

ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.: 40-8943

License No.: SUA-1534

Report No.: 40-8943/96-02

Licensee: Crow Butte Resources, Inc.

Facility: Crow Butte Project

Location: Crawford, Dawes County, Nebraska

Dates: September 23-25, 1996

Inspector: Robert J. Evans, P.E., Health Physicist
Nuclear Materials Inspection and
Fuel Cycle/Decommissioning Branch
Division of Nuclear Materials Safety

Approved By: Charles L. Cain, Technical Assistant
Division of Nuclear Materials Safety

Attachments:

- Attachment 1: Partial List of Persons Contacted
List of Items Opened, Closed, and Discussed
- Attachment 2: Photographs Taken at the Crow Butte Project

EXECUTIVE SUMMARY

Crow Butte Project NRC Inspection Report 40-8943/96-02

This inspection included a review of site status, operations, standard operating procedures, emergency preparedness, fire protection, and maintenance/surveillance testing activities. The licensee was noted to have continued to operate the site in accordance with NRC regulations and the conditions of the license.

Operations Review

- The licensee appeared to have operated the facility in accordance with the requirements of the license, and site systems had been operated in accordance with the guidance provided in site procedures. No equipment misalignments were identified, and no process flow, level, or pressure parameters were found outside of their required ranges (Section 2).

Standard Operating Procedures

- Site procedures had been developed and were properly maintained up-to-date. The procedures provided an adequate level of technical detail. Site workers appeared knowledgeable about the guidance provided in the procedures suggesting that site training activities were appropriate and effective (Section 3).

Emergency Preparedness

- The licensee had implemented an emergency preparedness program that met the intent of the site operating procedures (Section 4).

Fire Protection

- The licensee's fire protection program appeared adequately documented in site procedures. Fire fighting equipment was available. No notable fire hazards were identified during plant tours (Section 5).

Maintenance and Surveillance Testing

- The licensee's maintenance and surveillance program was reviewed and appeared to be effective (Section 6).

Report Details

1 Site Status

During the inspection, Crow Butte Resources' in-situ uranium mine was in operation with Mine Units 3, 4, and 5 in service and Mine Units 1 and 2 in restoration. The installation of new production and extraction wells was also in progress in Mine Unit 5. The licensee planned to install Mine Unit 6 in an area north of Mine Unit 5. The construction of Mine Unit 6 was expected to begin in early 1997, and the mine unit was expected to be placed into service by the end of 1997.

The licensee continued to produce yellowcake material in the main process building. Uranium-bearing leach solution was being pumped from the well fields to the process building. Ion exchange columns were being used to recover the uranium from the leach solution. The end product was dried in a negative pressure system dryer and was packaged in 55-gallon drums for shipment offsite. According to information provided by the licensee, the site produced over 729,000 pounds of product during 1995.

Five evaporation ponds were in service. Waste water was being pumped to the ponds at a rate of about 15 gallons per minute. Also, the licensee continued to dispose of waste water by deep well injection. The deep well injection flow rate was about 32 gallons per minute at the time of the inspection.

One reverse osmosis unit was in service at a nominal flow rate of 40-50 gallons per minute during the inspection. One of the primary functions of this unit was to provide purified water for groundwater restoration. The licensee planned to place a second unit into service in the near future. The second unit was expected to increase the cleanup capacity by about 100 gallons per minute.

The licensee continued to maintain a staff of about 40 employees and operated the plant around the clock. In addition, about 13-15 contractors were used onsite for drilling of wells and other similar activities.

2 Operations Review (88020)

2.1 Inspection Scope

A review of facility operations was performed to verify that site activities were being conducted in accordance with applicable regulations and the conditions of the license, and to ensure that operational controls were adequate to protect the health and safety of the workers and members of the general public.

