MEMO ROUTE SLIP
Form AEC-93 (Rev. May 14, 1947)

☐ See me about this. ☐ For concur ☐ For action.
☑ Note and return. ☐ For signature. ☐ For information.

TO (Name and unit)	INITIALS	REMARKS
F-311 RD J. Lieberman		DOCKET NO. 50-665
	DATE	

TO (Name and unit)	INITIALS	REMARKS
		5/20
	DATE	Lieberman JM

TO (Name and unit)	INITIALS	REMARKS
		Bolter WGB
	DATE	Simpson

FROM (Name and unit)	REMARKS
Bill Hughes D15 C-469	File FYI 4 inserts in MB Rec'd 8-15-61
PHONE NO. / DATE 5/19/60	

Date MAY 1
Copy No.
Director
Int.
Civ. Rea.
Nucl. Tech. 1
Army
Air
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Mar.
Comm. Act.
Adm.
GIA Stat.
CF

USE OTHER SIDE FOR ADDITIONAL REMARKS

☆ U. S. GOVERNMENT PRINTING OFFICE : 1957—O—422007

Information in this record was deleted in accordance with the Freedom of Information Act. Exemptions 6
FOIA/PA 2012-0394

B-2

RECEIVED
U.S. ATOMIC ENERGY COMMISSION

JUL 1 5 196'

A.M. P.M.
7 8 9 10 11 12 1 2 3 4 5 6

Re: talk c Peterson, Anaconda's Asst Mgr on 8/17/01

① Received only your ltr of 8/14/01 (i.e. copies of other must have only been distrib.)

② Will send in barrel hood description

③ Respirators are used in areas which are below MPC & will discontinue their use because of nuisance in handling

④ Filter presses, carbonate & acid circuit drum dryers are wet processes - can't understand why Coal ashs for ht of exhaust stacks etc?

⑤ Sample prep hood & metallurgical lab are roof level exhausts and are practical nil in release of lab scale dust from analytical proc.

⑥ Rotoclones 3, 4, 5, 6, 8, & 9 are in one area's (not one conc.) and I can't see why we are asking for conc. of rad materials etc.

⑦ Microdyne dust collecta is 8000 cfm

Concl we need no further info for loc action

OPTIONAL FORM NO. 10
5010-104

UNITED STATES GOVERNMENT

Memorandum

TO : Files

DATE: SEP 13 1962

FROM : Don Harmon

SUBJECT: RADIATION SAFETY ANALYSIS, THE ANACONDA COMPANY. DOCKET NO. 40-665.

DLR:DFH

Conclusions and Recommendations

Based on the fact that the information submitted by the licensee in support of his application for renewal of Source Material License No. R-138 appears adequate and the fact that all enforcement action has been completed (Only one minor violation was noted during the October, 1961, inspection and has been corrected--incineration of wooden filter press frames containing small quantities of natural uranium without authorization to incinerate), it is recommended that the license be renewed. Further, since Mr. Nussbaumer had the opportunity to tour this mill during his recent visit to Grants, it is recommended that a pre-licensing visit not be conducted.

Analysis and Findings

The major portion of the information submitted by the licensee in support of his application for license renewal has previously been reviewed (See memo from Rogers to Delaney dated October 11, 1960 and memo to files from Welty dated August 7, 1961.)

Welty points out in his review that the description of the ventilation system which exhausts the barrel filling hood was omitted in the application. This information has now been submitted and appears satisfactory. Welty also pointed out that the location and concentrations of exhaust ports for the Nos. 3, 4, 5, 6, 8, and 9 Rotoclones, the sample preparation hoods, barreling hoods, filter presses, drum dryers and metallurgical laboratory were not discussed by the licensee. Since Nos. 3, 4, 5, 6, 8 and 9 Rotoclones are in the ore crushing area where the collected dust is recycled to the circuit and since the crushing system is segregated from the main processing building, it appears that the small quantities of airborne radioactivity exhausted through the ports to unrestricted areas would be of little consequence and in any event would be detected by the licensee's air sampling program. In addition, the

...ce pu... ...nd in any ... ...rogram.

filter presses, carbonate and acid circuit drum dryers are wet processes and would not be expected to create significant airborne radioactivity. The same can be said for the sample preparation and metallurgical laboratory processes since they are lab scale processes. In any case, the licensee states that the 6 exhaust ports (including none of the above) from which significant concentrations of airborne radioactivity may be exhausted are sampled and that his unrestricted airborne survey program includes sampling at the property boundry. Since plant boundry airborne surveys, including diffusion calculations, show that the licensee is using an appropriate method to determine compliance with Section 20.106(b), it appears that we have adequate information regarding discharge of airborne radioactivity.

With regard to the three items of information requested in our letter dated July 3, 1962, the information submitted by the licensee appears adequate. The licensee has submitted a detailed description of his tailings retention system and earth dams including information on heights, top widths, side slopes, freeboard, seepage control, foundation design, fill material, construction methods, etc. This information has been reviewed by the Process Evaluation Branch and it is concluded that the licensee's earth dam retention system is adequate. The method of analysis for uranium, radium and thorium and the method for determining exposures of employees to external radiation are satisfactory.

In addition to the normal disposal system, the licensee is presently disposing of liquid wastes into a subterranean disposal well at a depth of 950 to 1,778 feet.

The licensee was first authorized to conduct a 90 day disposal test. Following satisfactory results he then requested authorization to continue this operation on a permanent basis. The request was evaluated by DL&R and the Environmental & Sanitary Engineering Branch, DRD. The program appeared satisfactory and an amendment granting authorization to continue this operation was granted December 2, 1960.

The disposal interval being used is separated from the potable water aquifer by a barrier interval of approximately 312 feet. The ion exchange properties and the volume of the disposal region indicate a capacity adequate for disposal through the present AEC contract (1966). To insure that water sources are not being contaminated, the licensee samples over 50 well and water sources per month for uranium, radium and thorium. Results obtained to date do not indicate that water sources have or will be contaminated. It is therefore recommended that the authorization to continue disposal by this method be granted and that a condition to the authorization

be added to require annual reports to DL&R of injection rates, survey results, etc. This will provide DL&R with information relative to this particular program should future requirements or unforeseen difficulties develop.

ANACONDA SUCCESSFULLY DISPOSES URANIUM MILL WASTE WATER BY DEEP WELL INJECTION

by R. D. LYNN and Z. E. ARLIN

The problem of disposing of excess waste water coming from The Anaconda Co.'s two uranium mills in Grants, N. M. first confronted the company's engineers in 1956. The increased discharge of mill waste water was due to the start-up of a second mill, recently completed to supplement production from a smaller plant which the company had operated since 1953.

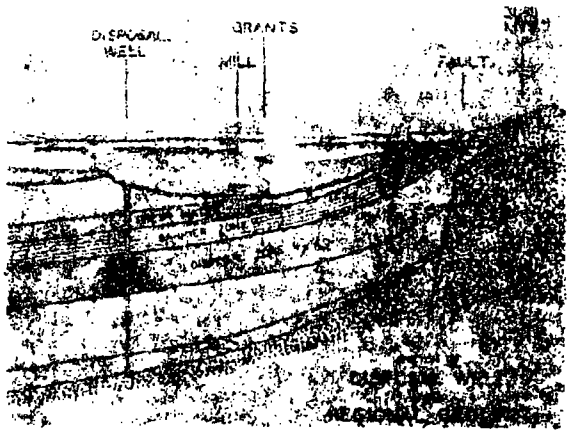
The waste water is mildly acidic and has a low level of radioactivity due to small amounts of uranium-natural, thorium-230 and radium-226. In addition, it contains large amounts of manganese, iron and the sulfate and chloride salts of sodium, calcium and magnesium.

Disposal of the excess mill waste water by deep well injection was investigated after extensive research had proved that alternate methods were not satisfactory. A study of the regional geology and hydrology indicated that a disposal well was feasible, and a test well to basement rock was planned. It was also determined that, after the process waste water was discharged to a tailing pond and subjected to partial loss by evaporation, there would still be about 400 gpm available for injection into the disposal well.

LOCATION

The selected location was on the northeast flank of the Zuni Uplift, within the extreme southern limits of the San Juan Basin in northwest New Mexico. The surface rocks at the location are the lower members of the Chinle formation of Triassic age. Below the Chinle, successively, are the San Andres, Yeso and Abo formations of Permian age, the Hermosa (?) formation of Pennsylvanian age and Precambrian granite gneiss. The San Andres formation is an artesian aquifer that is the major source of fresh water for the industrial, municipal and agricultural needs of the area. Lesser amounts of fresh water are obtained from shallow local aquifers in the Chinle formation and the alluvium. The formations below the San Andres contain impotable water.

Once the plan was approved, efforts were made to find a site for the well and underground reservoir. A disposal reservoir was sought that contained impotable water and was isolated from all fresh-water aquifers. It had to have good transmissibility and a large gross volume to allow it to accept fluid at a high rate of injection. A low natural formation pressure was desirable to eliminate the need for artificial injection pressures. The location of the disposal well had to be as far as possible from faults that could act as barriers within the disposal reservoir and reasonably near the tailing pond so that transmission costs would not be excessive.



CONSTRUCTION OF WELL

Drilling began on Jan. 11, 1959, and 110 days were required to drill, core, test and complete the well. A 7⅞-in. hole was drilled to 445 ft into the San Andres formation. After this hole was reamed to 12¼ in. to a depth of 85 ft and a 9⅝-in. surface conductor was hung, coring began.

A total of 2066 ft of continuous 3⅛-in. core was cut from a 7¾-in. hole to a total depth of 2511 ft in 75 core runs. This included 71 ft of core cut from the Precambrian basement rock. The over-all core recovery was 96.6%.

After each core was cut, precise footage and recovery measurements were made and marked on the core and a detailed megascopic log was made. Three-inch long sections of the core were taken at 2-ft intervals and canned to preserve original moisture and physical properties for permeability and porosity determinations. Similar samples were taken from specific sandstone, shale and evaporite intervals for other laboratory tests. Determinations were made of porosity, permeability, water content, ion exchange and neutralization capacities. Binocular examinations, thin section studies, and heavy-mineral and X-ray diffraction analyses were also made.

Drill Stem Testing, Swabbing and Logging: During the progress of the drilling and coring operations, 13 drill stem tests were attempted on intervals selected by megascopic examination of the core; nine

R. D. LYNN, *Chief Geologist of New Mexico Operations, and* Z. E. ARLIN, *Geologist, are with the Anaconda Co., Grants, N. M.*

were successfully co[illegible]eted and four were misruns. The nine successful tests provided valuable information on comparative formation pressures and gave advance information of the transmissibility of possible disposal zones.

Thirteen intervals in the hole were swabbed for fluid samples from the various formations and potential disposal zones. These water samples were taken only after continuous tests for chloride, conductivity, alkalinity and pH had stabilized, indicating that uncontaminated fluid was being removed from the formation. Analyses of the water samples showed that the disposal reservoir contained impotable water and that the quality of the formation fluids decreased with depth below the San Andres fresh-water aquifer.

Three electric logs were run when the total depth of the test hole was reached: sonic-gamma, induction and microlog-caliper. These logs provided accurate depth measurements for correlation of the core analyses with the casing and perforating operations, and were used to supplement the data obtained from core and drill stem tests.

FINAL STAGES OF PREPARATION

The well was completed in 563 ft of reservoir sandstones in the lower San Ysidro and Meseta Blanca members of the Yeso formation. These sandstones have an average porosity of 17.1% and an average permeability of 105 millidarcies. They have a static water level that is about 240 ft from the surface of the ground at the well location.

The disposal reservoir is separated from the San Andres fresh-water aquifer by an intervening evaporite zone. Core analyses and drillstem tests show that this evaporite zone is an almost impermeable barrier to transformational fluid migration.

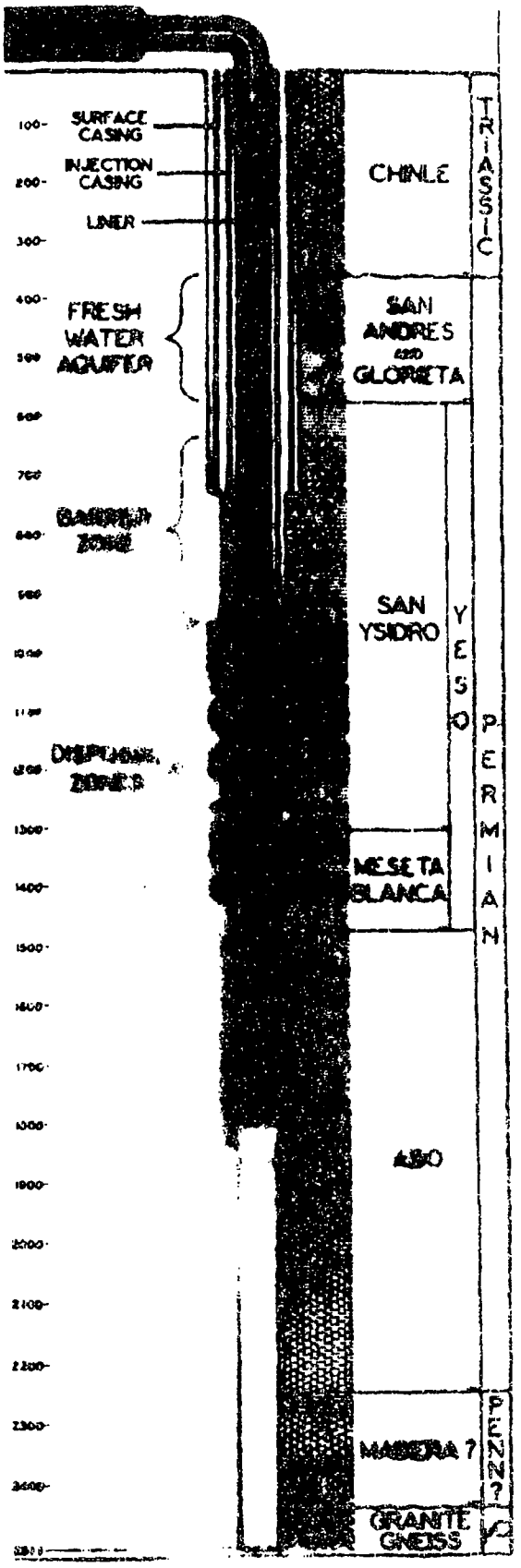
Casing Operations: The casing program had two objectives: to seal off all of the fresh-water aquifers from the well bore, and to support the walls of the hole throughout the disposal reservoir.

