

COMPLIANCE INSPECTION REPORT

1. Name and address of licensee Uranium Reduction Company 557 First Security Building Salt Lake City, Utah	2. Date of inspection May 12, 1960
	3. Type of inspection Supplementary Follow-up
	4. 10 CFR Part(s) applicable 20 - 40

5. License number(s), issue and expiration dates, scope and conditions (including amendments)
R-161, Amendment 3 (renewed in its entirety) Issued: 10-10-58 Expires: 4-1-62

Scope:

"To receive possession of and title to raw material, without limitation as to quantity, from producers and distributors thereof licensed by the Atomic Energy Commission to transfer and deliver possession and title to such material, for processing at your plant at Moab, Utah, in accordance with Contract Number AT(05-1)-266 between Uranium Reduction Company, First Security Bank of Utah as trustee and the Atomic Energy Commission.

"To receive, transfer, or deliver possession or title to refined source material, in the form of uranium concentrates, from or to persons appropriately licensed by the Commission for resale to the Atomic Energy Commission."

Conditions:

"you are required to maintain records of your inventories, receipts and transfers of refined source material.

"This license is subject to all the provisions of the Atomic Energy Act of 1954 now or hereafter in effect and to all valid rules and regulations of the U. S. Atomic Energy Commission, including 10 CFR 20, 'Standards for Protection Against Radiation', except that partial exemption is hereby granted from Section 20.205(e)(2) and exemption is

(Continued)


6. Inspection findings (and items of noncompliance)

Circumstances being such that the report of the follow-up inspection conducted October 26-29, 1959, was not completed until considerable time had elapsed, another follow-up inspection was made to assure that conditions previously reported had not appreciably changed. The condition of the mill was found to be essentially as it was at the time of the October inspection. The item of noncompliance concerning the posting of airborne radioactivity signs mentioned in the report of the October inspection, had been rectified as stated in that previous report (See Photograph 1, Appendix C). The other item of noncompliance observed or otherwise noted remained the same as formerly found, this being:

- 10 CFR 20.105 Concentrations in effluents to unrestricted areas.
(b) Concentrations of Radium-226 in liquid effluent released to unrestricted areas are in excess of MPC (Par. 15).

7. Date of last previous inspection October 26-29, 1959	8. Is "Company Confidential" information contained in this report? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> (Specify page(s) and paragraph(s))
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Approved by:

Original signed by
WILLIS E. JOHNSON
Richard T. Kant Original signed by
WILLIS E. JOHNSON
(Inspector)
Donald I. Walker, Director
Division of Licensee Inspection
Idaho Operations Office
(Operations office)

JUL 11 1960

(Date report prepared)

If additional space is required for any numbered item above, the continuation may be extended to the reverse of this form using foot to head format, leaving sufficient margin at top for binding, identifying each item by number and noting "Continued" on the face of form under appropriate item.

16-73214-2 U. S. GOVERNMENT PRINTING OFFICE

RECOMMENDATIONS SHOULD BE SET FORTH IN A SEPARATE COVERING MEMORANDUM

9612200138

Item 5 (Continued)

granted from Section 20.203(f)(2) for areas and containers in the plant, provided that all entrances to the mill are posted in accordance with Section 20.203(e)(2) to indicate that all areas and containers in the plant may contain radioactive materials."

(Specify, below, any deficiencies)

1. Control room, no radiation warning sign on door

2. No radiation warning sign on door to control room

3. No radiation warning sign on door to control room

4. No radiation warning sign on door to control room

5. No radiation warning sign on door to control room

6. No radiation warning sign on door to control room

7. No radiation warning sign on door to control room

8. No radiation warning sign on door to control room

9. No radiation warning sign on door to control room

10. No radiation warning sign on door to control room

11. No radiation warning sign on door to control room

12. No radiation warning sign on door to control room

13. No radiation warning sign on door to control room

14. No radiation warning sign on door to control room

COMPLIANCE INSPECTION REPORT

UNITED STATES NUCLEAR ENERGY COMMISSION

9. On May 12, 1960, Mr. R. T. Kant, Division of Licensee Inspection, ID, conducted what might be termed a supplementary inspection to the follow-up of October 26-29, 1959. This supplementary follow-up inspection was performed to ascertain that URC mill conditions had not regressed in the interim between the October inspection and the time of the report writing. Upon arrival at the mill, the inspector spoke briefly with Mr. R. F. Hollis, General Manager of the mill, prior to his departure on a business trip. The inspection was then handled through Mr. T. F. Izzo, Chief Metallurgist. The records of results of all surveys and sampling since the last inspection were examined. Mr. Izzo then conducted a tour of the facilities, pointing out the changes made since the October inspection. The inspector obtained photographs of these alterations and observed the general conditions of the mill during the tour. A grab sample of the tailings liquor overflow was collected at the overflow weir from the barite treatment retention pond (See Photographs 11, 12 and 13). This sample was split with the licensee for purposes of checking the accuracy of their analytical method. It would be well to mention that, although the barite treatment of the liquid effluent had not begun at the time the sample was collected, the mill was operating both an acid and an alkaline circuit. According to the results of previous analyses of this neutralized tailings liquor, which Mr. Izzo displayed, the advent of a carbonate circuit, in addition to the acid side of the mill, has caused a great reduction in the radioactive materials concentrations of the liquid effluent (this is borne out by the AEC results shown in Appendix A).
10. Another reason for conducting a supplementary follow-up inspection of URC was to ascertain the effects of the loss of essentially all of the mill's radiological safety group. Mr. E. B. Winn, who, under Mr. Izzo, was responsible for the program left the company as did Mr. T. Downard, who actually conducted the surveys and sampling program. Both men left the employ of URC at approximately the same time, according to Mr. Izzo. It was discovered, however, upon interrogating Mr. Izzo, that sufficient notice was given, on the part of both men, that their duties could be adequately assumed by competent replacements. Mr. Izzo, himself, has taken Mr. Winn's responsibilities, while Mr. Downard has been replaced by Mr. Henry Baty. Mr. Izzo explained that, whereas the loss of the entire group at one time caused them a good deal of concern, the overall program has not been affected.
11. Four proposals made in the URC reply to orders were not checked during the October inspection. These items were looked for May 12, 1960, and are hereafter listed:
 - a. Installation of a vacuum outlet on the hearth drier doors was considered by URC but testing resulted in abandoning the idea in favor of the use of the vacuum and catch tray arrangement (reported in the October 26-29, inspection report), and the newly installed hood over the yellow cake roaster (See Photograph 7).
 - b. All excessive piping and equipment not required for actual operation of the yellow cake drying and packaging system has been removed to eliminate dust accumulation areas.