2.2 Observations and Findings

a. License Compliance Review

Selected license conditions related to the operation of the plant were reviewed to ensure that the licensee had managed the facility in accordance with the requirements specified in the license. License Condition 12 states that the annual throughput shall not exceed a flow rate of 5000 gallons per minute, excluding restoration flow. At the time of the inspection, the throughput flow rate was 3700-3800 gallons per minute, which was well below the licensed limit. In addition, restoration flow in Mine Units 1 and 2 was being maintained at 500-600 gallons per minute.

In accordance with License Condition 13, the licensee is not permitted to possess more than an equivalent of 454,545 kilograms of dry U_3O_8 material at one time. During the site inspection, the licensee's inventory of yellowcake material was reviewed. The inspector determined that the licensee had only a small fraction of the licensed limit in its possession at that time.

License Condition 14 states that the annual production rate shall not exceed 2 million pounds of U_3O_8 material. About 729,300 pounds of yellowcake material were produced during 1995. The licensee's proposed 1996 production output was expected to be below the licensed limit of 2 million pounds.

License Condition 15 states that any significant changes in the process circuit previously submitted to the NRC shall require the approval by the NRC in the form of a license amendment. During the plant tours, the process flow paths were inspected. No deviations from the NRC-approved flow path were identified.

The yellowcake dryer is required to be operated and maintained in accordance with the specifications listed in License Condition 22. The operation of the yellowcake dryer was observed during the inspection. The licensee was noted to have operated the dryer in accordance with the instructions provided in the site procedure and in accordance with the requirements listed in the license. This area of plant operations had the greatest potential for internal exposures due to inhalation of dry yellowcake material. The individual who performed the yellowcake packaging operations appeared knowledgeable of the work and of the radiological risks associated with the dryer.

In accordance with License Condition 25, the licensee is required to perform and document routine inspections of the onsite evaporation ponds. The inspector accompanied a licensee representative as he performed the weekly inspection of the five onsite ponds. The licensee's representative appeared knowledgeable of the task being performed. The ponds appeared to have been maintained in accordance with the requirements of the license. For example, the ponds' levels were below the upper freeboard limit established for each pond. Minor erosion was observed

around selected ponds; however, the erosion appeared superficial and not indicative of a potential structural problem. No leakage was identified around the base of the ponds during the tour.

License Condition 25.B states that any time six or more inches of fluid is detected in the commercial ponds' leak detection standpipes, the fluid shall be analyzed for specific conductivity. In addition, if the water quality is degraded beyond the action level, the water shall be further sampled and analyzed for four chemical constituents. Since the license did not clearly define the action level, the licensee had established an action level at 50 percent of the specific conductivity of the water in the respective ponds. However, the inspector noted that the licensee had informally established the action level at 50 percent and had not proceduralized the action level.

The specific conductivity of the water in the pond was typically ten times the conductivity of the water in the standpipe; high conductivity in the standpipe was indicative of a pond leak. During the inspection, the standpipes' fluid and the pond water were analyzed. The standpipe fluid sample results did not exceed 50 percent of the respective pond waters' specific conductivity indicating that the pond was not leaking a detectable amount of fluid into the ground. The licensee maintained records of the results of these routine samples.

b. Site Tour

Plant tours were performed to ensure that the licensee was operating the facility in a manner consistent with the guidance provided in site procedures. During the plant tour, site buildings, fences, gates, and operating equipment were observed. Site fences were in good condition, and the facility was properly posted in accordance with License Condition 17. Building housekeeping was adequate, and all areas were properly lit.

Selected site procedures were reviewed and compared to the actual system alignments found in the plant. The procedures/systems reviewed included the ventilation, waste disposal, uranium washing systems, and the yellowcake dryer. Overall, all system components were in the proper positions to support the operation of the plant.

The inspector obtained gamma exposure rate measurements at several locations around the site property. The exposure rates were measured using a Ludlum Model 19 microrentgen meter calibrated to a cesium-137 source. No abnormal radiological survey readings were identified. Overall, no health or safety hazard was identified during the site tour.