The original test hole was reamed to 17¼ in. to a depth of 730 ft, and 13 3/3-in. OD surface casing was run and set into the upper 10-ft thick anhydrite bed in the evaporite zone. The injection casing which had an internal plastic lining was run from the surface to a depth of 1830 ft in an 11-in. hole. This casing was found to be subject to corrosion so the plastic liner was replaced by stainless steel.

Pump-Out Test: After the completion of the casing operations, a ten-day pump-out test was performed on the Meseta Blanca to observe its drawdown and recovery behavior. The Meseta Blanca is the largest single disposal zone in the well, and this was the first opportunity to conduct a practical test on the potential disposal reservoir.

The Meseta Blanca was perforated on 2-ft spacing with 108 bullets that made a hole 9/16 in. in diameter. These perforations were fractured with fresh water to ensure unrestricted communication between the well bore and the disposal reservoir. A submersible pump was installed and a separate probe pipe was run to allow undisturbed measurements of water levels.

The test consisted of measurements of the levels in the well during drawdown and recovery. The interpretation of these data indicated that the Meseta Blanca was a satisfactory disposal reservoir and that completion of the well was warranted. About one mill[illegible] gallons of water were pumped from the [illegible]



Diagrammatic [illegible] completed disposal well showing [illegible] and main [illegible] of well [illegible]

erforating and Fracturing Operations: The perting and fracturing operations e conducted wo stages. The first stage consis... of perforat- and fracturing all potential disposal zones below top of the Meseta Blanca, and the second stage, the zones above the Meseta Blanca.

or the first stage of fracturing operations, 38 forations were made in the seven thin sand- e zones in the upper Abo formation. These e in addition to the 108 perforations that had al- ly been made in the Meseta Blanca for the pump- test. During the second stage 101 perforations ve the Meseta Blanca were made and then frac- ed. A drillable packer was set at 1220 ft to isolate previously fractured zones.

'he hole was cleaned out to a completed total th of 1796 ft, and several short-term injection s were made with the drill rig pumps. These, subsequent tests, indicated that fracturing caused an increase in injectivity eight times ater than that indicated by core analyses.

SURFACE INSTALLATIONS

'he surface installations in the completed dis- al system consist of a decanter, filter plant and eline to the well. A monitor well was construc- near the disposal well to permit sampling of San Andres fresh water aquifer.

'he decanter is a wooden box 4 x 120 ft that was cted on foundations in the tailing pond adja- it to the filter installations. The top of the de- ter is raised as the water level of the pond rises th fill-up by tailing solids. The decanted water lifted from a pond-level sump by a turbine pump d filtered alternately through one of two circular f filters. This filtrate then passes through a small ge tank from which a centrifugal pump forces it ough a metering manifold and 1.4 miles of 12-in. bber-lined pipeline in a lift of 90 ft to the dis- sal well. The water enters the well by free fall in ealed pipeline-well connection that prevents the trainment of air. All filter, pump and pipeline uipment are either rubber-lined or stainless steel. The filter feed is continuously treated with 4 ppm pper sulfate for bacteria and fungi control and 20 m sodium polyphosphate to retard the deposition calcium sulfate. During the initial stages of in- ction, the filter feed and the well bore were eated with a total of 9000 lb of citric acid crystals sequester the high iron content of the waste ater. This temporary treatment prevented the pre- pitation of iron in the immediate vicinity of the ell bore where reservoir permeability is the most itical.

In practice, the filter product has a turbidity of out 0.1 ppm suspended solids on the silica scale, though a maximum turbidity of 0.4 ppm is allow- ble. This limit was determined by flood tests of re specimens from the disposal zones.

BEHAVIOR OF INJECTED WASTE WATER

When the acid waste water enters the near-neu- al environment of the disposal reservoir, it under- es marked changes due to neutralization, ion ex- iange and dilution. These changes destroy the iginal character of the waste water and eventually eate a fluid in equilibrium with the reservoir that pproaches the character of the original reservoir uid.

Neutralization of the acid waste water will cause e precipitation of thorium-230, calcium sulfate and ferric hydroxide. Radium-226 and other metal ions will be captured throug n exchange and adsorption by the clay minerals in the reservoir rocks. Incremental dilution at the wetted surfaces of the reservoir solids will occur throughout the invaded zone.

Determinations of neutralization capacity on core samples from the disposal reservoir indicate that 1 cu ft of sandstone will neutralize 389 gal of injected waste water to a pH of 7.0. Flood tests of whole cores indicate that the ion exchange capacity of 1 cu ft of reservoir sandstone is 9.66×10^{-3} g of radium-226.

These experimental results are substantiated by comparison of the analyses of the water injected during a 90-day test and the same water swabbed back out of the reservoir (see columns B, C and D of Table 1). A total of 67,474,320 gal of water were injected during the 90-day test. A sample taken after 476,000 gal of this fluid had been swabbed back out of the reservoir showed an over-all reduction in all major chemical and radioactive constituents except magnesium. Of the original concentrations of radioactive material, 13.3% of radium-226 and less than 1% of uranium-natural and thorium-230 remained in solution.

This returned water sample is calculated to have been withdrawn from the reservoir at a distance of 30 ft from the well bore. At that time the neutralization front was 20 ft from the well bore, the ion exchange front was 58 ft from the well bore, and the radius of invasion of total injected fluid was 342 ft. The returned water sample came from a position past the neutralization front but within the area of incomplete ion exchange. The remaining small con-

Table 1. Chemical and Radioactive Analyses of Disposal Reservoir Water, Injection Water, and Returned Injection Water

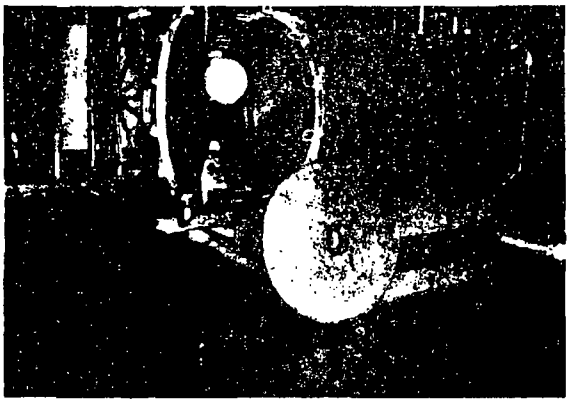
	A	B	C	D
Chemical Analysis	Formation Water[1] ppm	Injection Water[2] ppm	Returned Injection Water[3] ppm	Percent of Original Constituents Remaining in Returned Injection Water
Sodium	414	1,208	863	72
Magnesium	157	411	646	157
Calcium	592	677	523	77
Manganese	—	378	165	44
Total Iron	17.5	439	56	13
Chloride	364	1,725	1,296	75
Sulfate	2,270	6,332	4,414	53
Nitrate	Trace	130	35	26
Total Dissolved Solids	4,069	16,243	8,296	57
Conductance, micromhos	5,400	19,000	11,800	62
pH	7.3	2.8	5.5	
Radioactive Analysis	uc/ml[4]	uc/ml[4]	uc/ml[4]	
Gross Alpha	88×10^{-6}	3.42×10^{-4}	4.64×10^{-7}	0.14
Uranium-natural	0.22×10^{-9}	1.73×10^{-6}	1.73×10^{-6}	0.10
Thorium-230	—	2.57×10^{-4}	8.74×10^{-8}	0.03
Radium-226	0.64×10^{-9}	5.83×10^{-7}	7.46×10^{-8}	13.3

[1] Meseta Blanca ... -1480 feet, 2/3/59. Analysis by Earlougher Engineering.

[2] Average analysis of last 24.4 x 10^{3} gallons of waste water injected into the disposal well, during the 90-day test ending 5/8/60. Analysis by The Anaconda Co.

[3] Swabbed sample from disposal well after 476,000 gallons had been returned, 10/5/60. Analysis by The Anaconda Co.

[4] Analyses by Tracerlab, Inc.



From two U.S. filters (left), used for water clarification, waste water is sent to the [illegible] installation (right) via a 12-in. pipeline which is joined to the vertical 6 5/8-in. stainless steel injection [illegible] of the building. The line leading outside the building to the right is a well by-pass. Partially hidden on the [illegible] left of the injection liner is an instrument which measures water levels in the well through a small probe [illegible]

centrations of thorium-230, iron and radium-226 are compatible with this assumption. Also, the reduction in the nitrate content indicates at least a two-to-one ratio of dilution. The slightly acid condition of the returned sample indicates that a small degree of contamination may have occurred during withdrawal through the area near the well bore where waste water had not been neutralized.

The foregoing calculations assume that injected waste water will penetrate the reservoir as a vertical front having radial flow from the well. It is arbitrarily assumed that the average porosity of 17.1% and the reservoir thickness of 563 ft will be only 50% effective and that the laboratory-derived capacities of 389 gal of waste water neutralized per cubic foot of rock and 9.66 x 10^{-6} g of radium-226 exchanged per cubic foot of rock will be only 50% complete.

The radius of possible future penetration of the injected waste water may be calculated in a similar manner. By assuming the uninterrupted use of the disposal well for ten years at a rate of 400 gpm and using the above data and assumptions, the maximum radius of fluid penetration calculates to be 1912 ft from the well bore; the radium-226 ion exchange front would be 321 ft and the neutralization front 108 ft from the well bore.

Analyses of well behavior distinguish between the performance characteristics of the disposal reservoir and the mechanical efficiency of the disposal well bore. The reservoir has a calculated life expectancy of about ten years to overflow of the well at an injection rate of 400 gpm. One pressure barrier has been detected which will reduce the long-term injectivity. If more barriers are encountered, their effect will further reduce the life of the reservoir.

The life expectancy of the disposal well is unpredictable. Severe losses of injectivity have been caused by corrosion of the injection casing below the stainless steel line. Caving and sloughing of this casing have caused restrictions to the flow of water through the well bore. Remedial work will be done in the future as the condition of the well requires it.

MONITOR PROGRAM

The disposal system is continuously monitored to ensure that it does not become a threat to public health by contamination of local fresh water supplies. The monitor program consists of three phases: direct observation of the behavior of the disposal well, sampling of the major fresh-water aquifer in the immediate vicinity of the well, and routine sampling of regional fresh-water sources.

Daily measurements are made of the operating water level in the disposal well, and occasional recovery measurements are made when the well is shut down. Analyses of these pressure data to date have revealed no cause to suspect significant transformational leakage from the disposal reservoir.

A monitor well 628 ft deep was completed in the San Andres fresh-water aquifer 300 [illegible] northeast of the disposal well in the direction of the hydraulic gradient in that formation. Water samples from this well are analyzed weekly for chemical content and semiannually for radioactive content in order to detect any leakage that might occur in or near the immediate vicinity of the disposal well where reservoir pressures are the greatest.

The regional monitoring program of fresh-water sources that was begun by The Anaconda Co. in 1956 has been continued without interruption and now serves as a monitor system. A total of 50 water sources are sampled and analyzed for chemical and radioactive contents at monthly, bimonthly or semiannual intervals. These include the springs, three ponds and 44 domestic, industrial, agricultural and municipal wells that withdraw water from one or more of all the known fresh-water aquifers within an area of about 200 square miles.

SUMMARY

The original objective of The Anaconda Co.'s disposal project has been attained. The tailing pond is kept as small as practicable by use of the disposal well and this, in turn, keeps seepage losses at a minimum.

The injection of waste water into deep subsurface aquifers may in the future, prove to be more than an expedient means of disposal. The changes that cause the waste water to adjust to equilibrium with the reservoir environment remove many of the deleterious chemical and radioactive constituents. In this sense, the disposal of waste water by deep well injection is a conservation measure.