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- c. Reports on the progress and results of the radiological safety program are submitted to Mr. L. A. Painter, Mill Superintendent, as proposed. These reports are not always filed monthly, but each covers the activities for a given month's operation, although the report is sometimes late in being published.
 - d. An air balancing pipe has been installed, as proposed, connecting the discharge chute of the primary vibrating screen with the duct housing over the conveyor belt onto which the ore from the screen drops. This serves a purpose similar to that of the pressure equalization ducts located at transfer points on the conveyor belts. The latter were explained fully in the accompanying October inspection report. Careful examination of Photograph 2 shows the air balancing pipe. Although located in a position difficult to photograph, the pipe may be seen above and below the platform in the center background.
12. Several proposals being contemplated at the time of the October visit to the mill, in addition to those which were officially made in the response to orders, were found to be in the following status:
- a. A crusting agent known as Arzan A has been purchased and stored. The purpose of this agent is to form a crust of the fines on the ore pad and prevent their being blown about in the wind. It is not being used at present and may not be employed since it is the belief of Mr. Izzo that the heavy equipment moving constantly about the ore pad will merely crush the crust which is formed by the agent to powdered fine ore again.
 - b. The use of a belt beater and brush, or similar arrangement, to prevent accumulation of dust at the tension points on the conveyor belts has been resolved with an apparatus depicted in Photograph 6. The belt is cleaned of crusted ore by the pliable scraper and the dust thereby generated is vented to the dust collection system via the vent shown in the photograph.
 - c. Dust sensitive photoelectric cells, considered for installation in the crushing plant, have been received at the mill but have not been installed as yet. Mr. Izzo informed the inspector that Dr. Leslie Silverman, Ventilation expert of Harvard University, informed mill personnel during a visit to URC that such equipment would not work satisfactorily. The installation will be made soon, however, according to Mr. Izzo, since the equipment has been purchased.
13. A review of the URC records was accomplished. Surveys for sources of external radiation are performed on a quarterly basis. Since the last inspection there has been no detection of hazardous conditions. The highest indications detected throughout the mill area were found to be 5 mr/hr in contact with the highest grade ore on the premises. Average readings were noted to be less than 0.5 mr/hr. Except for two job classifications (crusher operator and moisture man) the old film badge program was discontinued on October 20, 1959. The highest reading,

Uranium Reduction Company

other than those classifications mentioned above, was 44 mrem per 40-hour work week. The employees in the job classifications previously mentioned sustained damage to their badges necessitating another 13 weeks of badging to determine their average weekly exposure. On February 15, 1960, employees engaged in new operations resulting from start-up of the new carbonate leach plant were badged to determine personnel exposures resulting from these new operations. Tracerlab, Inc. is supplying the badges and interpreting the results as in the previous program.

14. Of the multitude of air samples collected by the licensee between November 1, 1959, and May 1, 1960, 29 general air samples exceeded MPC. Only one breathing zone sample was in excess of MPC. Further breathing zone samples collected on the same operation produced results which, when averaged with the high concentration just referred to, indicated that personnel involved were not being overexposed. It is significant to state that the Chemistry Laboratory personnel at URC, who analyze the air samples fluorimetrically for uranium, are now using a figure of less than 1.24×10^{-11} $\mu\text{C}/\text{ml}$ as a lower level of confidence. This is of importance in that they can presently detect, with confidence, concentrations down to 25 per cent of the MPC. Mr. John Goff, Head Chemist, explained that they can justify this revision by the fact that larger volumes of air are now drawn in sampling.
15. Although URC liquid effluent sampling records (see Appendix A) show that the mill release contains concentrations of radioactive materials in excess MPC, it is noteworthy that since the commencement of operations of the alkaline circuit in addition to the acid plant, the neutralized tailings liquor analyses show radium concentrations to have been reduced by a factor of about 10. However, the release of radium concentrations in excess of MPC in the liquid effluent constitutes noncompliance with 10 CFR 20.103, "Concentrations in effluents to unrestricted areas." Barite treatment had not begun at the time of the inspection. The inspector was informed by Mr. Izzo, however, that treatment was to commence in the very near future. Chemistry laboratory experimentation (results shown with liquid effluent analyses in Appendix A to this report) indicates, according to Messrs. Izzo and Goff, that the introduction of barium sulfate to the tailings liquor overflow might, in addition to the acid and alkaline circuits' neutralizing effect, bring concentrations of radium in URC liquid effluent below MPC. Mr. Izzo told the inspector that barium chloride was even more effective in unofficial laboratory tests. The effects of the carbonate plant effluent and the forthcoming barium introduction upon the thorium concentration in the liquid effluent remains unknown to URC since they have made no attempt to analyze for thorium. Mr. Goff informed the inspector that chemicals have been ordered and arrangements have been made to analyze for Thorium-230, although the actual analysis has not begun.
16. While touring the mill with Mr. Izzo, the inspector noted the following:
 - a. The ore deposition in the area of the #2 and #3 vibrating screens, mentioned in the report of the October 26-29, 1959, inspection, was still a problem and a dust generation point (see Photograph 3). (According to Mr. Izzo, however, the cause of the ore falling from the belt had been discovered.

A divider plate which divides the moving ore between the #2 and #3 vibrating screens had been nearly disintegrated by the moving ore. Mr. Izzo explained that replacement of this steel plate was to be made and the problem thereby solved).

- b. The centrally located vacuum cleaning plant for the crushing area has been installed in the fine ore bin gallery, and outlets may be utilized throughout the crushing facility. (Note Photographs 3, 4 and 5).
 - c. A burner for ashing Shriver Press filters and recovering the yellow cake has been installed near the roaster on the fourth level of the drying area (see Photograph 8). [The burner was not operating at the time of the inspection, but Mr. Izzo assured the inspector that it would be operative in about one week. In the meanwhile, as shown in Photograph 10, the filter papers are stored in an isolated area. The burner will be exhausted through the same flue as the roaster (see Photograph 9).]
 - d. A recently installed hood over the top of the yellow cake roaster is being utilized along with the catch tray vacuum procedure in lieu of the vacuum outlet installation on the hearth drier doors. The latter did not prove adequate, according to Mr. Izzo. The hood and catch tray apparatus may be seen in Photograph 7.
 - e. At the time of the inspection visit, the barite treatment of tailings liquor had not begun, although the equipment was in readiness and the tailings liquor overflow was flowing through it. Introduction of the barium sulphate had not begun, but, as previously mentioned, Mr. Izzo stated treatment was to commence within the next few days.
17. On the day the tour was made, the mill was processing an extremely dry ore lot, which, according, to Mr. Izzo, had been previously crushed and stockpiled. A high wind was blowing and the atmosphere was dusty. While passing through the primary crusher building, the inspector noted that the heavy dust-laden atmosphere was attributable to the gusty wind blowing across the ore pad and into the building through open doors and other portals. Generation of dust within the crusher area itself was of a minimum quantity by comparison as evidenced when the wind momentarily let up. The fine ore return from the dust collection unit for the crushing plant had many leaks which contributed in some measure to the dust generation problem. Mr. Izzo said that gaskets would be replaced to curtail the dust generation from this source.
18. In a discussion with Mr. Izzo, the inspector brought up the possibly hazardous operation of cleaning and/or maintaining the baghouse wherein is located the dust collection system for the yellow cake drying and packaging area. Mr. Izzo informed the inspector that the baghouse is only entered for purposes of maintenance. The configuration is such that cleaning is taken care of automatically without the necessity for entry into the housing. Furthermore, maintenance has only been required

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two times in the approximately 2-1/2 years of operation, according to Mr. Izzo's information. It is admittedly a dirty operation requiring respirators when done, however. It was also learned in the discussion that radiation safety personnel have placed dust collection plates coated with an adherent petroleum product in several locations between the mill and the city of Moab. These plates were located in these several positions shortly before the May 12, 1960, inspection and will be assayed after one year for dust-borne uranium.