2.3 Conclusions

The licensee appeared to have operated the facility in accordance with the requirements of the license, and site systems had been operated in accordance with the guidance provided in site procedures. No equipment misalignments were identified, and no process flow, level, or pressure parameters were found outside of their required ranges. In addition, the licensee had appeared to maintain good operational control of the yellowcake drying and packaging operations.

3 **Standard Operating Procedures (88058)**

3.1 Inspection Scope

Site standard operating procedures were reviewed to ensure that the licensee had developed and maintained clearly written guidance to ensure that operations were carried out in a safe, consistent, and efficient manner.

3.2 Observations and Findings

License Condition 20 states that standard operating procedures shall be established for all operational process activities involving radioactive materials that are handled, processed, or stored. The licensee's operating procedures manual was reviewed during the inspection to ensure that all operational processes had been described by the procedures. The licensee had not developed a procedure for land disposal of liquid effluents because the licensee did not plan to use this method of disposal in the near future although authorized by License Condition 42. In addition, selected procedures were reviewed for technical adequacy. Overall, the procedures were noted to be up-to-date, appeared to be written by technically competent personnel, provided an adequate level of detail, and were properly approved.

Personnel training related to site procedures was reviewed. Procedure training had been provided to site personnel during routine safety meetings. In addition, special training sessions and on-the-job training was provided as needed. Selected site personnel were interviewed during the inspection. These individuals demonstrated an excellent knowledge and understanding of facility operations.

3.3 Conclusions

Site procedures had been developed and were properly maintained up-to-date. The procedures provided an adequate level of technical detail. Site workers appeared knowledgeable about the guidance provided in the procedures suggesting that site training activities were appropriate and effective. Several minor observations related to the site procedures were made and reported to the licensee.

4 Emergency Preparedness (88050)

4.1 Inspection Scope

The objectives of the emergency preparedness inspection were to ensure that the licensee's emergency preparedness program was being maintained in a state of readiness and that appropriate procedures had been developed.

4.2 Observations and Findings

The licensee's procedures for emergency preparedness activities were reviewed by the inspector. Implementation requirements for the emergency preparedness program were provided in the licensee's Operating Procedure C-21, "Emergency Preparedness." The conditions discussed in the emergency preparedness procedure included employee injuries, fire, and severe weather. Other related procedures in place at the site included Procedure C-18, "Nonroutine Reporting to Regulatory Agencies," and Procedure C-19, "Significant Solution Spills." Overall, the procedures provided an adequate level of guidance for emergency incidents.

During the site tour, emergency call lists were noted to be posted at the control room in clear view. In addition, the emergency call list appeared to be up-to-date.

4.3 Conclusions

The licensee had implemented an emergency preparedness program that met the intent of the site operating procedures.

5 Fire Protection (88055)

5.1 Inspection Scope

The purpose of this portion of the inspection was to determine whether the licensee had an adequate fire protection program and had the necessary organization and controls in place to implement the program.

5.2 Observations and Findings

Fire-fighting requirements were listed in the site procedure manual. Basic fire-fighting response instructions were provided in the licensee's Procedure C-21, "Emergency Preparedness." According to this procedure, upon discovery of a fire, site personnel should attempt to put out the fire with a fire extinguisher if possible and if practical. If the licensee determines that the fire is too large to extinguish with a hand-held fire extinguisher, the local volunteer fire department would be contacted.

During the plant tours, no significant fire hazards were identified. Although some combustible material such as cardboard and wood was found in the plant, the volume was not significant.

The licensee's ability to respond to a fire was reviewed. Discovery of a fire would be made by the receipt of a process alarm or by direct observation and plant workers would have to be notified either verbally, by the plant's alarm system, or by radio. The local fire department could be notified using the commercial telephone "911" service.

Special precautions, if applicable, were added to radiation work permits or work instructions when performing welding or torch cutting. In addition, the licensee attempted to perform most welding and cutting in an area that was segregated from the rest of the plant. The licensee stated that 44 hand-held fire extinguishers were available throughout the facility.

