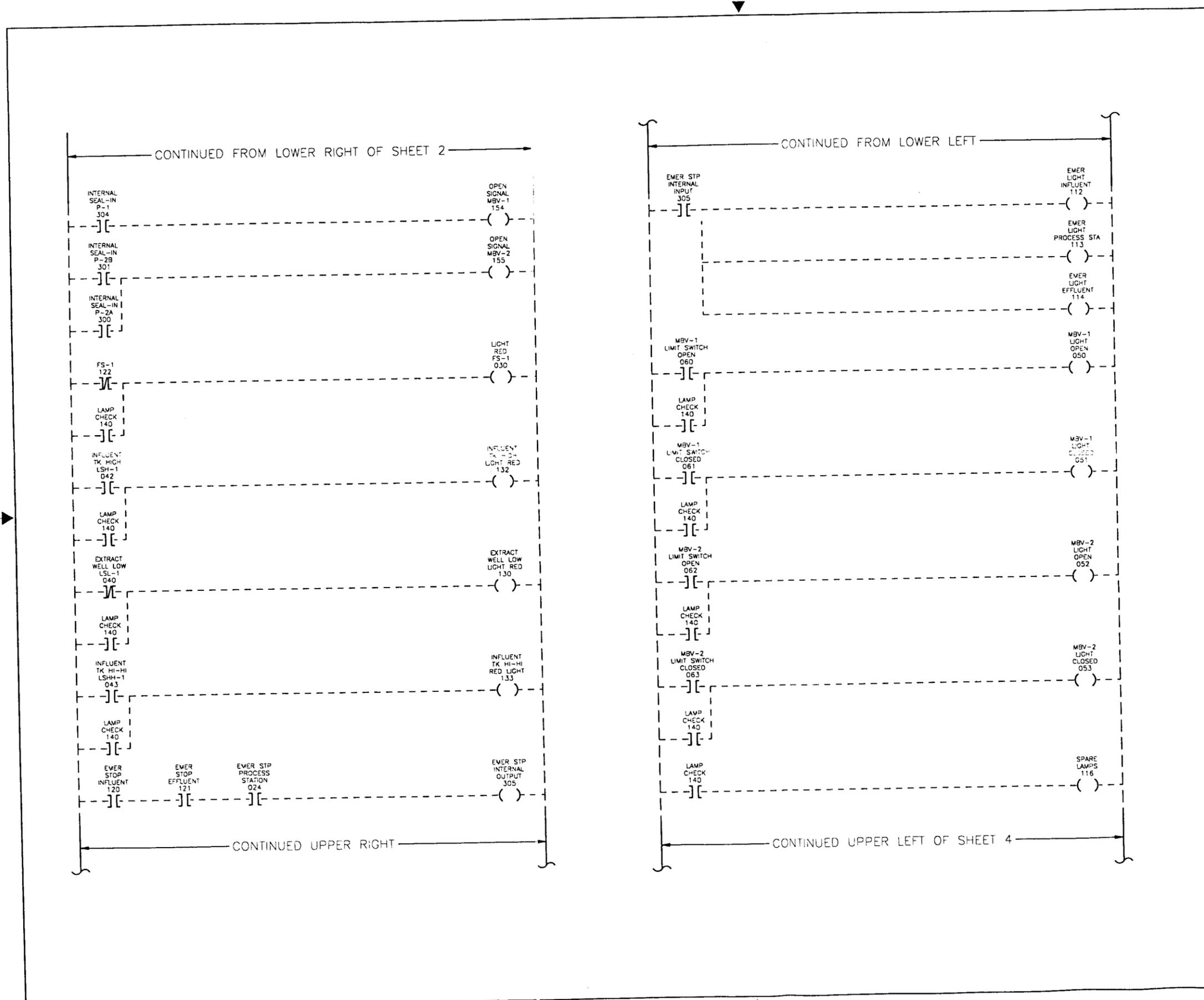
LEGEND

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△	10-20-94		X						
REV	DATE	DESCRIPTION	BY	CHK	ENCR	DRN	APP	INT	ENGR
SCALE 1" = 12'									
<b>U.S. DEPARTMENT OF ENERGY</b> DOE FIELD OFFICE, RICHLAND HANFORD ENVIRONMENTAL RESTORATION PROGRAM									
BECHTEL HANFORD INC. RICHLAND, WASHINGTON					IT HANFORD INC. RICHLAND, WASHINGTON				
200-BP-5 BY CRIB PROGRAMMABLE LOGIC CONTROLLER LADDER LOGIC DIAGRAM									
BECHTEL JOB NO.		DOE CONTRACT NO.			CADD FILENAME				
22192		DE-AC06-93RL12367			PLC-BYL1				
DRAWING NO.									
200-BP-5									

(4 sheets)

*Handwritten signature and initials*





NOTES

LEGEND

REV	DATE	DESCRIPTION	BY	CHK	ENGR	DRN	APPV	BY	PROJ	ENGR
10-20-94		X								

SCALE: 1" = 100'

**U.S. DEPARTMENT OF ENERGY**  
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HANFORD ENVIRONMENTAL RESTORATION PROGRAM