19. Items under consideration to enhance safe operation of the mill from a radiological standpoint are, according to Mr. Izzo, as follows:
 - a. A street sweeper larger than the one presently in use on the ore pad has been proposed and bids are being received on same.
 - b. Additional dust collection equipment has been considered for the area encompassing the sample tower and that over and under the fine ore bins.
 - c. Of greater magnitude is the 100 per cent standby dust collection system proposed for the crushing plant. Both Mr. Hollis and Mr. Izzo explained that when and if this standby system was installed, it would be utilized while the existing system undergoes preventive maintenance. At that time, the present system will be placed in a standby status to assure no plant down time in the event of a dust collection system breakdown. Although not in the installation stages, this proposal will most likely be accepted, according to Mr. Izzo.
 - d. A turbo-powered boat may be purchased by URC, according to Mr. Izzo, for the sampling of the Colorado River. At present the company utilizes the services of a boat and the employee who owns it for river sampling trips. Economically, a mill-owned boat might be more feasible over a lengthy period of sampling, according to Mr. Izzo.
20. Following the inspection, a lengthy discussion was held with Mr. Izzo and Mr. L. A. Painter, Mill Superintendent. The item of noncompliance was discussed and Mr. Painter brought out a point which seems to bear repeating in this report. In essence, this point, made by Mr. Painter and shared with him by Mr. Izzo, was that if nothing is to be done by the Commission in the cases where uranium mills did not comply with regulations, or make any noticeable attempt to do so, what would be the object of them (URC) spending so much time, effort, and money to have a good mill which is in compliance. A prelude to this statement was made by Mr. Painter when he asked the inspector what was going to happen in the cases where mills did not comply. It was explained by the inspector that they might be assured that whatever course of action the Commission took, their efforts at URC would not be for nothing.

Uranium Reduction Company

21. It was discovered early in the inspection visit that URC had applied for an extension of one year to gather additional data to substantiate evidence to support a request for an exemption for discharging concentrations of radioactive materials in liquid effluent to the Colorado River. (Appendix B is a copy of this letter of request.) To the date of the inspection, no answer had been received nor had URC received acknowledgment that DLR was in receipt of the letter from Mr. Hollis. The inspector was informed by Mr. Hollis that he appreciated DLR's workload, but was worried as to whether or not the request for extension had even been received. The inspector assured Mr. Hollis, at that time, and Messrs. Painter and Izzo during the parting comments, that DLR would be reminded of the situation.

APPENDIX A

URANIUM REDUCTION COMPANY Moab, Utah

Liquid Effluent Analyses
Samples Collected May 12, 1960

<u>Location</u>	<u>AEC</u>		<u>URC *</u>	
	<u>Radium-226</u> <u>μc/ml x 10⁸</u>	<u>Thorium-230</u> <u>μc/ml x 10⁸</u>	<u>Radium-226</u> <u>μc/ml x 10⁸</u>	<u>Thorium-230</u> <u>μc/ml x 10⁸</u>
Lower end of overflow weir from retention pond. No barite introduced at time of sampling, but both acid and alkaline plant operating.	87 ± 2.2	1.5 ± 0.5	94	.75

* The sample was collected and split with URC in order to compare analytical results. Comparison was made by telecon with Mr. Izzo, at a later date.

URANIUM REDUCTION COMPANY

INTER-OFFICE CORRESPONDENCE

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To T. F. Lane

From John Goff

Date May 12, 1960

Subject RADON ASSAYS COMPLETED BY THE ABC METHOD

TAILINGS POND EFFLUENT

(Date)	(Acid)
11-12-59	
1-21-60	
3-11-60	
3-24-60	

TAILINGS POND EFFLUENT COMPOSITION

January, 1960

February, 1960

March, 1960

TAILINGS POND EFFLUENT

Date	Acid	Radon (mCi/L)
1-18-60	No addition	25
1-18-60	.1 gm $\text{Fe}_2(\text{SO}_4)_3/\text{L}$	23
1-18-60	.5 gm $\text{Na}_2\text{SO}_4/\text{L}$	1.6
1-18-60	.5 gm $\text{Na}_2\text{SO}_4 + .1 \text{ gm } \text{Fe}_2(\text{SO}_4)_3/\text{L}$	1.3
1-18-60	.1 gm $\text{Na}_2\text{SO}_4/\text{L}$.6
1-18-60	1 gm $\text{Na}_2\text{SO}_4 + .1 \text{ gm } \text{Fe}_2(\text{SO}_4)_3/\text{L}$	1.9
1-18-60	3 gm $\text{Na}_2\text{SO}_4/\text{L}$	1.1
1-18-60	3 gm $\text{Na}_2\text{SO}_4 + .1 \text{ gm } \text{Fe}_2(\text{SO}_4)_3/\text{L}$	1.5
1-18-60	3 gm $\text{Na}_2\text{SO}_4/\text{L}$	1.0
1-18-60	3 gm $\text{Na}_2\text{SO}_4 + .1 \text{ gm } \text{Fe}_2(\text{SO}_4)_3/\text{L}$	1.1

ABC METHOD

(mCi/min 10^{-9})
405 no neutralization

29
47
46

40
42
47

22
31

.7
.9
1.0
.8
.5
.1
.7
.6

BARRELL METHOD

(Comparison)
mCi/ml $\times 10^{-9}$

25

23

1.6

1.3

.6

1.9

1.1

1.5

1.0

1.1

RIVER WATER ASSAYS

LOCATION

Date	Location	Radon (mCi/L)
3-11-60	Belores above Colorado	3
3-11-60	Colorado above Belores	.9
3-11-60	Colorado at the Boney Bridge	1.6
3-11-60	Colorado at Meab Bridge	1.9
3-11-60	Colorado 1/4 mile below mill	3.0
3-11-60	Colorado 1/2 mile below mill	2.6
3-11-60	Colorado 3 miles below mill	2.3
3-11-60	Colorado 10 miles below mill	3.2
3-11-60	Colorado 20 miles below mill	4.7
3-11-60	Colorado 10 miles above confluence	3.7
3-11-60	Cole. 1 mile above confluence	4.4
3-11-60	Cole. 1 mile below confluence	3.8
3-11-60	Green 1 mile above confluence	1.1
3-24-60	Cole. above Belores	1.3

RIVER WATER ASSAYS

LOCATION

Date	Location	Radon (mCi/L)
3-24-60	Belores above Colorado	3.1
3-24-60	Colorado at Boney Bridge	.9
3-24-60	Colorado at Meab Bridge	1.2
3-24-60	Colorado 1 mile below mill	1.3

ABC METHOD

(mCi/min $\times 10^{-9}$)

3.1
.9
1.2
1.3

Appendix A/2

APPENDIX B

C
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Y

February 25, 1960

Reference Code - (40-3453)

Mr. H. L. Price, Director
Division of Licensing and Regulation
United States Atomic Energy Commission
Washington, 25, D. C.