Equipment available to fight fires included the water truck, hand-held fire extinguishers, and, for the scenario of a grass fire, the site's perimeter monitoring wells. Some monitoring wells have quick-disconnect couplings and submersible pumps, and these wells can be used as a source of water.

5.3 Conclusions

The licensee's fire protection program appeared adequate. Fire fighting equipment was available for use in an emergency. No significant fire hazards were identified during plant tours.

6 Maintenance and Surveillance Testing (88025)

6.1 Inspection Scope

The purpose of this portion of the inspection was to determine whether general maintenance operations, surveillance tests, and calibrations were being conducted in accordance with license requirements and approved procedures.

6.2 Observations and Findings

Site maintenance activities were deemed acceptable for the facility. Maintenance activities at the site consisted primarily of corrective maintenance; when a component malfunctioned, that component was repaired. Most problems that occurred in the plant usually resulted in a control room alarm. These alarms were then investigated by the plant operators. If the component in question had malfunctioned, maintenance activities were then performed as necessary to restore the component to an operable status.

Preventive maintenance that was performed on a daily basis included the inspection of pumps and process filters. Weekly and biweekly checks were performed on other mechanical components such as compressors, drives, agitators, blowers, and loaders. Seasonal checks were performed on burners and site vehicles. Preventive maintenance was not performed on items such as plant instrumentation. Although these components were not routinely checked for proper calibration, the licensee believed that the failure of process instrumentation would not go unnoticed by plant operators.

Maintenance records were kept for major plant components such as the site pumps. A work log was used to document needed repairs on plant equipment, otherwise an entry was normally made in the control room logbook. The documentation of maintenance at the site was noted to be simple but effective because the licensee appeared to have maintained the facility components in an effective manner. The licensee did not maintain procedures for maintenance although vendor manuals were available for some plant components. During the plant tour, one pH meter was noted to be out of the required range; however, the licensee repaired the meter prior to the end of the inspection. Few other maintenance issues were identified during the plant tours.

6.3 Conclusions

The licensee's maintenance and surveillance program was reviewed and appeared to be effective.

7 **Followup (92702)**

7.1 (Closed) Violation 40-8943/9601-01: Failure to Establish Procedures and to Maintain Current Procedures in the Facility

During the previous inspection, a violation was identified involving the licensee's failure to establish certain environmental monitoring procedures and a failure to maintain current copies of applicable procedures in certain areas of the facility as required by License Condition 20. The licensee was noted to not have developed procedures for control and use of environmental monitoring thermoluminescent dosimeters, soil sampling, vegetative sampling, and sediment sampling. In addition, out-of-date operating procedures were found in the reverse osmosis building and the deep well pumphouse. The out-of-date procedures were removed from these two areas prior to the end of the inspection.

Since the last inspection, the licensee developed and issued procedures for all required environmental monitoring activities. These procedures were noted to have been incorporated into the licensee's procedure manual. Also, plant tours were performed during the current inspection. Up-to-date procedures were found in all areas of the plant.

Exit Meeting Summary

The inspector presented the inspection results to the representatives of the licensee at the conclusion of the inspection on September 25, 1996. Licensee representatives acknowledged the findings as presented.

Attachment 1

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Grantham, Radiation Safety Officer
R. Herrick, Health Physics Technician
S. Magnuson, Vice President/Manager of Operations
C. Miller, Plant Superintendent