FROM: Compliance Los Alamos	DATE OF DOCUMENT: 6/7/62	DATE RECEIVED 6/8/62	NO.: 5400
	LTR.	MEMO: X	REPORT: OTHER:
TO: Lyall Johnson	ORIG.: X	CC:	OTHER:
	ACTION NECESSARY ☐ NO ACTION NECESSARY ☐	CONCURRENCE ☐ COMMENT ☐	DATE ANSWERED: BY:
CLASSIF.: U	POST OFFICE: REG. NO.:	FILE CODE:	

DESCRIPTION: (Must Be Unclassified)
NEW MEXICO DEPARTMENT OF PUBLIC HEALTH MEETING June 5, 1962

REFERRED TO	DATE	RECEIVED BY	DATE
~~[illegible]~~	~~6/8~~	[illegible] 6/8	
Nuntanne			

ENCLOSURES:

REMARKS:

U. S. ATOMIC ENERGY COMMISSION

MAIL CONTROL FORM FORM AEC-326S (8-60)

U. S. GOVERNMENT PRINTING OFFICE: 1961 — 613956

OPTIONAL FORM NO. 10
5010-104

UNITED STATES GOVERNMENT

Memorandum

TO : Lyall Johnson, Assistant Director
for Materials Licensing
Division of Licensing and Regulations

DATE: JUN 7 1962

FROM : Leo Dubinski, Assistant Director for Materials
Division of Compliance

SUBJECT: NEW MEXICO DEPARTMENT OF PUBLIC HEALTH MEETING - June 25, 1962

Attached is copy of a letter received by Division of Compliance, Region IV, from Carl R. Jensen, Occupational Health Section, New Mexico Department of Health, dated June 4, 1962, with attachment.

The letter states that a meeting is to be held on June 25, 1962, in Albuquerque, New Mexico, to discuss the question of the water supply of the Laguna Indian Tribe as it might be affected by the wastes from the Anaconda Uranium Mill.

Inasmuch as the matter involves licensing, it is referred to you for appropriate handling. We would appreciate being advised regarding your desires on the subject since Doctor Walker has not as yet responded to Mr. Jensen but is awaiting advice from us. Doctor Walker will be glad to assist you in any way he can.

Attachment:
Cpy ltr dtd 6/4/62
Cpy ltr dtd 3/28/62

cc: D. I. Walker, CO:IV w/o attachment

RECEIVED
JUN 8 - 1962
U. S. A. E. C.
Division of Licensing
and Regulation

5400

NEW MEXICO

DEPARTMENT OF PUBLIC HEALTH

SANTA FE

June 4, 1962

Donald I. Walker, Director
Region IV, Division of Compliance
Atomic Energy Commission
P.O. Box 15266
Denver 15, Colorado

Dear Doctor Walker:

We have been advised that the Laguna Indian Tribe is disturbed by the fact that the Anaconda Uranium Mill at Bluewater is disposing of its process wastes by injection into a deep water stratum. They fear that this material may be a threat to their water supply at the reservation some thirty to forty miles away.

Mr. Dailey, Governor of the Pueblo, has requested that a meeting be held on June 25, 1962, at 1:00 P.M., in Albuquerque to discuss the matter.

As you know, Anaconda did not undertake this method of disposal until they had approval from the AEC and this Department. This Department did not grant the approval until after we had held several conferences with representatives from the U. S. Geological Survey, the Office of the State Engineer, and Anaconda. Thus, we expect that at the June 25 Albuquerque meeting, representatives from each of the above agencies will be present.

Now as AEC also granted approval for this disposal, we suspect you will probably wish to have one or more representatives attend the meeting. We would most certainly like to have them. A copy of Governor Dailey's letter is enclosed.

The meeting is to be held in Doctor Zobel's office on the 11th floor of the Bank of New Mexico Building, in Albuquerque, at 1:00 P.M., June 25, 1962.

Sincerely yours,

Carl R. Jensen, Chief
Occupational Health Section
Environmental Sanitation Services

CRJ/np
enc.

5400

March 28, 1962

Mr. Guy C. Williams
General Superintendent
United Pueblos Agency
1000 Indian School Road, N.W.
Albuquerque, New Mexico

Dear Mr. Williams:

We enclose an AP news item from the Albuquerque Journal of February 11, 1962, disclosing a plan to transport a substantial volume of water from the Bluewater Underground Basin across the Continental Divide to Gallup. This apparently would transport water from the Rio Grande watershed to the Colorado.

We also enclose another clipping from the Albuquerque Journal reporting that Anaconda Corporation disposes of its chemical and radioactive waste by introducing it into the deep underground.

Both of these activities have given our Council and officials basis in fearing that our ground water supply could be depleted and dangerously polluted by these activities.

We therefore request that you take immediate steps to have competent and thorough studies made of both the proposed transport of ground water to Gallup and the method used by Anaconda to dispose of its dangerous waste. We suggest that the United States Geological Survey, the United States Public Health Service, and the Atomic Energy Commission be mobilized to get this work done.

We also urge you to notify the Field Solicitor and the Department of Justice about the Plan to transport water out of the Basin so that they may be alerted to commence studies looking toward legal protection of our interests. The State Engineer of New Mexico should also be informed of the interest of the United States and of the Pueblo of Laguna.

Finally, if necessary, we urge that steps be taken to prevent removal of any water from the Basin until it is determined that such removal will not adversely affect the rights of the Pueblo of Laguna.

We and our attorneys, Deane, Deane and Hopkins, will be available for discussion.

JAN 22 1962

LR:CGW
40-663

The Anaconda Company
New Mexico Operations
P. O. Box 638
Grants, New Mexico

Attention: Mr. A. J. Fitch, Manager

Gentlemen:

This refers to the inspection conducted on October 4 and 5, 1961, of your activities authorized under Source Material License No. R-138.

It appears that certain of your activities were not conducted in full compliance with the requirements of the AEC's "Standards for Protection Against Radiation," Part 20, Title 10, Code of Federal Regulations, in that wooden filter press frames containing natural uranium were incinerated without the specific approval of the Commission, in violation of Section 20.305, "Treatment or disposal by incineration." We note that in response to your application dated October 14, 1961, License No. R-138 was amended on November 1, 1961 to authorize the incineration of discarded wooden equipment. Should you have any questions regarding this matter, please feel free to write us.

There were no other items of noncompliance noted as a result of this visit. We appreciate the cooperation given the AEC representative.

Very truly yours,

bcc: Compliance Division, HQ
Compliance Division, IOO
Public Document Room

Eber R. Price
Assistant Director
Division of Licensing
and Regulation

Enclosure
10 CFR 20

OFFICE ▶	LR:EB	LR:S&SNMB	CO	LR		
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Form AEC-318 (Rev. 9-53) U. S. GOVERNMENT PRINTING OFFICE 16—62761-3

Leo Dubinski, Assistant Director
for Materials, Division of Compliance,
AEC Headquarters
Donald I. Walker, Director, Idaho
Compliance Area, Division of Compliance

DEC 15 1961

ORIGINAL SIGNED BY
DONALD I. WALKER

REINSPECTION REPORT, THE ANACONDA COMPANY, NEW MEXICO OPERATIONS, GRANTS, NEW MEXICO, SOURCE MATERIAL LICENSE R-138

CO-ID:WCP

Transmitted herewith are four (4) copies of the subject report.

The only item of noncompliance observed or otherwise noted during the course of the inspection is as follows:

10 CFR 20.305 Treatment or disposal by incineration

in that the licensee has incinerated wooden filter press frames containing natural uranium since the beginning of operations at the mill, without specific approval of the Commission.

Although the licensee has been incinerating wooden filter press frames which contain source material, we feel that the hazard which has existed in the past or which will exist in the future, during the performance of these incinerations, is negligible. In the first place, the amounts which have been involved in the incinerations have been small and the number of such incinerations have not exceeded two per year. Also, the location of the concrete pad on which the press frames have been burned is within the licensee's restricted area at a point very near the processing buildings. Therefore, we feel that the chances of any licensed materials being released to the unrestricted area are no greater than when source material is released from stacks which exhaust the dust collectors in the processing buildings. Since the licensee has applied for approval to incinerate these frames, and an amendment, dated November 1, 1961, to their license approving of their procedures has been sent to them, we feel that this matter has been corrected.

The status of the licensee's program for controlling the hazards incident to the processing of uranium ores can be summarized by the following statements. Whenever a problem or a potential hazard has been found which has been associated with radiation safety

(Continued)

(but not necessarily limited to it), the licensee's attitude has been one of taking positive action to eliminate the problem. On inspection, it is quite obvious that the Anaconda Company has gone to considerable expense to provide working conditions for their employees in the mill which are well within any limits prescribed in "Standards for Protection Against Radiation". The licensee's efforts have not been limited to persons working within the confines of the restricted area. The licensee has taken steps which enable them to dispose of liquid tailings without releasing them to the unrestricted area and has made surveys to establish that airborne radioactivity is not being released to the unrestricted area in excess of permissible limits.

Because of the effectiveness of the equipment which has been installed to eliminate the presence of concentrations of airborne uranium which are in excess of permissible limits and of the other steps which have been taken by the licensee to correct any items of noncompliance, it is the opinion of this office that the licensee has attained a status of complete compliance with Federal Regulations.

The licensee can be contacted through A. J. Fitch, Manager, The Anaconda Company, New Mexico Operations, P. O. Box 638, Grants, New Mexico.

A reinspection of the licensee will be scheduled in accordance with Section III .03 of Draft Manual Appendix 0705.

Enclosure:
Anaconda Inspection Report (4 cys)

Form AEC-417 (4-58)

UNITED STATES ATOMIC ENERGY COMMISSION

COMPLIANCE INSPECTION REPORT

II A, 2

1. Name and address of licensee	2. Date of inspection
The Anaconda Company New Mexico Operations P. O. Box 638 Grants, New Mexico	October 4 and 5, 1961
	3. Type of inspection Reinspection (1)
	4. 10 CFR Part(s) applicable 20 - 40

5. License number(s), issue and expiration dates, scope and conditions (including amendments)

Source Material License R-138 Issued: 7-1-59 Expired: 6-30-60

"Scope"

"...you are hereby licensed to receive possession of and title to at your plant located at Bluewater, New Mexico, raw and refined source material for resale and for processing with raw source material from your own mining operations.

"You are further licensed to transfer and deliver possession of and title to refined source material to any person licensed by the Atomic Energy Commission, within the limits of his license."

Condition:

"As a condition of this license, you are required to maintain records of your inventories receipts and transfers of refined source material. The issuance of this license does not constitute any agreement by the Commission to purchase ores and/or concentrates or other products from the licensee.

"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 you are exempt from the requirements of Section 20.203(f)(2) for individual shipping containers of uranium provided that areas are posted as described in your letter dated

(Continued)

6. Inspection findings (and items of noncompliance)

The licensee has completely changed the apparatus used in drumming yellow cake, which has resulted in the reduction of airborne uranium concentrations in the yellow cake area to levels which are below maximum permissible limits. Beginning in December, 1960, liquid waste resulting from the processing of uranium ore was released to a subterranean disposal well as a normal operation; disposals to the well had been made prior to this time during a 90-day authorized test. The licensee has sampled stacks from which airborne radioactive materials are released, and the environment within and at the perimeter of their property (defined by fence) in order to establish the status of compliance with 10 CFR 20.106(b).

The only item of noncompliance observed or otherwise noted during the course of the inspection is as follows:

10 CFR 20.305 Treatment or disposal by incineration

in that the licensee has incinerated wooden filter press frames containing natural uranium since the beginning of operations at the mill, without specific approval of the Commission. (Paragraph 21).

7. Date of last previous inspection	8. Is "Company Confidential" information contained in this report? Yes ☒ No ☐ (Specify page(s) and paragraph(s))
May 3 - 5, 1960	Photographs 1, 2 and 3 in Appendix E

DISTRIBUTION:

CO (4)
GJ (1)
ID (1)

Original signed by
W. C. Pierce
Wellington C. Pierce
(Inspector)

Approved by: Willis B. Johnston, Inspector
Idaho Compliance Area
Division of Compliance
(Operations office)

DEC 15 1961 Original signed by WILLIS B. JOHNSTON
(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.

18—75314-2 U. S. GOVERNMENT PRINTING OFFICE

RECOMMENDATIONS SHOULD BE SET FORTH IN A SEPARATE COVERING MEMORANDUM

ITEM 5 (Continued)

February 3, 1959. Neither this license nor any right under this license shall be assigned or otherwise transferred in violation of the provisions of the Atomic Energy Act of 1954."

Amendment dated November 1 , 1959

"...your license R-138 is hereby amended to permit for a ninety day period only disposal of mill waste effluent by injection through a cased and cemented bore-hole into underlying rock formations in accordance with the procedures set forth in your letter of October 9, 1959. The licensee may commence the disposal at any time before February 1, 1960, upon written notification to the Commission."

Amendment dated May 12, 1960

"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 you are exempt from the requirements of Section 20.203(f)(2) provided that all areas are posted as described in your letter dated February 3, 1959. Neither this license nor any right under this license shall be assigned or otherwise transferred in violation of the provisions of the Atomic Energy Act of 1954."

Amendment dated December 2, 1960

"You are hereby authorized to dispose of the radioactive liquid waste resulting from uranium processing operations into a subterranean disposal well according to the procedures described in your application dated July 5, 1960.

"As a condition of this license you are required to maintain records of the volume of waste disposed, the average concentration of the radioactive constituents, and the natural water head pressures and injection rates. Further, this license does not authorize an increase in injection pressure above that produced by the natural water head of the waste effluent stream."

Amendment dated November 1, 1961

"You are hereby authorized under License R-138 to incinerate discarded wooden equipment containing source material and return the ashes to process for recovery of the contained uranium in accordance with the procedures submitted in application dated October 14, 1961."

The Anaconda Company

9. Inspection History

The initial inspection of the licensee's operations was made on January , 1959. At this time, it was noted the licensee was in noncompliance with several sections of the Federal Regulations, in that surveys to determine compliance with regulations had not been made, areas and rooms in the plant were not posted with proper caution signs and containers having quantities of source material in excess of specified limits were not labeled. As the result of the initial inspection, a follow-up inspection was made on April 21, 1959, and on May 3-5, 1960 (written up as one report). As a result of this inspection, the licensee was notified by AEC on December 1, 1960, that their surveys were inadequate because the exposure of each employee who works in areas containing airborne radioactive material in excess of permissible limits had not been determined by occupancy studies. In a letter dated December 28, 1960, the licensee notified AEC of the steps which they had taken to correct the alleged item of noncompliance noted during the follow-up inspection.