Dear Sir:

In my letter to you dated August 10, 1959, the following quoted paragraphs describe the Uranium Reduction Company's effluent and river sampling program.

"Our procedure with respect to the determination of concentrations of radioactive material discharged in liquid effluents has been to take, starting February 27, 1959, monthly samples of Colorado River water from a point one mile above the Moab Mill, a point 5 miles downstream, and another 10 miles downstream from the mill, as well as monthly samples of the tailings pond overflow into the river. These samples, up to and including June 23, 1959, have been sent to Combustion Engineering Corporation for radium analysis. The results of these tests may well be in our possession by the time you receive this letter.

"It is our intention to apply for an exemption to the provisions of 20.106, relating to the radium and uranium limits in our tailings pond effluent. We believe that it is reasonable to apply for an exemption because of our isolated location and because of the large volume of water flowing past the Moab Mill in the Colorado River. However, in order to present adequate data to the United States Atomic Energy Commission with the application for exemption, we plan to gather data for one year prior to the application. In addition to the sampling program described above, we plan to inaugurate a more extensive sampling program in the near future. This sampling schedule will be made in line with suggestions of the United States Geological Survey Office located in Salt Lake City. This enlarged sampling program will enhance our data. The reason for this extended test period is to be in possession of complete information to cover the large seasonal variations in river flow so that a sensible and understandable presentation can be made."

Since the inception of this program, two conditions have developed which I believe warrant an extension of this testing program.

The first of these conditions is the conversion of our plant from an acid leach - RIP plant to a combined acid leach - alkaline leach - RIP plant. This conversion has resulted in a substantial reduction in radium concentration in our tailings effluent.

The second condition is the discovery by A. E. C. personnel in January, 1960 that the Modified Harwell analytical procedure for radium analysis which we have been using gave erroneously high results on tailings effluent samples due to co-precipitation of Thorium. Since our analytical results on tailings effluent have been negated by this

Appendix B/1

9612/90426

Page 2

Reference Code - (40-5453)

discovery, we are in the process of changing our analytical procedure to correspond with that recommended by A. E. C. personnel at the seminar held in Idaho Falls in January of this year.

For these reasons I am requesting a one year extension of our sampling and testing program.

I would appreciate an early reply as to whether this meets with your approval.

Sincerely

R. F. Hollis
Vice President-General Manager

RFH:mw

MEMO ROUTE SLIP		See me about this.	For concurrence	For action.
Form AEC-98 (Rev. May 14, 1947)		Note and return	For signature.	For information.
TO (Name and unit)	INITIAL	URANIUM REDUCTION COMPANY, LICENSE NO. R-161		
R. E. Cunningham L&R	DATE			
TO (Name and unit)	INITIALS	Attached for your information is a copy of the report dated July 11, 1960, together with the ID transmittal memo, also dated July 11, 1960, with respect to the inspection of subject licensee. We are preparing a memo containing our comments and recommendations.		
	DATE			
TO (Name and unit)	INITIALS			
	DATE			
FROM (Name and unit)	REMARKS			
W. E. Kriegsmann CO				
PHONE NO.	DATE			
3670	7/18/60			