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

None

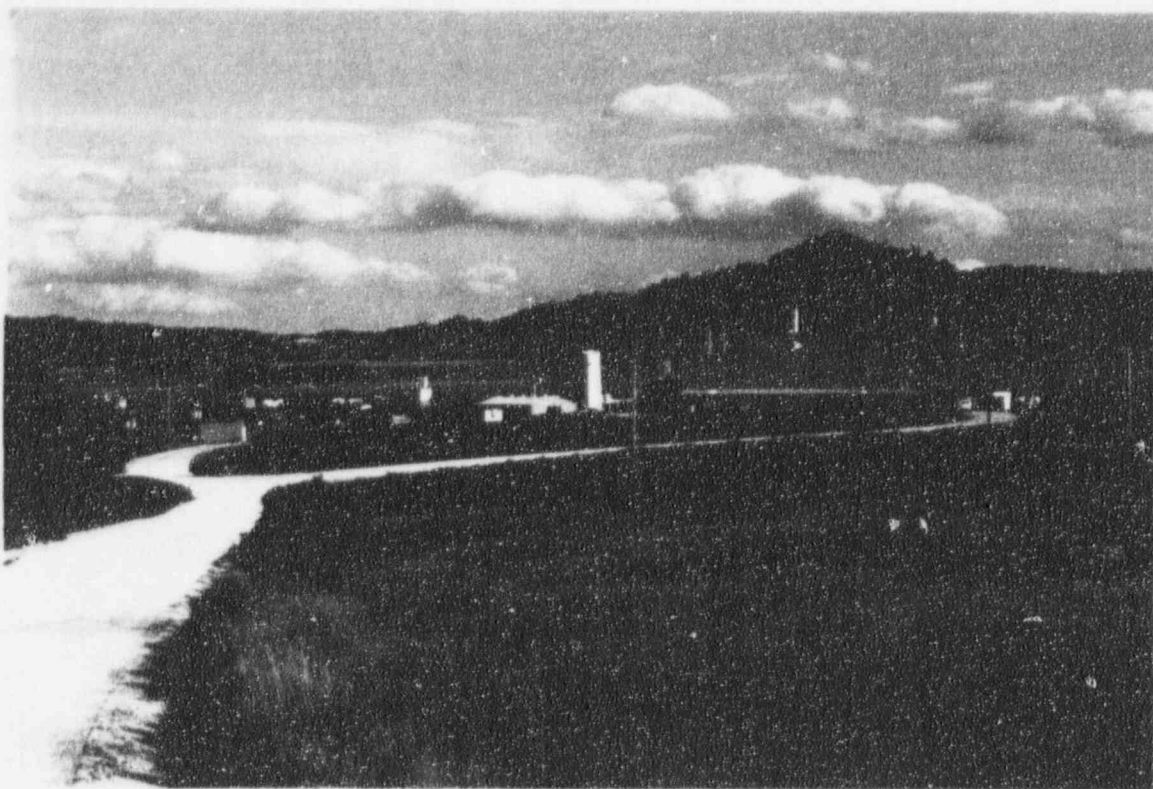
Closed

40-8943/9601-01 VIO Failure to establish procedures and to maintain current
procedures in the facility