10. General

An unannounced reinspection of the licensee's operations was made on October 4 and 5, 1961. The inspector was accompanied by Eugene McFall, Inspector, CO-AL. Initial contact was made with Ralph Wilde, Industrial Radiological Engineer. Other persons contacted during the course of the inspection were A. J. Fitch, Manager, and E. C. Peterson, Assistant Manager. It should be noted that the inspector was presented with copies of all of the survey records collected by the licensee and that they are on file in this office.

11. Air Sampling Surveys - Restricted Area

Mr. Wilde presented records showing the results of analyses for uranium content of all of the air samples collected by the Anaconda Company since the time of the last inspection (Paragraph 9). A review of the survey records presented by the licensee revealed that, during 1960, air samples were collected in eight general areas once every three months. During 1961, the number of general areas which were sampled was increased to 13 and the frequency of sampling in the yellow cake area was increased to once a month. The survey records show that 511 general air samples and 208 breathing zone samples have been collected by the licensee since April 21, 1960; the licensee has also collected 1[illegible] process samples in the yellow cake area. Mr. Wilde stated that, whenever an area which is sampled is found to contain concentrations of uranium in excess of permissible limits, a study is made to determine the reason for the presence of the high concentrations, and the area is resampled the following month to determine if correction of the condition has been attained. Except for the yellow cake area, in every case where the licensee has determined the presence of concentrations of airborne uranium in excess of permissible limits, their survey records of the following month show that the condition has been corrected. Copies of the reports which Mr. Wilde sends to Mr. Peterson showing the results of the air sampling surveys were also presented (Paragraph 10) and are on file in this office; the details of the study which the licensee makes of each situation where excessive concentrations of airborne uranium are found, and of the corrective measures which are taken to reduce the concentrations are revealed in these reports. Examination of the licensee's survey records reveals that the licensee has placed considerable emphasis on the collection of air samples in

the final product area, including the yellow cake sample room. According to the licensee's records, most of the general air samples collected in the yellow cake area have been determined to contain concentrations of uranium which are below the MPC. However, breathing zone samples collected by the licensee reveal that there were several operations in areas in which concentrations of airborne uranium were in excess of the MPC. A summary of the breathing zone samples collected by the licensee since the time of the last inspection in May, 1960, is presented in Appendix A. Examination of these results shows that improvements which have been made by the licensee have resulted in the eventual lowering of concentrations of airborne uranium which originally existed during yellow cake drumming and sampling operations to values below the MPC.

12. Job Exposure Evaluation Studies

As a result of the last follow-up inspection of the licensee, it was noted that their survey program was inadequate in that the exposure of employees who work in areas containing airborne radioactive materials in excess of permissible limits had not been determined by occupancy studies (Paragraph 9). According to Mr. Wilde, during the month of June, 1960, working-place time-distribution studies were made by him of operators who occupy the final product area, namely, the dryer operators and the sample room operators (records of these studies are on file in this office). Mr. Wilde stated that their surveys reveal that the yellow cake area was the only area where concentrations of airborne uranium were in excess of the MPC. Examination of the licensee's records of job exposure evaluations reveals that there have been no employees working in the yellow cake area who have been overexposed to airborne uranium. A summary of the results of job exposure evaluations which have been calculated by the licensee is presented as Appendix B. It should be noted that all exposure evaluations calculated by the licensee prior to January 1, 1961, were calculated by using an 30 percent respirator efficiency factor during the times when operators were performing operations which involved the direct handling of yellow cake. Mr. Wilde stated that they have always required operators to wear respirators while performing these operations; however, because of recent improvements in the final product enclosure (see Paragraph 13 below), they plan to discontinue the requirement of wearing respirators during the performance of normal operations in the final product enclosure. Ahtough respirator efficiency factors were used to calculate weighted exposures prior to January 1, 1961, the licensee's survey records reveal that no respirator efficiency factors were used after this date. It can be seen from the licensee's survey records on file in this office that weighted exposure calculations would have resulted in values which exceeded the MPC (4.1×10^{-11} $\mu c_s/ml$, since operators work 48 hours) prior to January 1, 1961, had respirator efficiency factors not been used in the calculations.

13. Modifications in Yellow Cake Barreling Apparatus

Mr. Wilde stated that, because of the continual presence of high concentrations which were being determined during the times when the dryer operators were changing barrels of yellow cake, a complete modification of the yellow cake barreling apparatus was undertaken in March, 1961, and completed in April, 1961. It was observed that yellow cake enters the drums from the dryers through the bung hole of the drum lid, (drum lids are in place and sealed prior to filling), thereby limiting the surface of exposed yellow

cake in the filled drum to that of the bung hole. A demonstration of the barrel-changing process which is now used revealed that, after the barrel has filled (a process which is controlled by a special air-pressure level-controlling device) and the presence of the full barrel is indicated by a red light, the operator approaches the filled barrel, removes the flexible rubber hose from the delivery spout (the slide in the delivery spout is automatically closed by a switch set off by the level-controlling device), unscrews the hose and barrel adapter from the drum and caps the drum; the filled barrel is then removed, replaced with an empty, connected to the delivery spout with the rubber hose and barrel adapter, and filled. Photograph 1, Appendix E, is a view of the barreling device showing the delivery spout, the rubber tube and barrel adapter in place, and the barrel in filling position. The hood-work which has been constructed around each of the barreling positions can be seen in Photograph 1 and also from a rear view in Photograph 2. A demonstration of the modified barrel-sampling device which is now being used was also made; an auger sampler has been enclosed in a device which is sealed onto the bung hole of the filled drum and the sample is delivered from the auger to a jar which is held in place at the top of the auger. It can be seen in Photograph 3, that the sampling apparatus has also been semi-enclosed, and that it is ducted to the dust collection system. The apparent success of the new installations which have been made by the licensee in the yellow cake barreling area to eliminate the presence of concentrations of airborne uranium in excess of permissible limits can be seen by the examination of Appendix A. Mr. Wilde pointed out that the other changes which had been made at the Anaconda mill since the last inspection were: (a) the redirection of the flow to the yellow cake precipitation tanks from the top of the tanks to a position below the liquid level of the tanks to prevent an aerosol caused by the free fall of liquid into the tanks; (b) the completion of the new analytical laboratory in which fluorimetric determinations for uranium and radiometric determinations for radium and thorium are performed (See Photograph 4).

14. Results of Air Samples Collected by Inspector

During the course of the inspection, breathing zone air samples were collected during the times when the dryer operator was performing a complete barrel change and the sample operator was performing a complete sampling operation (with automatic sampling device); the sampling times were less than 4 minutes and the sampling rates were 35 l/min. Neither one of the samples was found to contain a concentration of uranium in excess of $0.4 \times 10^{-}$ μc_R/ml. The samples were analyzed by the Analysis Branch, Health and Safety Division, Idaho Operations Office. Additionally, a sequential sampler, operating at 5 l/min., was placed in the general area of the yellow cake barreling devices during an entire shift while yellow cake was being barreled. Mr. Wilde stated that yellow cake is now stored for a period of time (as a precipitated slurry) and dryed and barreled all at once, every other day of the week for the first 5-6 hours of the day (about 30 percent of operator's time). The results of the uranium determinations of the five one-hour samples which were collected in sequence showed that there were no concentrations in excess of $0.6 \times 10^{-}$ μc_R/ml during the sampling time.

15. Air Sampling Surveys - Unrestricted Area

The licensee's survey records (Paragraph 10) show that, between the time of the last inspection and January 1, 1961, their

environmental air sampling surveys consisted of the collection of air samples with a Staplex high-volume sampler from the two yellow cake dust collector discharge stacks and from the environment in the near vicinity of the stacks; the analytical results of the stack samples for uranium content showed that the discharge from both stacks was above the MPC (1. x 10^{-12} μc_S/ml). After January 1, 1961, the licensee's records show that environmental surveys of stacks at the Anaconda mill included, in addition, the exhaust of three rotoclones in the crushing and sampling plants and of the stack from the sample bucking room; the survey also included the sampling of the area around the mill buildings within the perimeter fence and at the perimeter fence. A summary of the results of the surveys made by the licensee during February, March and part of April 1961, was presented to AEC Headquarters in a letter dated April 19, 1961, and signed by A. J. Fitch. Included in this letter was: (a) a description of the geographical location of the mill, (b) a discussion of the site meteorology including a rosette showing the direction of the prevailing winds, (c) the types, quantities and concentrations of air effluents discharged including the location and height of each stack from which effluents are discharged, (d) a description of the method used for determining the concentration of radioactive material being released to the unrestricted area, (e) the results of air sampling surveys for February, March and part of April, 1961, and (f) the results of diffusion calculations of ground level concentrations as determined by Sutton's equation. The letter also included a request, in accordance with 10 CFR 20.106(a), to discharge concentrations of airborne radioactive materials specified in Appendix B, Table 2, Column 1, to the boundary fence which defines their restricted area. The AEC informed the licensee that an amendment to their license was not required, because in accordance with 10 CFR 20.103 and the terms of their license, the release of these concentrations could be made to the boundary fence which defines the restricted area. According to the licensee's letter, they have formulated their environmental survey program in accordance with the paper received by them from the AEC entitled, "A Basis for Surveying to Determine Concentrations of Radioactive Material Discharged as Air Effluents from Uranium Mills". As a result of the sampling of stacks and the determination that the most likely source of airborne contamination results from the effluent from the yellow cake dust collector discharge stacks, the licensee has (according to their records) concentrated on the collection of air samples in the downwind direction from the yellow cake dust collector discharge stacks; the prevailing winds are reportedly from the northwest and the southeast. In addition, the licensee's survey records show that they have compared the actual concentrations found at the perimeter fence with the theoretical calculations of concentrations, as determined by Sutton's equation. Mr. Wilde stated that he was quite surprised that the actual concentrations and the theoretical concentrations were reasonably close. It was noted by reviewing the licensee's records of surveys at the perimeter fence that there were no concentrations of airborne uranium in excess of permissible limits which were being released to the unrestricted area at the time of any of the samplings. According to the licensee's survey records, they have continued to sample, on a monthly basis, each of the stacks from which airborne radioactivity is released. The results of these surveys indicate that exhaust stacks from the Microdyne dust collector and the Anaconda dust collector have continually been found to be releasing effluents which contain from 2 - 598 x MPC for an unrestricted area (2 x 10^{-12} μc_R/ml); of the stacks from which ore dust is released, three of the five have been continually found to be releasing effluents which contain from 1 -

20 x MPC for uranium in an unrestricted area (8×10^{-13} $\mu c_R/ml$). The licensee has noted in their records of survey that the concentration of uranium in the effluent released from their Microdyne dust collector has decreased considerably since the time of the installation of the new drum filling equipment in the yellow cake area. A summary of the licensee's environmental sampling program since April, 1961, is presented as Appendix C. It can be seen from the licensee's survey records at the perimeter fence (Appendix C), that no effluents containing airborne uranium in excess of permissible limits have been released by the licensee to the unrestricted area from April, 1961, to August, 1961. In addition to the results of air sample determinations, the licensee's environmental survey records include a map (made each month) of the entire Anaconda mill site showing the locations at which each of their environmental samples is collected. A copy of one of these maps was attached to the licensee's letter of April 19, 1961, which was sent to AEC Headquarters.

16. External Radiation Surveys

According to survey records presented by the licensee (Paragraph 10), external radiation surveys of the areas in the mill buildings have been made approximately every calendar quarter; during 1961, the records show that the scope of the surveys has been extended to include the determination of radiation levels in the shop facilities, warehouses, offices and in the assay laboratory. The licensee's records indicate that the only areas where radiation levels have been found to be in excess of 1 mr/hr have been in the ion exchange area and in the yellow cake area. The levels of beta-gamma radiation which have been determined by the licensee in the ion exchange building have ranged between 2 - 4 mr/hr in the area of the walkways which surround the clarification presses and 8 - 9 mr/hr at the surface of these presses. Mr. Wilde stated that their employees had been cautioned not to spend unnecessary time in the clarification press area. During the survey of April, 1960, the licensee found that the beta-gamma level at the surface of the yellow cake operator's coveralls was 2.5 mr/hr. Mr. Wilde stated that a daily wash procedure had been established for coveralls worn by operators who work in the yellow cake area. He added that the coveralls are washed in a solution of sodium carbonate and that the waste water from the washing machine is returned to the sodium carbonate storage tanks. The licensee's survey records since April, 1960, indicate that the radiation level of the coveralls has been lowered to about 0.4 mr/hr. Mr. Wilde stated that they use an Eberline E-112 B-1 geiger counter to determine radiation levels in the mill.

what surface

17. Personnel Monitoring

Personnel monitoring records showing the exposures of personnel to external radiation were also presented (Paragraph 10). The records reveal that 14-21 persons who work in the yellow cake area and clarification press area were badged during 1960. The licensee subscribes to the two-week film badge service of Tracerlab, Inc. Exposure records of persons badged during 1960 reveal that the highest dose received by any person to the whole body was 130 mrem gamma per two-week period; the highest dose to the skin of the whole body was 410 mrem beta-gamma per two-week period. As indicated by the licensee's records, the first calendar quarter observed by the licensee for the purpose of maintaining personnel monitoring records, during 1961, began on January 2, 1961, and ended on April 10, 1961 (14 weeks); the licensee's exposure records for the first calendar quarter of 1961 indicate that the highest exposure to the whole body was 90 mrem gamma and the

highest exposure to the skin of the whole body was 2220 mrem total beta-gamma (in excess of 25 percent of the MPD). Beginning with the second calendar quarter, the licensee's records reveal that the number of employees being badged was increased to 45 to give a record of the current external radiation exposure for all of the various jobs in the plant; the highest recorded exposure to the whole body during the second calendar quarter was 405 mrem gamma and the highest dose to the skin of the whole body was 2,080 mrem total beta-gamma. The licensee's quarterly exposure records for the third calendar quarter were not complete at the time of the subject inspection. Mr. Wilde stated that, although records of exposures, as determined by personnel monitoring, indicate that personnel monitoring is not required for any employees other than the operators who work around the clarification presses, he has recommended that their film badging program be continued. He exhibited records of exposures to radiation which are kept by them on Form AEC-5 for all employees who have been film-badged; Mr. Wilde also exhibited records of Form AEC-4 which have been completed for each of the badged employees. It was observed that separate Form AEC-5's are kept for the whole body exposure and for the skin of the whole body exposure for each person who is badged.