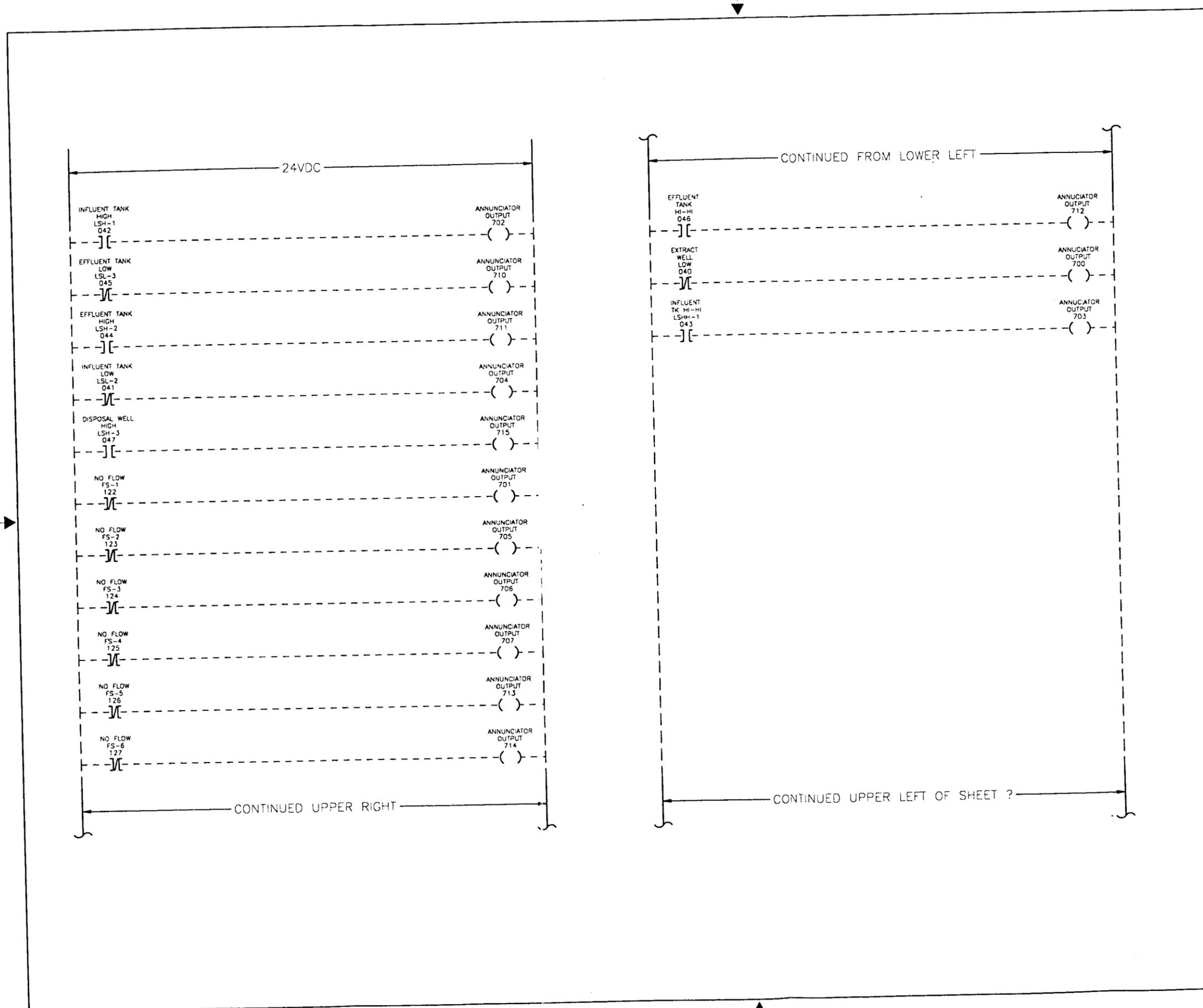
BECHTEL HANFORD INC. RICHLAND, WASHINGTON	IT HANFORD INC. RICHLAND, WASHINGTON
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200-BP-5 BY CRIB  
PROGRAMMABLE LOGIC CONTROLLER  
LADDER LOGIC DIAGRAM

BECHTEL JOB NO.	DOE CONTRACT NO.	CADD FILENAME
22192	DE-AC06-93RL12367	PLC-BY1.3

DRAWING NO.  
200-BP-5

*MAF*  
*[Signature]*



NOTES

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LEGEND

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△	10-20-94		X						
REV.	DATE	DESCRIPTION	BY	CHK	ENGR	DATE	APP	REV	DATE

SCALE: 1" = 10'

**U.S. DEPARTMENT OF ENERGY**  
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HANFORD ENVIRONMENTAL RESTORATION PROGRAM

<b>BECHTEL HANFORD INC.</b> RICHLAND, WASHINGTON	<b>IT HANFORD INC.</b> RICHLAND, WASHINGTON
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200-BP-5 BY CRIB  
PROGRAMMABLE LOGIC CONTROLLER  
LADDER LOGIC DIAGRAM

BECHTEL JOB NO. 22192	DOE CONTRACT NO. DE-AC06-93RL12367	CADD FILENAME PLC-BYL4
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