Discussed

None

PHOTOGRAPHS TAKEN AT THE CROW BUTTE PROJECT



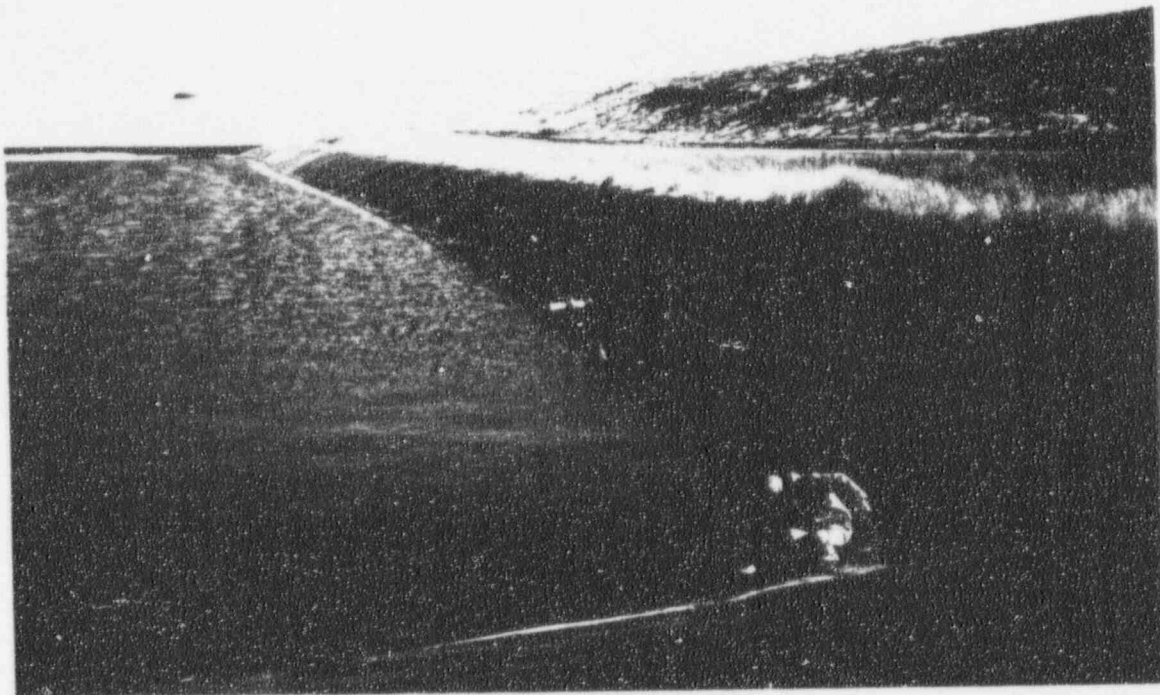
Photograph 1 - The Crow Butte Project with a wellfield in the foreground.



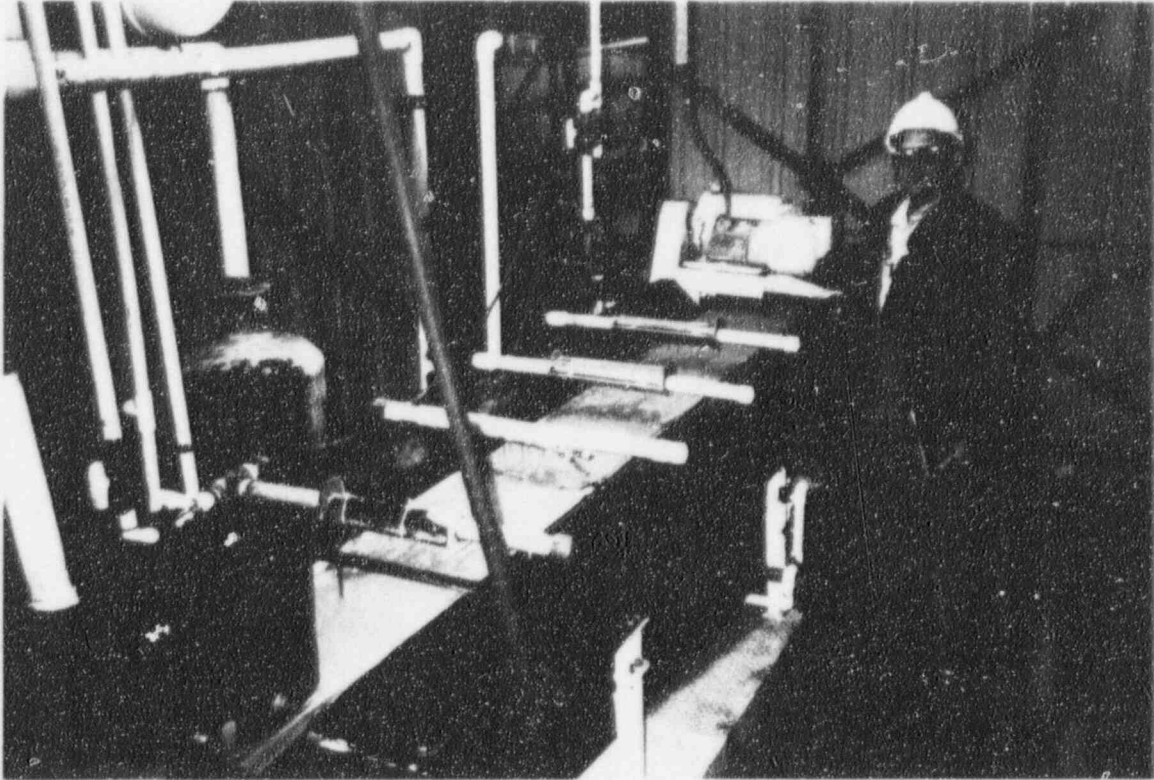
Photograph 2 - A wellfield house under construction in Mine Unit 5.