18. Posting Conditions

During the course of the inspection, it was noted that the entrances to all processing buildings at the Anaconda mill were posted with signs bearing the radiation caution symbol and the words "CAUTION - RADIOACTIVE MATERIALS - IN THIS BUILDING RADIOACTIVE MATERIALS ARE BEING PROCESSED" in magenta on a yellow background. It should be noted that the licensee received a clarification of one of the conditions of the subject license which originally only exempted the labeling of shipping containers, but which, by the letter of clarification dated May 12, 1960, exempted the licensee from the requirements of 10 CFR 20.203(f)(2), without specification as to the particular types of containers. It was also observed that the yellow cake area was posted with a sign bearing the radiation caution symbol and the words "CAUTION - AIRBORNE RADIOACTIVITY AREA - WASH YOUR HANDS BEFORE EATING OR SMOKING" in magenta on a yellow background.

19. Instruction of Personnel

Mr. Wilde presented a copy of the safety manual which he stated was passed out to each employee at the Anaconda mill. Included in the safety manual, which is on file in this office, are instructions to personnel concerning the presence and hazards of radiation and radioactive materials and the procedures which are required by the company to minimize exposure to employees. Mr. Wilde stated that radiation hazards are discussed in safety lectures, and that each person is given specific instructions in the radiation safety procedures which are established in the particular areas in which each person works. He added that they are prepared to advise any of their employees of reports of radiation exposure when the employee requests it. It was observed that the survey notebooks maintained by Mr. Wilde contain current copies of 10 CFR 20, and copies of their license and amendments to their license. Form AEC-3 was observed to be posted in several conspicuous places throughout the mill buildings, including on the bulletin boards in the change rooms where all of the employees reportedly spend some time during each day. Mr. Wilde stated that they were also prepared to

furnish former employees with reports of exposure to radiation should they make the request for such information; he added that no such requests had been made at the time of the inspection.

20. Disposal of Liquid Wastes

In a letter to the licensee from the AEC, dated December 2, 1960, the subject license was amended authorizing the licensee to dispose of radioactive liquid waste into a subterranean disposal well according to procedures described in their application dated July 5, 1960 (Item 5). In accordance with the other conditions of this amendment, records of the volume of waste disposed, the average concentrations of radioactive constituents, and the natural water head pressures and injection rates have been maintained by the licensee. Mr. Wilde pointed out the recorder on which the injection rate was being continuously determined; the recorder was observed to be in operation and the recording (on circular graph paper) of 400 GPM was indicated on the graph. Mr. Wilde said that they attempted to maintain an injection rate which was as near to 400 GPM as they could maintain it. He also stated that the water head pressures were determined by calculations using the determinations of the distance of the liquid surface with reference to the top and bottom of the well. Records of the volume of waste disposed, the concentrations of the radioactive constituents and the total amounts of radioactive nuclides were presented to the inspector. A summary of the volume of waste disposed and of the concentrations of radioactive constituents is presented in Appendix D. According to the licensee's records, as of July 31, 1961, 4.42 curies of natural uranium, 142.3 curies of Thorium-230 and 0.282 curies of Radium-226 have been released to the disposal well; this also includes that which was released during the 90-day test. Mr. Wilde stated that the determinations of monthly composites for gross alpha, natural uranium, Radium-226 and Thorium-230 were made by Tracerlab, Inc.; he said that they were preparing to perform their own analyses as soon as they could standardize their procedures, since they are now set up to do them. A sample of the effluent to the disposal well was collected at the time of the inspection at the point where the licensee collects their composite samples. The sample was analyzed for Radium-226 and Thorium-230 content by the AEC (Paragraph 14); the results of the analyses revealed that the effluent sample contained 36.3×10^{-8} μc/ml of Radium-226 and 96.5×10^{-8} μc/ml of Thorium-230.

21. Treatment of Licensed Material by Incineration

During the course of the inspection, it was learned from Mr. Wilde that the licensee has been incinerating wooden filter press forms containing natural uranium since the beginning of operations at the Anaconda mill. Mr. Wilde stated that the wooden press forms used in the clarification of pregnant uranium liquor become deformed after continual use, and that they absorb a certain amount of uranium during the filtering process. He added that the used presses are taken to a concrete pad within the licensee's perimeter fence (inside restricted area) and are burned; according to Mr. Wilde, the ashes which result from the burning of the frames are returned to the mill for reprocessing. Mr. Wilde said that he had no idea how much uranium was in the presses at the time of their burning, but that surveys of the presses with a survey meter had revealed that the level of radiation at the surface of the presses was 8 - 9 mr/hr total beta-gamma. Mr. Wilde stated that he was not aware that the incineration of the filter presses constituted noncompliance with

10 CFR 20.305, but that they would apply for an exemption from the requirements of this section. In a letter to the AEC, dated October 14, 1961, such a request was submitted by the licensee. Also included in the licensee's request for exemption was a map of the Anaconda mill site showing the location of the concrete pad where the licensee intends to incinerate the wooden filter presses. In a letter to the licensee, dated November 1, 1961, the AEC amended Source Material License R-133 authorizing Anaconda to incinerate discarded wooden equipment containing source material and to return the ashes to process for recovery of the contained uranium.

22. Discussion with Management

Immediately following the inspection, the inspection findings were discussed with Messrs. Fitch, Peterson and Wilde. It was suggested that the Anaconda Company might consider requesting AEC for an exception from 10 CFR 20.305 allowing the incineration of the filter press forms. The action which has been taken by the licensee has been reported in Paragraph 21.

SUMMARY OF ANALYSES OF BREATHING ZONE SAMPLES

SAMPLE OPERATOR DURING BARREL SAMPLING

Uranium Content - μc/ml x 10[illegible] *

Date	No. of Samples	High	Low	Average
May 1960	2	113.0	3.3	58.2
Aug 1960	2	40.0	21.5	30.8
Oct 1960	3	32.0	8.2	20.3
Nov 1960	2	36.0	13.6	49.[illegible]
Feb 1961	3	9.1	2.1	4.5
Mar 1961	3	1.[illegible]	1.2	1.5
Apr 1961	8	0.9	0.1	0.4
May 1961	[illegible]	5.1	0.3	1.5
June 1961	3	2.6	0.2	1.1
July 1961	18	5.2	0.1	0.9
Aug 1961	6	0.8	0.1	0.4

SAMPLE OPERATOR PREPARING COMPOSITES

Uranium Content - μc/ml x 10[illegible] *

Date	No. of Samples	High	Low	Weighted Average**
June 1960	3	110.0	12.2	39.1
Sept 1960	3	32.3	[illegible].2	13.9
Dec. 1960	2	[illegible].5	2.6	6.5
Jan. 1961	3	1.1	0.2	0.[illegible]
Jan. 1961	3	1.[illegible]	0.9	1.4
Feb. 1961	2	18.4	1.8	16.5
Feb. 1961	2	1.3	0.5	0.[illegible]
Apr. 1961	2	3.6	0.4	6.9
Apr. 1961	2	3.0	0.1	2.3
Apr. 1961	5	8.0	0.1	6.3
May 1961	3	2.4	0.5	2.0
May 1961	3	1.0	0.1	0.6
June 1961	3	[illegible].9	5.4	6.4
June 1961	3	10.4	8.[illegible]	8.3
July 1961	3	6.6	0.3	3.5
July 1961	2	3.8	3.2	3.6
July 1961	3	0.6	0.4	0.5***
July 1961	3	0.5	0.1	0.4
Aug. 1961	3	1.5	1.1	1.4
Aug. 1961	3	0.8	0.3	0.4
Aug. 1961	3	0.2	0.1	0.2

DRYER OPERATOR REMOVING AND REPLACING DRUMS

Uranium Content - $\mu c/ml \times 10^{-1}$ *

Date	Number of Samples	High	Low	Average
May 1960	.	471.0	5.4	86.5
Aug 1960	3	45.6	22.5	31.6
Oct 1960	2	53.0	44.5	48.8
Nov 1960	3	160.0	22.2	89.2
Feb 1961	2	55.3	1 .0	36.2
Mar 1961	3	1.1	0..	0.8
Apr 1961	9	1.2	0.1	0.4
May 1961	5	1.5	0.2	0..
June 1961	6	3.3	0.1	0.8
July 1961	13	4.4	0.3	1.2
Aug 1961	6	1.6	0.2	0..

* Prior to January, 1961, calculations were made using a curie of uranium as 3.7×10^{10} dis/sec.; after January, 1961, the licensee used the definition of the curie as defined in 10 CFR 20.5(c) to calculate concentrations of uranium content.

** Time-weighted average determined by licensee for this operation only - duration less than 50 minutes, no respirator factor.

*** Cleaning of sample bottles with compressed air was discontinued after this time.

SUMMARY OF JOB EXPOSURE EVALUATIONS

Dryer Operator

Date of Air Sample Collection		Weighted Average Conc.* μc U/ml x 10^{-11}	Percent of MPC**
May	1960	1.55	37.2
October and November	1960	0.82	19.7
November	1960	3.55	85.1
February	1961	4.22	84.4

Sample Room Operator

Date of Air Sample Collection		Weighted Average Conc.* μc U/ml x 10^{11}	Percent of MPC **
May	1960	1.80	43.2
October	1960	1.45	34.8
November	1960	2.52	60.4
February	1961	2.38/1.89	47.6
April	1961	0.50	10.0
May	1961	0.35	[illegible].0
June	1961	0.40	8.0
July	1961	0.23	5.0

* Prior to January, 1961, calculations were made using a curie of uranium as 3.7 x 10^{10} dis/sec.; after January, 1961, the licensee used the definition of the curie as defined in 10 CFR 20.5(c) to calculate concentrations of uranium content.

** MPC was 4.1[illegible] x 10^{-11} μc_R/ml prior to January 1, 1961, and 5.0 x 10^{-11} μc_R/ml thereafter.

SUMMARY OF ANALYSES OF BREATHING ZONE SAMPLES

SAMPLE OPERATOR DURING BARREL SAMPLING

Uranium Content - $\mu c/ml \times 10^{11}$*

Date	No. of Samples	High	Low	Average
May 1960	2	113.0	3.3	58.2
Aug 1960	2	40.0	21.6	30.8
Oct 1960	3	32.8	8.2	20.3
Nov 1960	2	86.0	13.6	49.1
Feb 1961	3	9.1	2.1	4.5
Mar 1961	3	1.7	1.2	1.5
Apr 1961	8	0.9	0.1	0.4
May 1961	7	5.1	0.3	1.5
June 1961	3	2.6	0.2	1.1
July 1961	18	5.2	0.1	0.9
Aug 1961	6	0.8	0.1	0.4

SAMPLE OPERATOR PREPARING COMPOSITES

Uranium Content - $\mu c/ml \times 10^{11}$ *

Date	No. of Samples	High	Low	Weighted Average**
June 1960	3	110.0	12.2	89.1
Sept 1960	3	32.8	7.2	18.9
Dec. 1960	2	7.5	2.6	6.5
Jan. 1961	3	1.1	0.2	0.7
Jan. 1961	3	1.7	0.9	1.4
Feb. 1961	2	18.4	1.8	16.5
Feb. 1961	2	1.8	0.5	0.7
Apr. 1961	2	8.6	0.4	6.9
Apr. 1961	2	3.0	0.1	2.5
Apr. 1961	3	8.0	0.1	6.3
May 1961	3	2.4	0.5	2.0
May 1961	3	1.0	0.1	0.6
June 1961	3	7.9	5.4	6.4
June 1961	3	10.4	0.7	8.3
July 1961	3	6.6	0.3	3.5
July 1961	2	3.8	3.2	3.6
July 1961	3	0.6	0.4	0.5***
July 1961	3	0.5	0.1	0.4
Aug. 1961	3	1.5	1.1	1.4
Aug. 1961	3	0.8	0.3	0.4
Aug. 1961	3	0.2	0.1	0.2

DRYER OPERATOR REMOVING AND REPLACING DRUMS

Date	Number of Samples	Uranium Content - $\mu c/ml \times 10^{11}$ * High	Low	Average
May 1960	7	471.0	5.4	86.5
Aug 1960	3	45.6	22.5	37.6
Oct 1960	2	53.0	44.5	48.8
Nov 1960	3	160.0	22.2	89.2
Feb 1961	2	55.3	17.0	36.2
Mar 1961	3	1.1	0.7	0.8
Apr 1961	9	1.2	0.1	0.4
May 1961	5	1.5	0.2	0.7
June 1961	6	3.8	0.1	0.8
July 1961	13	4.4	0.3	1.2
Aug 1961	6	1.6	0.2	0.7

* Prior to January, 1961, calculations were made using a curie of uranium as 3.7×10^{10} dis/sec.; after January, 1961, the licensee used the definition of the curie as defined in 10 CFR 20.5(c) to calculate concentrations of uranium content.