USE OTHER SIDE FOR ADDITIONAL REMARKS

U. S. GOVERNMENT PRINTING OFFICE : 1957—O-4220.

Uranium Reduction Company

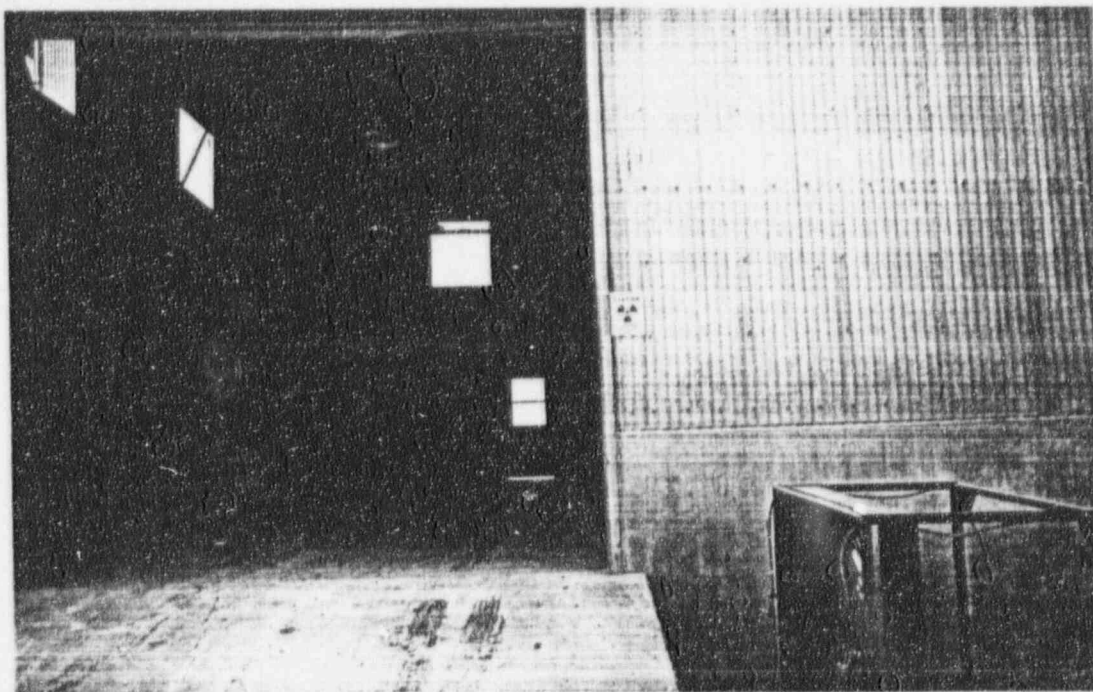
Mouab, Utah

APPENDIX C

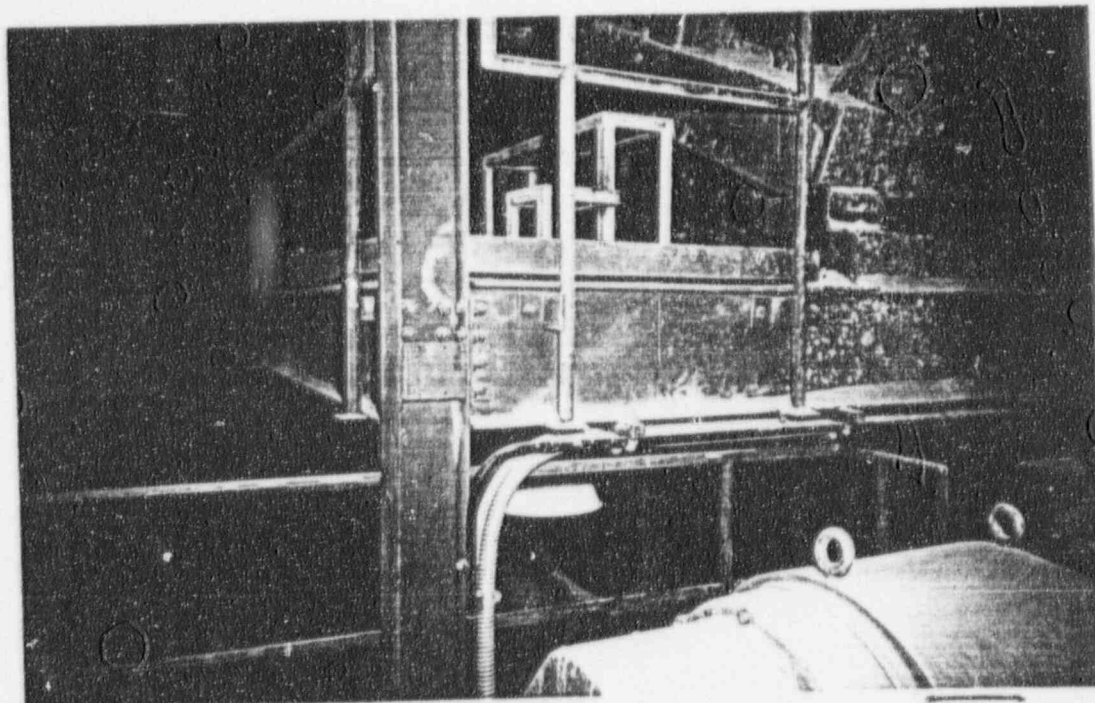
PHOTOGRAPHS

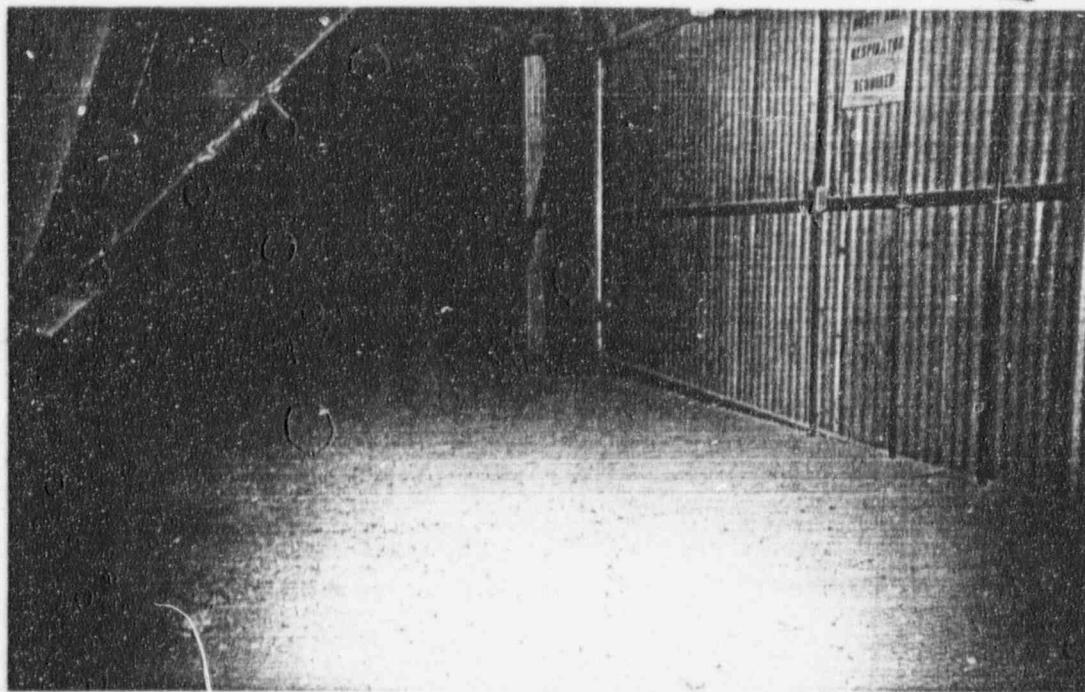
Supplementary Follow-up Inspection

May 12, 1960

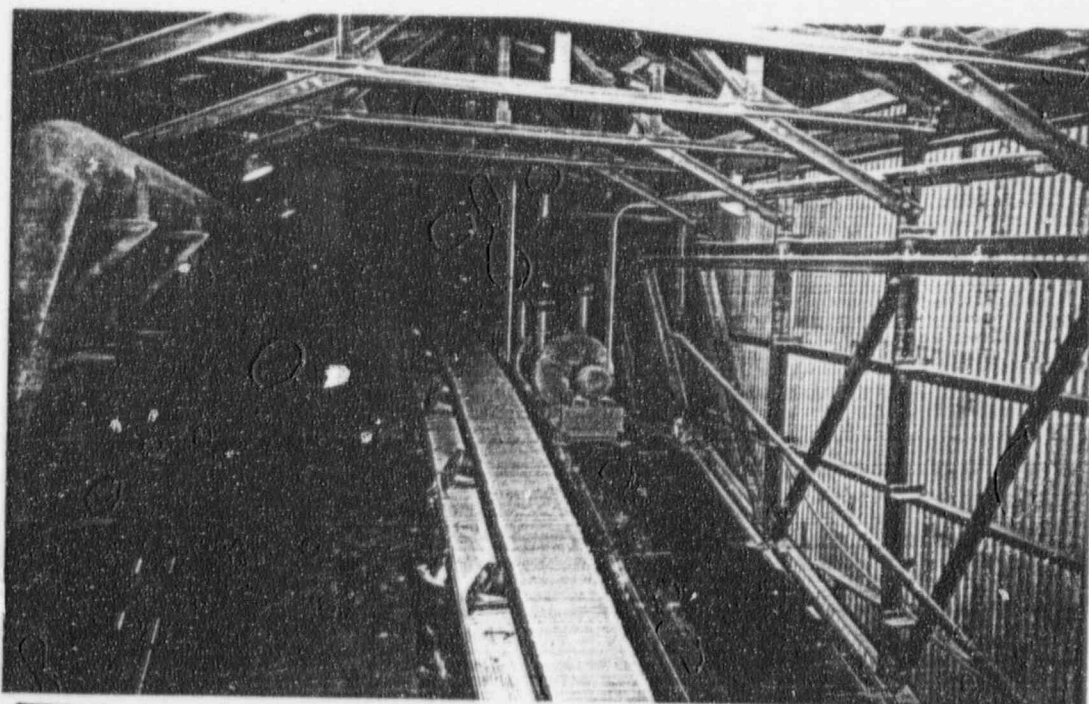


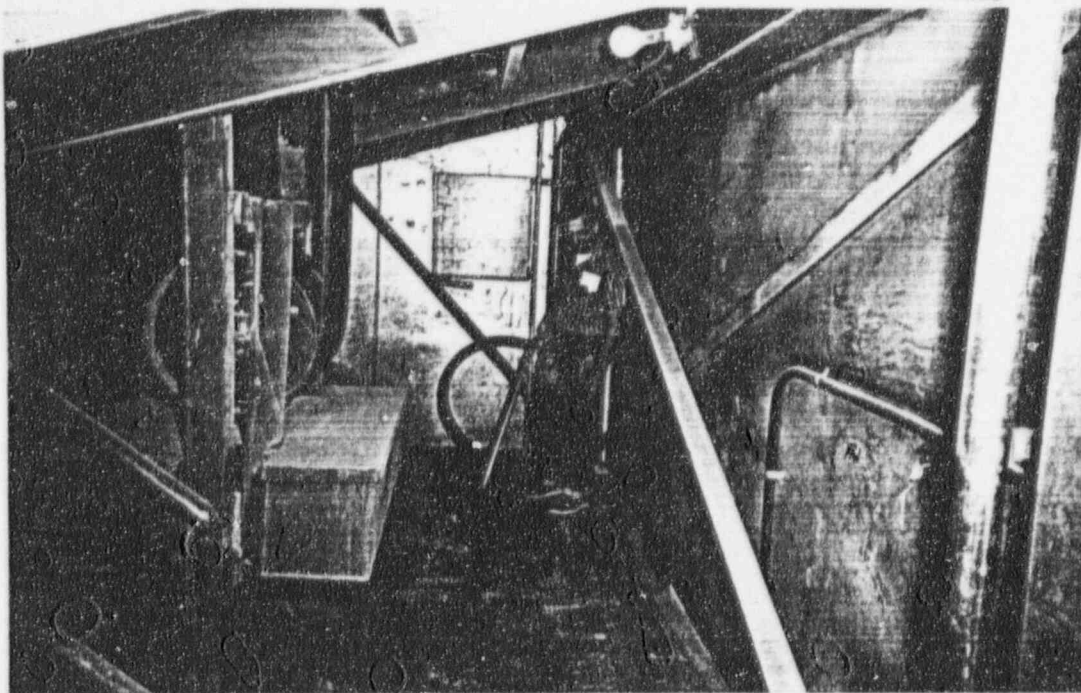