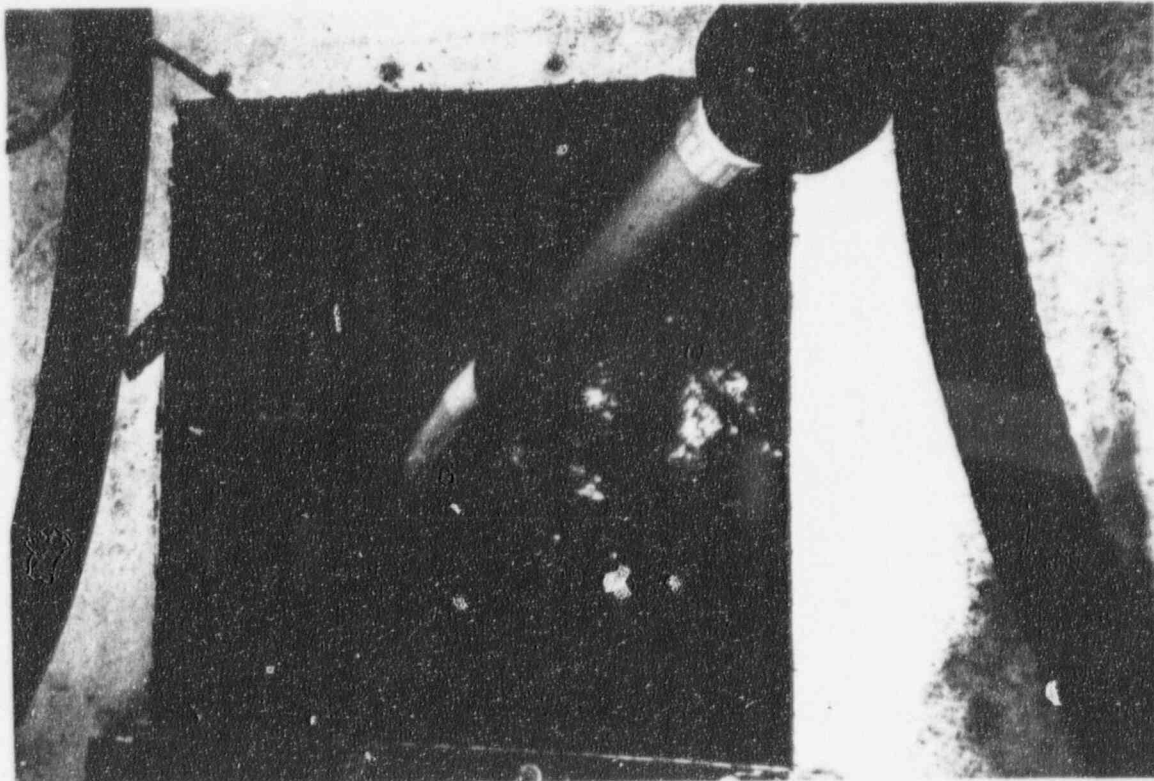
Photograph 3 - Utility person checking pond standpipe fluid conductivity level.



Photograph 4 - Utility person obtaining a pond sample.



Photograph 5 -NRC inspector adjacent to the belt filter, the location where the uranium product was washed prior to drying.



Photograph 6 - Recirculation of contents in the uranium slurry storage tank just prior to transfer to the vacuum dryer.