** Time-weighted average determined by licensee for this operation only - duration less than 50 minutes, no respirator factor.

*** Cleaning of sample bottles with compressed air was discontinued after this time.

SUMMARY OF JOB EXPOSURE EVALUATIONS

Dryer Operator

Date of Air Sample Collection		Weighted Average Conc.* μc U/ml x 10^{11}	Percent of MPC**
May	1960	1.55	37.2
October and November	1960	0.82	19.7
November	1960	3.55	85.1
February	1961	4.22	84.4

Sample Room Operator

Date of Air Sample Collection		Weighted Average Conc.* μc U/ml x 10^{11}	Percent of MPC **
May	1960	1.80	43.2
October	1960	1.45	34.8
November	1960	2.52	60.4
February	1961	2.38/1.89	47.6
April	1961	0.50	10.0
May	1961	0.35	7.0
June	1961	0.40	8.0
July	1961	0.23	5.0

* Prior to January, 1961, calculations were made using a curie of uranium as 3.7×10^{10} dis/sec.; after January, 1961, the licensee used the definition of the curie as defined in 10 CFR 20.5(c) to calculate concentrations of uranium content.

** MPC was 4.17×10^{-11} μc_S/ml prior to January 1, 1961, and 5.0×10^{-11} μc_R/ml thereafter.

OPTIONAL FORM NO. 10
5010-104

UNITED STATES GOVERNMENT

Memorandum

TO : Eber Price, Assistant Director
Division of Licensing and Regulation

DATE: DEC 27 1961

FROM : Leo Dubinski, Assistant Director
for Materials
Division of Compliance

SUBJECT: THE ANACONDA COMPANY, GRANTS, NEW MEXICO;
LICENSE NO. R-138

CO:RMN

Attached for appropriate enforcement action is a copy of a memorandum dated December 15, 1961, from ID Compliance Area together with a copy of the inspection report dated December 15, 1961.

Attachment:
Cpy memo fm CO-ID to CO
w/insp rpt, dtd 12/15/61

cc: D. I. Walker, CO-ID, w/o

SUMMARY OF ENVIRONMENTAL SURVEYS

Month of Sample Collection	Area	Number of Samples	Uranium Concentration $\mu c_R/ml \times 10^{13}$ H.	Low	Average
April	Within Perimeter	20	2.56	0.38	1.14
April	At Perimeter	9	2.01	0.42	0.95
May	Within Perimeter	1	2.62	-	2.62
May	At Perimeter	4	1.48	0.51	1.06
June	Within Perimeter	13	5.59	0.44	2.55
June	At Perimeter	5	1.56	0.74	1.17
July	Within Perimeter	18	3.42	0.52	1.08
July	At Perimeter	2	7.52	1.23	4.24
August	Within Perimeter	7	0.36	0.11	0.20
August	At Perimeter	0	-	-	-

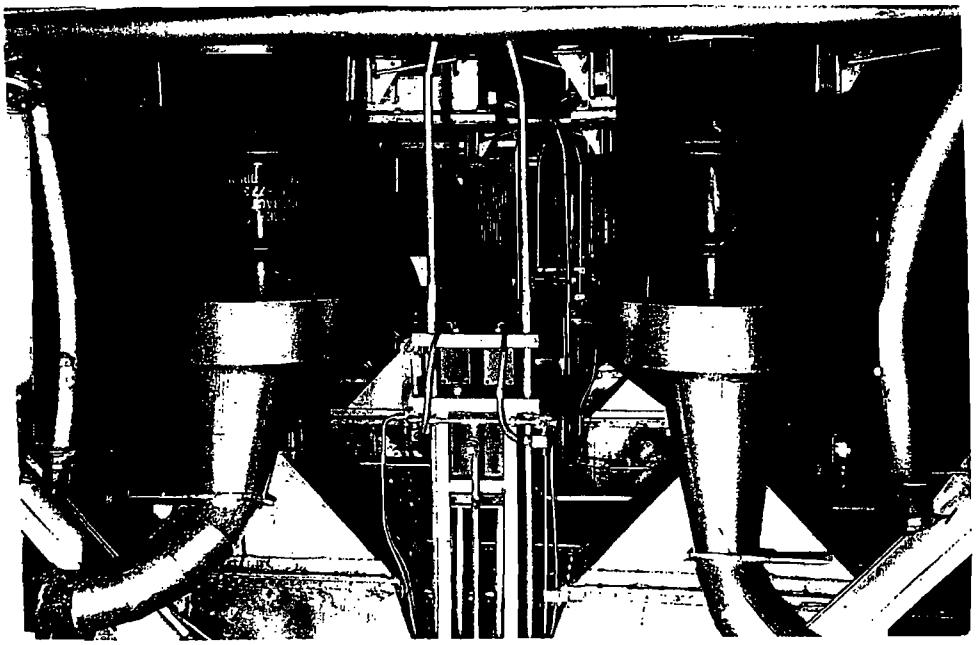
SUMMARY OF DISPOSAL WELL DATA

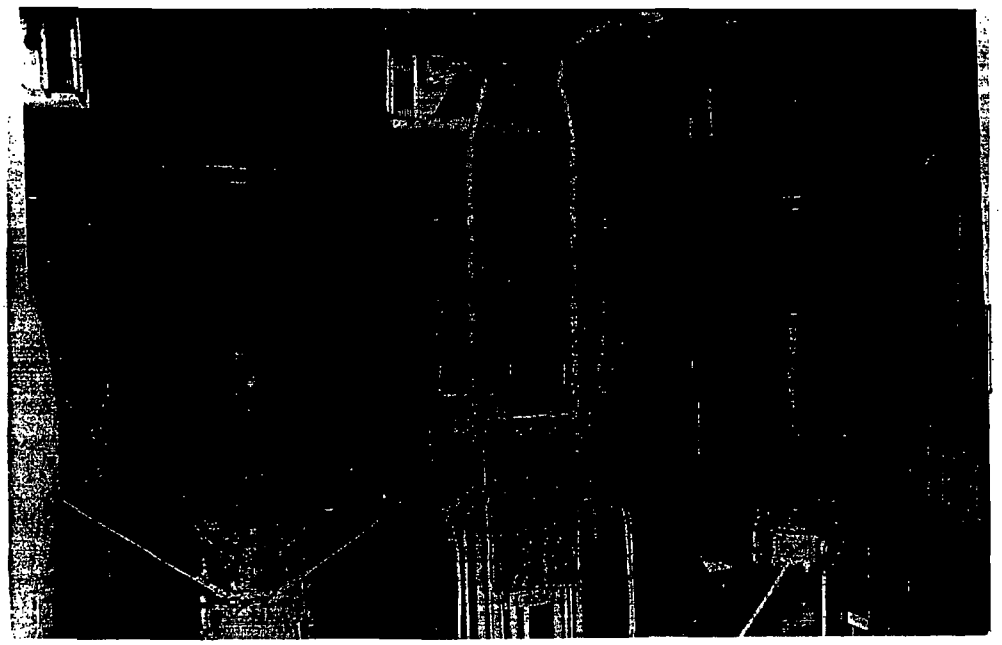
Date	Concentration of Materials Released - μc/ml				Volume in Gallons
	Gross Alpha	Uranium-Nat.	Thorium-230	Radium-226	
Dec. 1960	4.8×10^{-4}	1.1×10^{-5}	1.8×10^{-4}	2.0×10^{-7}	10,169,925
Jan. 1961	1.6×10^{-4}	5.2×10^{-6}	1.43×10^{-4}	1.15×10^{-7}	16,843,428
Feb. 1961	2.4×10^{-4}	5.23×10^{-6}	1.56×10^{-4}	2.0×10^{-7}	11,256,540
Mar. 1961	3.0×10^{-4}	5.57×10^{-6}	1.74×10^{-4}	4.4×10^{-7}	14,088,400
Apr. 1961	2.1×10^{-4}	6.36×10^{-6}	1.99×10^{-4}	6.0×10^{-7}	12,967,670
May 1961	3.7×10^{-4}	7.89×10^{-6}	2.61×10^{-4}	2.6×10^{-7}	13,834,750
June 1961	3.5×10^{-4}	8.96×10^{-6}	3.4×10^{-4}	3.0×10^{-7}	11,831,670
July 1961	5.1×10^{-4}	7.63×10^{-6}	3.1×10^{-4}	4.2×10^{-7}	13,020,450

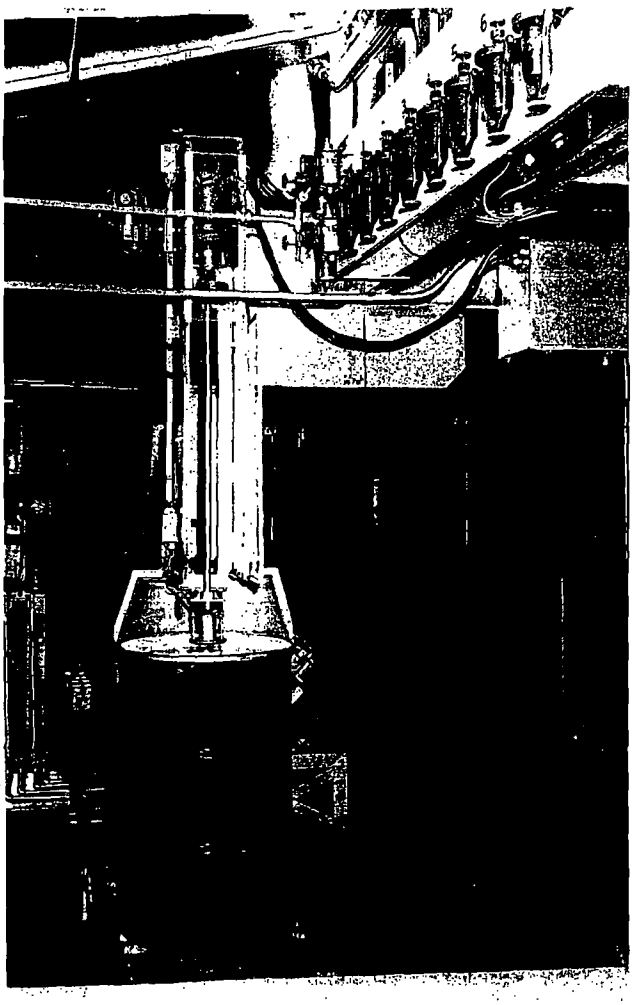
[redacted]

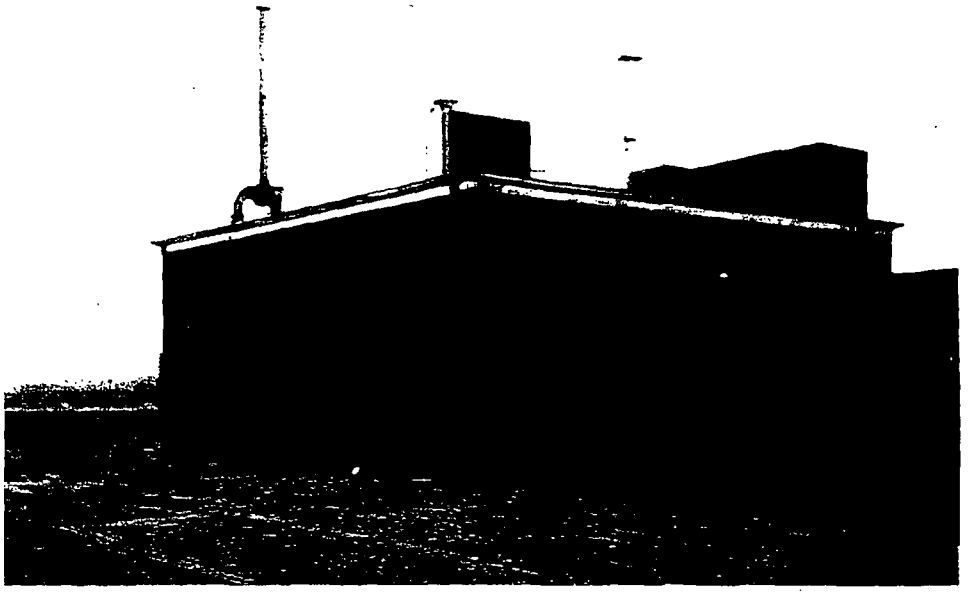
[redacted]

[redacted]









OPTIONAL FORM NO. 10
5010-104
UNITED STATES GOVERNMENT

Memorandum

TO : Files

DATE: October 26, 1961

FROM : J. J. Lane

SUBJECT: THE ANACONDA COMPANY - LICENSE R-138 - DOCKET 40-665

LR:JJL

ANALYSIS & FINDINGS

By application dated October 14, 1961, the subject applicant requests amendment to License R-138 to authorize the incineration of discarded wooden equipment and return the ashes to process for recovery of the contained ~~recovery~~ uranium

The incineration will consist mainly of burning the wooden plates and frames from the filter presses in an area on their plant site within the restricted area of the mill but well removed from plant activities and personnel. (500 - 1000 feet) Coincident surveys will be made. Incineration will take place twice a year with about 1000 pounds of wooden material involved.