1. Crusher Building showing one of many signs posted as a result of October 26-29, 1959, inspection.
2. Air balance pipe connecting the discharge chute of #1 vibrating screen with the dust collection duct housing below. (See center background)





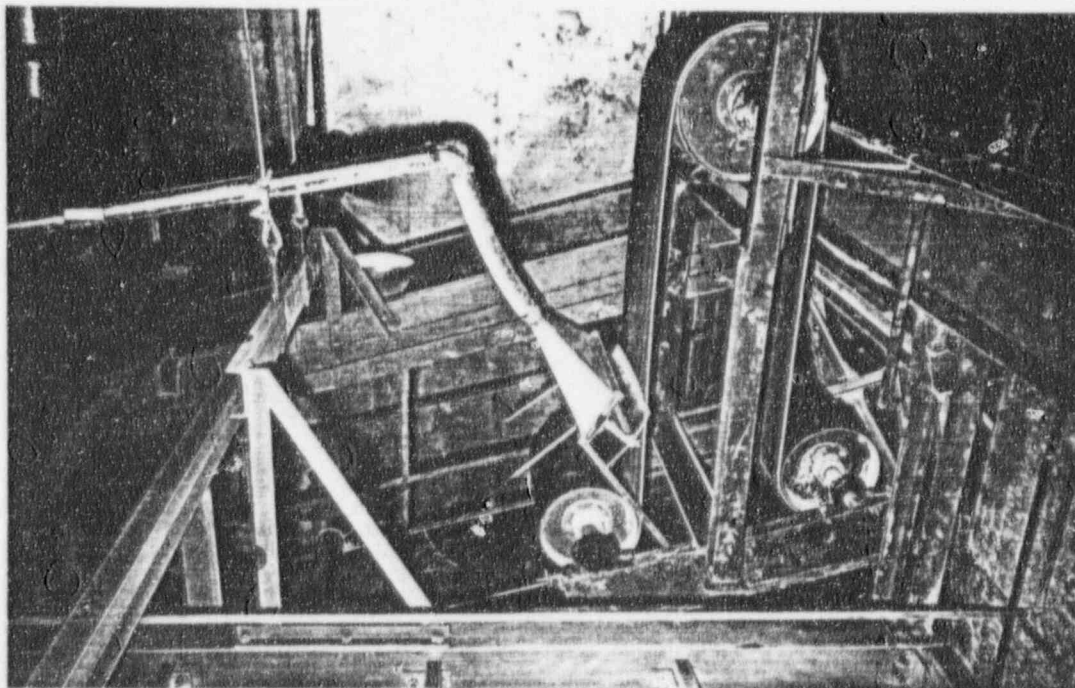
3. Area behind #2 and #3 vibrating screens. (Note vacuum cleaner outlet and piping in center of photograph)
4. Centrally located vacuum cleaning plant for crushing area -- Fine ore bin gallery.

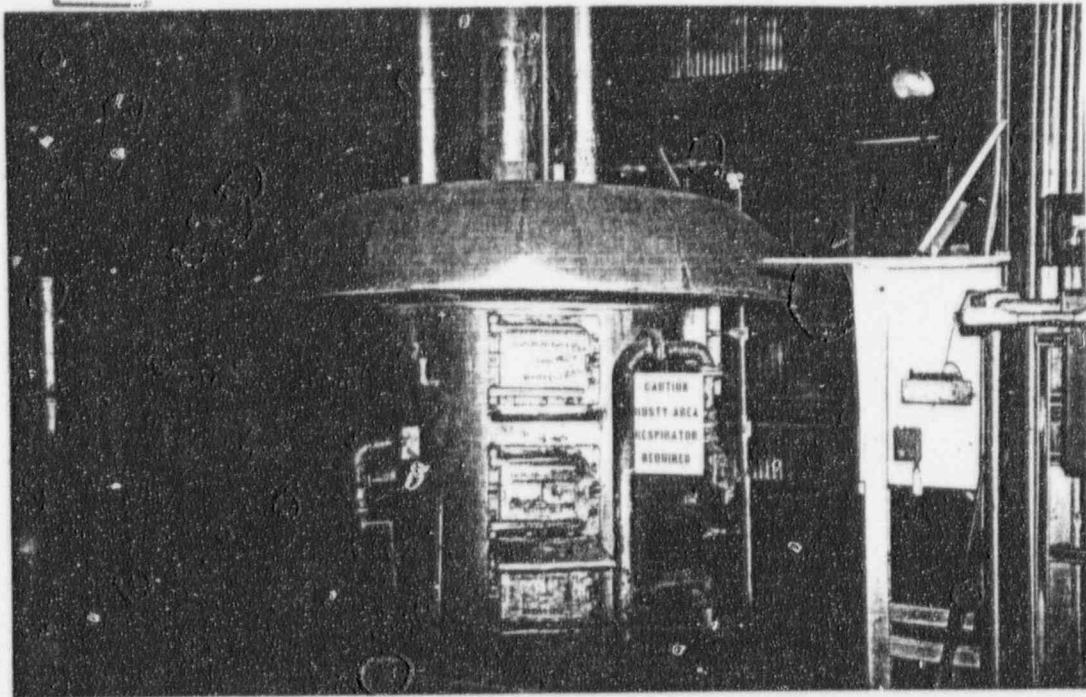




5. Mr. Iaso with cleaning tool and hose in crushing-sampling area.
(Note vacuum piping right foreground)

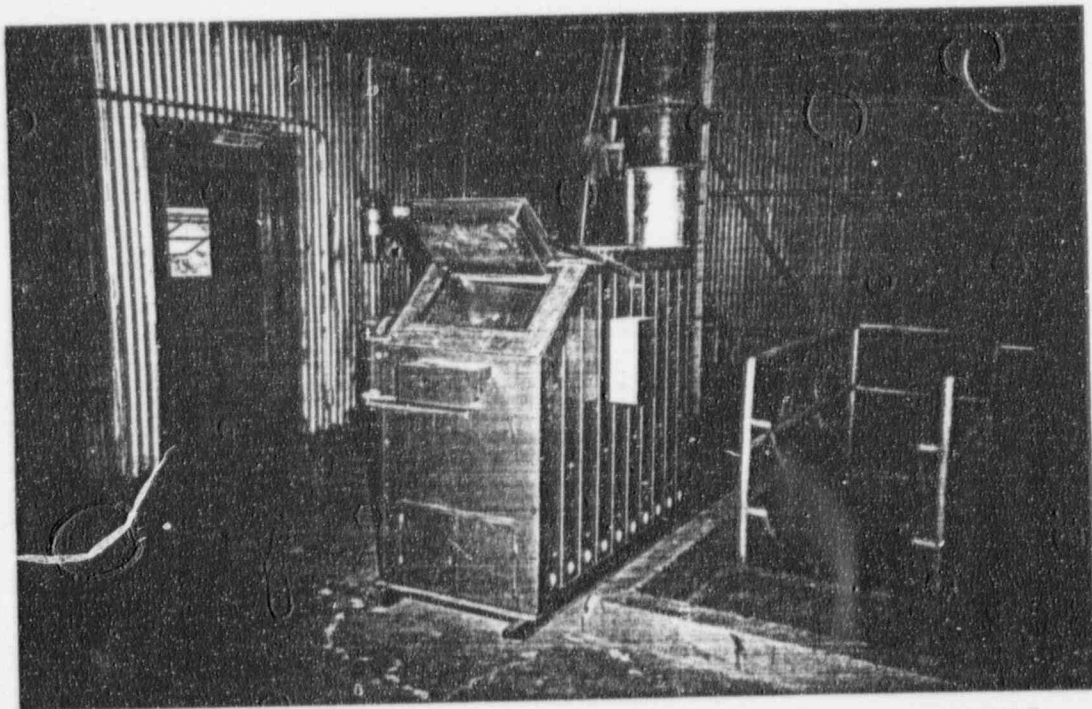
6. Conveyor belt tension point showing belt cleaner and dust collection ductwork.