The burning of material containing uranium, as has been found for thorium, results in minimal release of source material to the atmosphere with nearly all remaining in the ash or residue. This is based primarily on the elemental weight involved as compared to the C and O released in the smoke.

The applicant has not submitted details on the ash handling and return of the ash to process; however, due to the infrequent handling (semi-annually) and low quantity by weight of material to be incinerated, it is not anticipated that operating personnel will be exposed to airborne concentrations in excess of 10 CFR 20 based on a 40-hour work week. Further, the applicant has stated that coincident surveys will be made and results recorded.

Based on the review of the information submitted by the applicant, it is recommended that the applicant's License R-138 be amended to authorize this activity.

APPROVED:

for Donald A. Nussbaumer, Chief
Source & Special Nuclear Materials Branch

OPTIONAL FORM NO. 10
5010-104

UNITED STATES GOVERNMENT

Memorandum

TO : Files

DATE: August 7, 1961

FROM : C. G. Welty, Enforcement Branch
Division of Licensing and Regulation

SUBJECT: THE ANACONDA COMPANY, NEW MEXICO OPERATIONS,
P. O. BOX 638, GRANTS, NEW MEXICO
SOURCE MATERIAL LICENSE NO. R-138, DOCKET NO. 40-665
APPLICATION FOR RENEWAL OF SOURCE MATERIAL LICENSE NO. R-138
TO PROCESS URANIUM ORES AT THE COMPANY'S PLANT NEAR GRANTS,
NEW MEXICO

LR:CG

The licensee on May 18, 1960, submitted an application for renewal of License No. R-138 which had an expiration date of June 30, 1960. On May 23, 1960, DL&R acknowledged receipt of the application.

DL&R on December 1, 1960, in a compliance letter, requested licensing information from Anaconda concerning ten phases of the Company's activities under License No. R-138. This information was submitted on January 30, 1961. The following is a summary of review findings and associated comments.

On December 2, 1960, the Anaconda Company was authorized to discharge liquid effluents by injecting them into a deep well.

FINDINGS

ITEM 1. Organization, Authority and Supervision.

A chart of the Management indicating the position and name of administrative and supervisory personnel was provided. The chart indicates that Mr. R. M. Wilde the Industrial Radiological Engineer for the mill reports directly to the Mill Manager, A. D. Fitch and his Assistant, E. C. Peterson. Information is sufficient.

ITEM 2. Radiological Personnel Qualifications.

Mr. Ralph M. Wilde is in charge of the plant radiation safety program. He has a B.S. in chemistry and has had six years experience in the uranium industry; two years as an analytical chemist, two years as a metallurgist, and two years in his present position.

RE: The Anaconda Company

Item 2 - continued

Mr. Wilde attended a training course in radiological health at the Robert A. Taft Sanitary Engineering Center. He has visited the Winchester Laboratory and the Environmental Health Field Station of the USPHS in Salt Lake City, Utah, for additional training. He is presently serving as chairman of the New Mexico State Radiation Protection Technical Advisory Council, which advises the New Mexico State Department of Public Health.

Mr. Wilde appears well qualified for the position of Plant Industrial Radiological Engineer.

ITEM 3. Restriction of Mill and Pond Areas.

The mill and tailings areas are fenced and posted. Access gates are locked or guarded. Guards make periodic patrols to determine if gates and fences are secure against unauthorized entry.

ITEMS 4 AND 5. Dusty Areas and Dust Control Equipment.

The licensee submitted a bound volume containing descriptions and blue prints of dusty areas and dust control equipment. A master index drawing is provided showing the location of all dust areas.

Area A - The Bucking Room.

The ventilation system as indicated by Drawing No. 142-2 consists of hoods over 5 Pulverizers, the 4" x 6" Jaw Crusher, 5 splitters, 4 rolling units, 2 bucking boards, and 2 Eggers Sample grinders; a settling chamber in which large dust particles are removed from the ventilation air; and a 4,000 CFM and a 5,000 CFM fan exhausting air from the settling chamber. It appears that all dust producing equipment in the Bucking Room is ventilated by this sytem.

Area B - Primary Crusher.

Drawing No. 47-3 shows that the hammer mill, shaker, screens, and transfer points are enclosed and ventilated. Ventilation air is passed through a dust settling chamber and an Am. Air Filter, Type N rotoclone dust collector (R-1) before being discharged to the atmosphere.

RE: The Anaconda Company

Items 4 and 5 - continued.

Area C - Fine Ore Bins and Conveyor to Rod Mill in Acid Leach Plant.

Drawing No. 47-8 shows that inlets and outlets to fine ore bins and ore belt transfer points are enclosed and ventilated. It appears that the ore bins are maintained under a negative pressure. Vent air is passed through a dust settling plenum and an Am. Air Filter, Type-N Rotoclone (R-7), and discharged to the atmosphere.

Area D - Secondary Crushing Plant.

Drawing No. 47-23 shows the ventilation system for the cone crusher and transfer points on conveyors leading to and from the crusher. Air is passed through a dust settling chamber, an AM. AIR FILTER, Type N Rotoclone (R-8), and discharged to the atmosphere.

Area E - Fine Ore Bins in the Carbonate Leach Circuit.

Drawing No. 47-11 indicates that ore bins No. 1, 2, 3 and 7 are served by a separate ventilation and air cleaning system from that which serves bins No. 4, 5 and 6. Each system ventilates inlets and outlets to ore bins, maintains bins under negative pressure (except for bins No. 1, 2, 3 and 4), and ventilates enclosures over conveyor transfer points. Each system is provided with a dust settling chamber and Am. Air Filter, Type N Rotoclone dust collector (R 4 and 5) through which air is passed before being exhausted to the atmosphere.

Area F - Limestone Storage Bins and Sample Tower.

Drawings No. 47-12, 47-15, 47-16, and D-75 indicate that a ventilation system provides negative static for limestone ore Bins No. 1, 2, 3, and 4, ventilation for enclosures at conveyor ore transfer points in the sample tower, and ventilation for the acid grind and leach MnO_2 system. The air is passed through a dust settling chamber and an Am. Air Filter, Type N Rotoclone (R-3) and discharged to the atmosphere.

RE: The Anaconda Company

Items 4 and 5 - continued.

Area G - Limestone Sample Tower.

Drawings numbered U-15 and U-16 indicate that conveyor transfer points, classifier screens,and ore sampling equipment are enclosed and ventilated by a single ventilation system. Air is passed through a dust settling chamber and an Am. Air Filter, Type N Rotoclone (R-6), and discharged to the atmosphere.

Area H - Sandstone Sample Tower and Limestone Crushing Plant.

Drawing No. U-3 shows the system which ventilates enclosures at ore screens, conveyor transfer points, and ore sampling equipment. Air is passed through a dust settling chamber and an Am. Air Filter, Type N Rotoclone (R-2), and discharged to the atmosphere.

Area I - Limestone Primary Crusher.

Drawing No. U-4 shows the system that ventilates enclosures on the crusher and ore conveyor transfer points. Air is passed through a cyclone dust collector, a dust settling chamber, and an Am. Air Filter, Type N Rotoclone (R-9), and discharged to the atmosphere.

Area J - Yellow Cake Sampling Laboratory.

Drawings F-26 and F-27 show the sample preparation hood and ventilation system. There is a water spray unit installed in the duct downstream from the blower apparently for dust precipitation purposes. It is noted that the blower is located at the back of the hood thus making some of the duct in the laboratory under positive pressure.

No details are provided of the spray collection chamber, or the manner in which the system exhausts to the atmosphere.

Area K - Yellow Cake, Drum Dryers, Drying Plates and Barrel loading.

Four independent ventilation systems are described.

RE: The Anaconda Company

Items 4 and 5 - continued.

Area K - continued

System 1. This system ventilates the hopper enclosure on the carbonate circuit drum dryer, and hoods over the double and single drying plates. Air is passed through a 4000 CFM Joy Microdyne dust collector and exhausted to the atmosphere. (From drawings No. F-2 and F-22).

System 2. This system ventilates the hopper enclosure on the two acid circuit drum dryers, and the furnace dust collection hood. The air is passed through an 8,000 CFM Joy Microdyne dust collector and exhausted to the atmosphere. (See drawings No. F-2 and F-22).

System 3. This system exhausts the enclosures over the two acid circuit drum dryers. The air is passed through what appears to be a wet spray dust collector (Anaconda Dust Collector), a large dust collection tank, a cyclone liquid mist collector and exhausted to the atmosphere. (From drawings No. F-38 and F-57.)

System 4. This unit exhausts eight barrel filling hoods. Dust collecting equipment is not specified or described. (See drawing No. F-78).

The licensee should be requested to submit information concerning the dust collecting unit.

Area L - Yellow Cake Filter Press.

Each of four filter presses is ventilated by an overhead canopy hood. The hoods are long and appear to have no baffles. Air flow distribution is probably poor. Each hood has an individual veneaxial fan which exhausts 3,460 CFM. It does not appear that air cleaning is provided. (From Drawing No. F-79.).

RE: The Anaconda Company

Area M - Carbonate Process Drum Dryer.

Drawing No. D-88-10 shows the drum dryer enclosure ventilated at the top. The air is passed through a wet impact dust collector and a precipitation tank where water mist is removed, and discharged to the atmosphere through a vent from the top of the tank.

Area N - Metallurgical Laboratory.

Drawing No. E-44 shows the sample splitter hood which opens on both sides and is vented by a baffled plenum down the center of the hood. Air appears to be vented directly to the atmosphere with no air cleaning.

Area P - Lime Mixing Tank in Ion Exchange Building.

Drawing No. E-46 is of the air ejector ventilation system for the sack opening hood and the lime mixing tank. No radioactive materials are involved in this operation.

ITEMS 6 AND 7. The Air Survey Program.

The licensee uses Gast Model AD44D air pumps with 5 to 25 liters per minute capacity, and Steplex Hi-Volume, Model TFLA air samplers at about 17 CFM.

Whatman No. 41 filter paper is used. Air sampling equipment has been calibrated for air flow rate at Los Alamos Scientific Laboratory.

Samples are taken on a quarterly basis in all areas except in the Yellow Cake Section where air concentrations at times exceed MPC. Sampling in the Yellow Cake area is on a monthly basis. Approximately 86 mill locations are sampled resulting in about 140 air samples per quarter.

GA, BZ and Process Air samples are drawn.

The method of analyzing for Uranium is stated to be essentially the same as the Fluorimetric method developed by Claude W. Sill, Health and Safety Division, U.S. A.E.C., Idaho Falls, Idaho. The step-by-step analysis procedure was described.

RE: The Anaconda Company

Items 6 and 7 - continued

The air sampling and uranium analysis procedures appear satisfactory.

ITEM 8. Determination of Employee Average Weekly Exposure to dust.

Average daily and weekly exposures are calculated from results of air surveys and occupancy time studies.

Employees entering areas with concentrations in excess of MPC are required to wear respirators.

The licensee's attention should be directed to the provisions and requirements of Section 20.103(c)(3).

ITEM 9. Mill Discharge Stacks and Effluents.

The applicant states that only 6 mill stacks discharge effluents containing air-borne radioactive material.

Ore dust

a. No. 1 Rotoclone, Crushing plant.
b. No. 2 Rotoclone, Ore Sampling Tower.
c. No. 7 Rotoclone, Fine Ore Bins.
d. Sample Bucking Room.

The licensee has failed to describe the exhaust from Rotoclones No. 3, 4, 5, 6, 8 and 9. Perhaps this is because these units do not exhaust through stacks.

Yellow Cake Dust

a. Anaconda Dust Collector.
b. Microdyne Dust Collector.

The licensee has failed to describe the exhaust from the sample preparation hood, the barreling hoods, the filter presses, the carbonate circuit drum dryer and the metallurgical laboratory, and has not indicated which microdyne collector (4000 CFM or 8000 CFM unit) is referred to.

RE: The Anaconda Company

Item 9 - Continued

Concentrations discharged from the six stacks:

Stack location	Yearly Average Concentration
No. 1 Rotoclone	7.80×10^{-13} μc/ml U Nat.
No. 2 Rotoclone	3.15×10^{-13} μc/ml U Nat.
No. 7 Rotoclone	2.84×10^{-13} μc/ml U Nat.
Bucking room	1.99×10^{-12} μc/ml U Nat.
Anaconda Collector	5.03×10^{-11} μc/ml U Nat.
Microdyne Collector	6.82×10^{-11} μc/ml U Nat.

Note: Only the two stacks discharging yellow cake dust have average concentrations that exceed the MPC of 2×10^{-12} μc/ml of air for natural uranium in unrestricted areas.

The licensee's methods for determining the concentration of radioactive material released to the environment.

Air samples are taken of stack effluents and in areas around the stacks to determine what is discharged and the effect of dilution and dispersion.

The licensee indicated that an environmental air sampling program was being formulated on the basis of our air survey guide, "An Acceptable Basis for Surveying to Determine Concentrations of Radioactive Material Discharged as Air Effluents from Uranium Mills." The program was scheduled to start in February, 1961.

The Anaconda Company also has a water sampling program for periodically testing wells, springs and ponds in the area for chemical and radioactive constituents. This includes 50 sources of water.