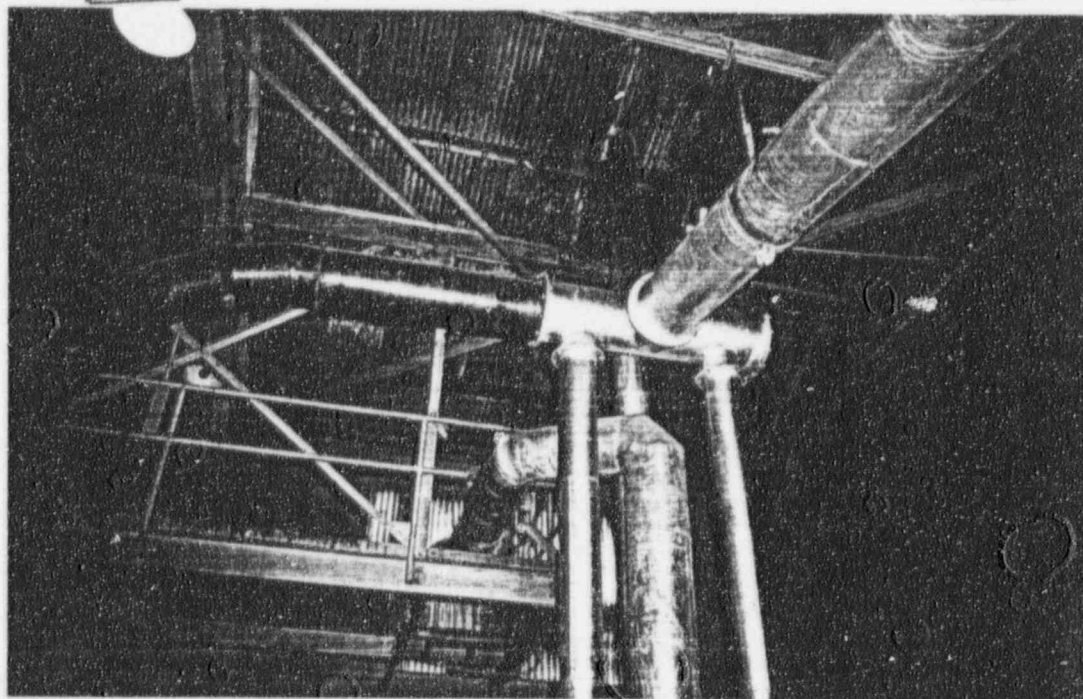




7. Top of yellow cake roaster showing new hood and flues. (Note sign, and tray beneath hearth door)

8. New burner for ashing Shriver Press filter papers.

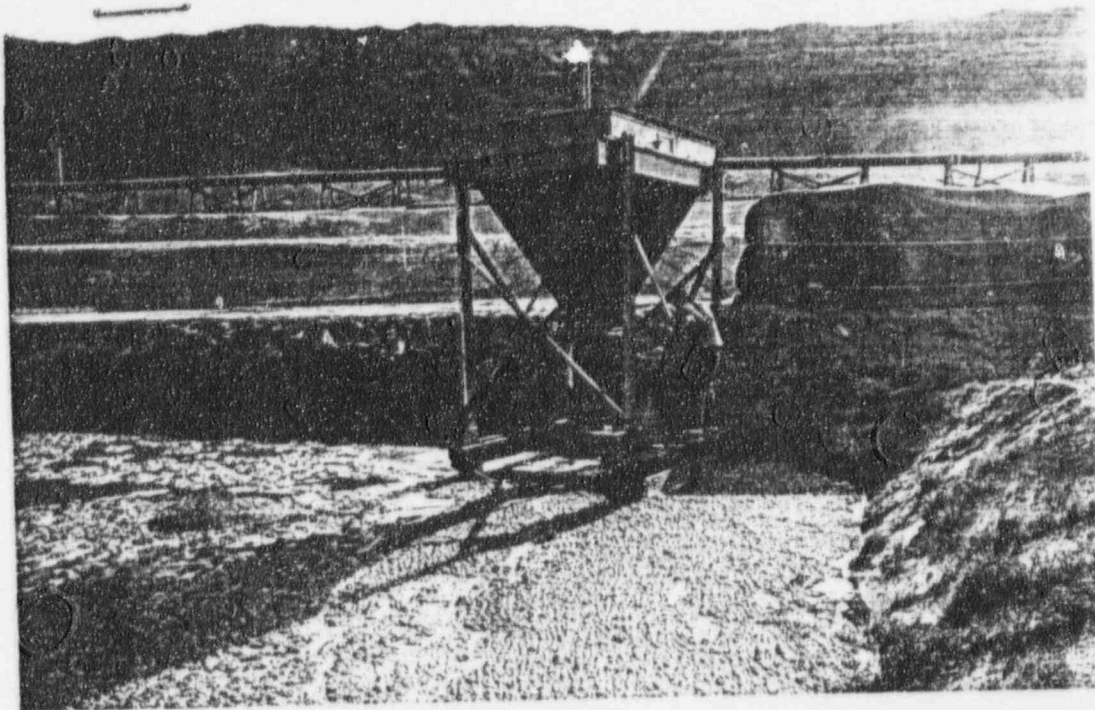




9. Yellow cake roaster exhaust flues. (Note: Dark pipe from left is from new burner shown in photograph 8. Roaster and burner exhaust are integrated.)

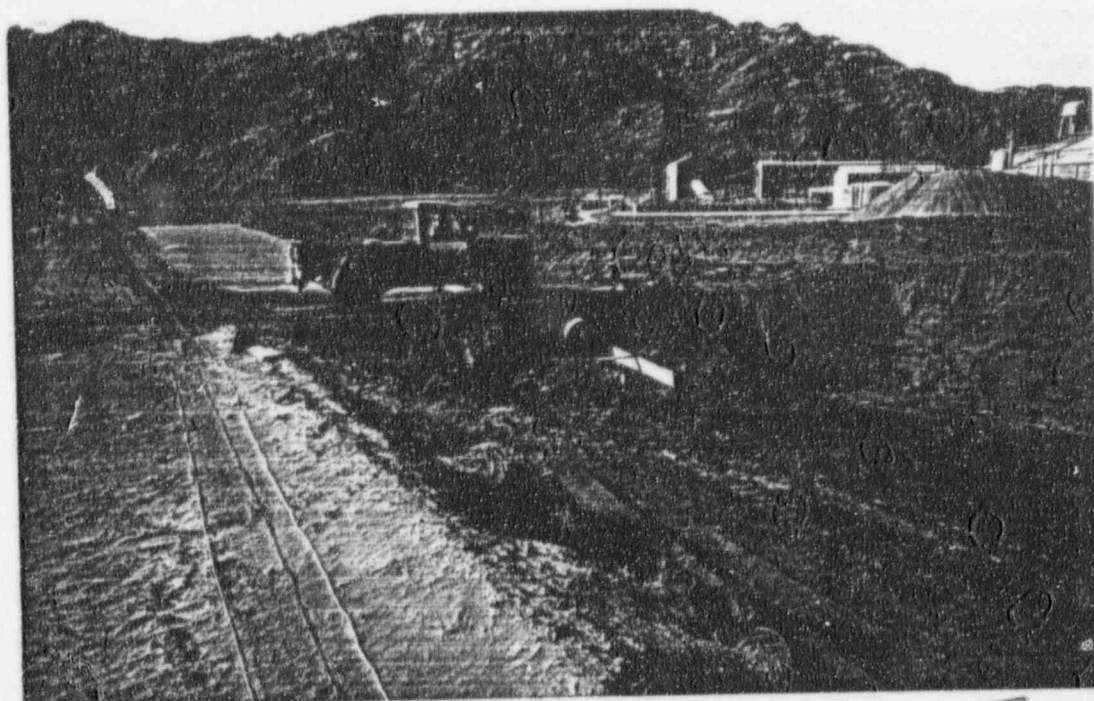
10. Isolated storage shed for Shriver Press filters (until new burner is operative).

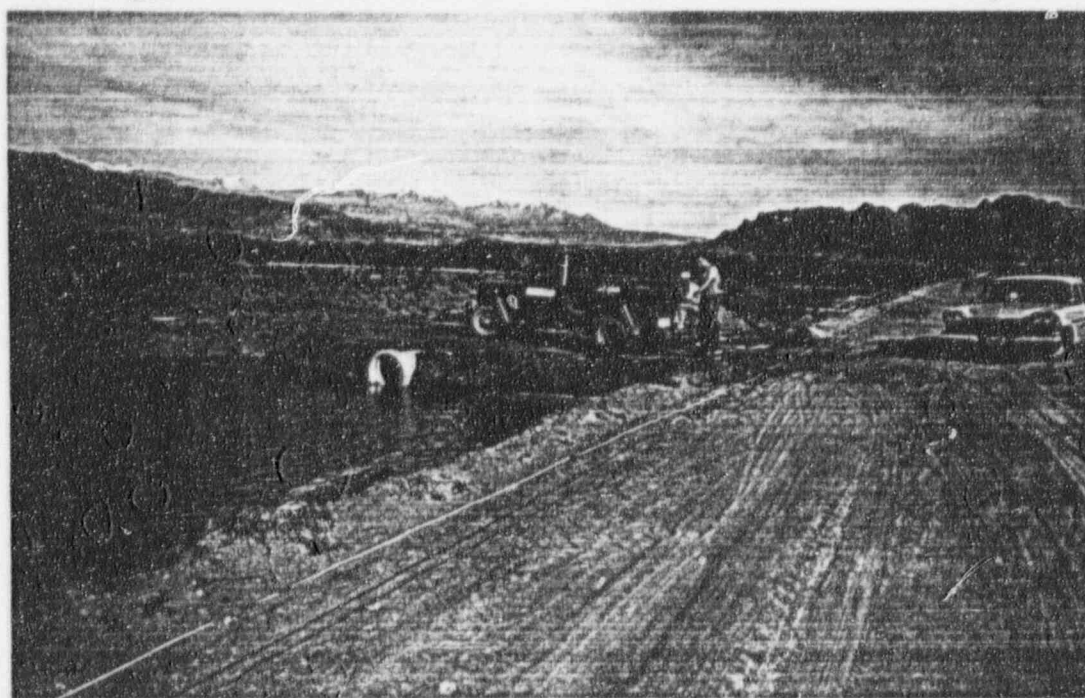




11. Inlet to barite treatment retention pond showing barite introduction equipment. (Note tailings pond dike in background)

12. Barite treatment retention pond showing overflow to ditch bound for Colorado River. (Note barite introduction equipment in distant background)





13. Overflow weir in barite retention pond. (Note ditch to Colorado River in background)