Additional air and water environmental surveys have been conducted by Associated Nucleonics, Inc., in the period of December, 1958 through December, 1959. The surveys were made to detect any effect on the environment from mill operations.

RE: The Anaconda Company

ITEM 10. Written Radiological Safety Instructions.

Copies of eight different Memoranda and Bulletins were submitted. Material in these items cover nearly all phases of Safety, Radiological Health and Industrial Hygiene.

In addition, it is stated that specific instructions to supervisors on health and safety are recorded in the supervisor's log books.

GENERAL REMARKS

Generally, the Anaconda Company facilities and operations appear satisfactory with respect to Health and Safety. However, the licensee should be requested to provide additional information concerning deficiencies in the application as discussed above under each item.

In brief, the deficiencies are: Insufficient descriptions of ventilation and dust collection equipment, failure to describe certain ventilation exhaust ports and effluents and the need for clarification of the statements which indicate that respirators may be relied on to prevent employee overexposure.

Cunningham

Wik notified 2:40 pm 12-1-60

Ltr dtd 12-1-60

I have signed this letter. But with the proviso remaining for resolution before disposition of whether the 16th or June 2nd 61 might not make closer to have Average we are referring to, as written, it looks like our inspection would sufficient to think values have changed

Let me know if it is proper and if you think amendment is well disposed.

40-665

The Anaconda Company
New Mexico Operations
P. O. Box 638
Grants, New Mexico

Attention: Mr. A. J. Fitch, Manager

Gentlemen:

This refers to the inspections conducted on April 21, 1959 and on May 3 - 5, 1960, of your activities licensed under AEC Source Material License No. R-138.

We note that your surveys were not sufficient to determine compliance with the AEC's "Standards for Protection Against Radiation," Part 20, Title 10, Code of Federal Regulations, as required in Section 20.201(b), "Surveys," because the exposure of each employee who works in areas having airborne radioactive material above the maximum permissible concentrations, specified in Part 20, Appendix B, Table I, had not been determined by occupancy studies. Pursuant to the provisions of Section 2.201(a), "Notice of violation," of the AEC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, you are requested to notify this office, within thirty days of your receipt of this notice, of the steps taken or to be instituted to achieve correction of the alleged violation and the date when such correction has been or will be achieved.

We have delayed action on your May 18, 1960 application for renewal of License No. R-138 until the information resulting from our inspection and the information you have previously submitted to us could be correlated and thoroughly analyzed. As a result of this analysis, we have found that our information about certain aspects of your radiation safety program and facilities and equipment, as they pertain to radiation safety, is insufficient for us to act on your application. Therefore, we would appreciate receiving the following information so that our review and radiation safety evaluation can be completed.

AIR MAIL
REGISTERED MAIL
RETURN RECEIPT REQUESTED

OFFICE ▶						
SURNAME ▶						
DATE ▶						

1. A detailed description of your organization, including authority and responsibility of each level of management and/or supervision in regard to development, approval, and adherence to operating procedures.

2. The qualifications and experience of the personnel in your organization assigned the responsibility for developing, conducting and administering the radiation safety program for the mill.

3. A description of the method for restricting both the mill and the tailings pond from unauthorized entry.

4. A diagram of the plant layout, indicating areas and points in the process where dust is generated.

5. A description of dust collection and ventilation equipment that are utilized when the mill is in operation, including the type, capacity and locations of such equipment, e.g. ore transfer points, crushing, grinding, etc.

6. A description of the survey program which is followed to determine concentrations of airborne radioactivity within the mill, including the make, model number and capacity of sampling devices, and the step-by-step procedures for sample analysis.

7. In the description of your air sampling program, please include:

   a. A description of the sampling location in respect to operating personnel;
   b. a description of the sampling location in respect to the process operation;
   c. the approximate number of sampling locations in each area; and
   d. the approximate number of air samples taken in each mill area per month.

8. A description of the procedure followed in determining the average daily and weekly exposures to airborne radioactivity for each employee who frequently or occasionally occupies areas where air contamination exceeds MPC values specified in 10 CFR 20.

OFFICE ▶						
SURNAME ▶						
DATE ▶						

9. A description of mill discharge stacks, including stack heights, types and concentrations of effluents discharged, method for controlling release of radioactive material, and methods for determining the concentration of radioactive material released to the environs. Enclosed is a paper, entitled, "An Acceptable Basis for Surveying to Determine Concentrations of Radioactive Material Discharged as Air Effluents from Uranium Mills," which may be of assistance to you in formulating your survey program for air effluents.

10. A copy of the written radiological safety operating instructions supplied to employees. These instructions should include provisions for personal hygiene, including washing prior to eating or leaving the plant, instructions for wearing personnel monitoring devices, and instructions for cleaning up dust and spills within the plant.

FOR THE ATOMIC ENERGY COMMISSION

H. L. Price, Director
Division of Licensing and Regulation

Enclosures:
1. 10 CFR 2
2. 10 CFR 20
3. Air Survey Guide

bcc: Compliance Division, HQ
Compliance Division, IOO
Public Document Room
OGC (2)

OFFICE ▶	DLR:RSB	DLR:WAS		DLR	DLR	
	CGW:hgs:LRR	DELANEY		RLKirk	for HLPrice	
SURNAME ▶	CGW RBL				RLKirk per mm	
DATE ▶	10-31-60				12-1-60	

Form AEC-318 (Rev. 9-53) U. S. GOVERNMENT PRINTING OFFICE 16—62701-3

MEMO ROUTE SLIP
Form AEC-93 (Rev. May 14, 1947)

See me about this.	For concurr	For action.
Note and return.	For signat.	For information.

(Name and unit)	INITIALS / DATE	REMARKS
L. R. Rogers L&R		RE: ANACONDA COMPANY, LICENSE NO. R-138 We have sent you a memorandum today setting forth
TO (Name and unit)	INITIALS / DATE	our comments and recommendations with respect to the inspection of subject licensee. In addition to this memorandum we would appreciate your taking
TO (Name and unit)	INITIALS / DATE	a look at Dr. Walker's memorandum with respect to correspondence pending in L&R. This matter was not included in our formal transmittal memorandum.
FROM (Name and unit) L. D. Low CO		REMARKS
PHONE NO. 3336	DATE 7/26/60	

USE OTHER SIDE FOR ADDITIONAL REMARKS

U. S. GOVERNMENT PRINTING OFFICE : 1957—O-422007

MEMO ROUTE SLIP
Form AEC-93 (Rev. May 14, 1947)

See me about this.	For concurrer	For action.
Note and return.	For signature.	For information.

TO (Name and unit)	INITIALS / DATE	REMARKS
R. E. Cunningham L&R		RE: THE ANACONDA COMPANY, LICENSE NO. R-138
TO (Name and unit)	INITIALS / DATE	Attached for your information is a copy of the report dated July 12, 1960, together with the ID transmittal memo, also dated July 12, 1960, with
TO (Name and unit)	INITIALS / DATE	respect to the inspection of subject licensee. We are preparing a memo containing our comments and recommendations.
FROM (Name and unit) W. E. Kriegsman CO		REMARKS
PHONE NO. 3670	DATE 7/18/60	

USE OTHER SIDE FOR ADDITIONAL REMARKS

U. S. GOVERNMENT PRINTING OFFICE : 1957—O-422007

OPTIONAL FORM NO. 10

UNITED STATES GOVERNMENT

Memorandum

TO : H. L. Price, Director
Division of Licensing and Regulation

DATE: JUL 26 1960

FROM : L. D. Low, Director
Division of Compliance

SUBJECT: ANACONDA COMPANY, LICENSE NO. R-138

SYMBOL: CO:WEK

A copy of the report dated July 12, 1960, of the inspection of subject licensee, together with a copy of the ID transmittal memorandum also dated July 12, 1960, was sent to Mr. Cunningham of your office on July 18, 1960. This memorandum is intended to confirm the transmittal and provide our comments and suggestions.

The inspection report contains information based on visits to the uranium mill on April 21 and May 3 to 5, 1960. The report indicates that substantial progress has been made in reducing the concentration of airborne uranium within the restricted area. One area, the yellow cake area, remains above AEC standards. However, the company is takings steps to reduce the level within this area to meet the AEC requirements. Although personnel in the yellow cake area have been equipped with respirators, occupancy factors have not been established to determine the exposure of personnel to airborne materials. For this reason, the licensee has been cited for noncompliance with 20.201(b).

With respect to the licensee's status of compliance with 20.103 as it pertains to airborne effluent in the unrestricted areas, the report contains information gathered by both the licensee and the inspection representatives. In reviewing this information, however, we find we are in much the same position as in the Uranium Reduction case which has been recently forwarded to you. We would like to suggest that in the proposed meeting with regard to the scope and adequacy of surveys, the problems prompted by this report also be discussed.

We concur with the comments of the field Inspection Division with respect to the citation for 20.203(f)(2). It appears to us that the noncompliance resulted from a misunderstanding between the licensee and the AEC with respect to the issuance

(Continued)

of the amendment which exempted them from the labeling requirements. In view of this, we suggest that the licensee not be advised of this citation.

We concur with the recommendations contained on pages 4 and 5 of the ID memorandum and also suggest that the licensee be informed that insufficient data was gathered at the time of the inspection to determine compliance with the airborne requirements of 20.103. We also suggest it be noted in the letter to the licensee that we are aware that additional data on airborne effluents to unrestricted areas is being collected by the company and that this data will be considered in inspections which are scheduled.

UNITED STATES
ATOMIC ENERGY COMMISSION

DIVISION OF INSPECTION

REPORT

L. D. Low, Director, Division of
Compliance, AEC Headquarters

JUL 12 1960

Allan C. Johnson, Manager,
Idaho Operations Office

Orig. signed by
W. C. Funk

FOLLOW-UP INSPECTION REPORT - THE ANACONDA COMPANY, GRANTS, NEW MEXICO - SOURCE MATERIAL LICENSE NO. R-138
LI:RCP

Transmitted herewith are four (4) copies of the subject report covering the follow-up inspection conducted April 21, 1959, and May 3 - 5, 1960.

Items of noncompliance observed or otherwise noted are as follows:

10 CFR 20.201 Surveys
(b) Surveys to determine exposures of all individuals in restricted areas to airborne radioactive materials have not been completed in that occupancy factors have not been applied in those areas which the licensee's surveys have shown to be above the MPC for airborne natural uranium.

10 CFR 20.203 Caution signs, labels, and signals
(f)(2) Containers having natural uranium in excess of specified limits have not been labeled.

The follow-up inspection of the Anaconda mill at Grants, New Mexico, was made in two parts, the first part of the inspection being made by W. B. Johnston on April 21, 1959, and the second part by R. C. Paulus on May 3 - 5, 1960. Since a compliance inspection report was never submitted as a result of the April, 1959, inspection, it was decided to combine the findings of the two inspections and treat them as parts of one inspection.

The management of this mill seems to be making a conscientious effort to attain compliance with the Federal Regulations. Mr. Fitch mentioned that between the waste disposal well and modifications made to bring the mill into compliance, the Company has spent nearly one and one-half million dollars. The results of this expenditure are obvious. The only area in the mill above MPC for airborne natural uranium is the yellow cake area, and this forms the basis for the recommended citation under 10 CFR 20.201(b). As mentioned in the report, management

(Continued)

of the mill has elected to solve the problem of possible overexposure to airborne natural uranium by reducing the concentrations of uranium in air to levels below the MPC rather than allowing areas to remain above the MPC and limiting occupancy of these areas. Admittedly, this method may take longer to achieve compliance with the Regulations, but it is the inspectors' opinion that this plan represents a more sensible approach to the problem. It is certainly far better to have all areas in a mill below MPC for airborne uranium than to rely on a man limiting his time in areas above MPC.

The progress which the licensee has made in reducing the concentrations of airborne uranium in the yellow cake area is apparent from a comparison of his results of surveys for airborne uranium before and after modifications made in the yellow cake area. The samples collected by the inspectors show further reduction of airborne uranium concentrations in this area. In fact, the results of air samples collected by the inspectors at the time of the follow-up inspection in May, 1960, indicate that at that time, the only part of the yellow cake area above the MPC for airborne natural uranium was the yellow cake barreling enclosure. Mr. Wilde stated that although access to the barreling area was limited and employees were required to wear respirators when they entered this area, the Company was still planning to reduce airborne uranium concentrations in the barreling area to levels below the MPC.

The licensee was found to be technically in noncompliance with 10 CFR 20.203(f)(2) in that the license currently in force contains the exemption from this section with regard only to shipping containers. However, as mentioned in the report, the licensee has requested an exemption from the requirements of this section for all containers in the mill on two separate occasions, and was laboring under the impression that the exemption had been granted in this form. It seems very poor practice indeed to tell a licensee by telephone what his exemption includes and then fail to confirm this information in writing. Yet, this is apparently just what happened in this case. The manner in which this case has been handled has not left the licensee very favorably impressed with the AEC. Apparently the matter has finally been straightened out for Mr. Fitch sent to this office a copy of a new amendment to Anaconda's license which he had received on May 14, 1960. This amendment exempts the licensee from the provisions of 10 CFR 20.203(f)(2) for all containers in the mill. This office recommends that the licensee not be cited under 10 CFR 20.203(f)(2) even though he was in noncompliance with this section at the time of the inspection.

(Continued)

As you will note in the report, the licensee has made a survey for airborne uranium on the roof of the Carbonate Mill Building in the vicinity of the yellow cake area dust collectors' discharges. The licensee's records show that all of the samples collected were below the MPC for airborne natural uranium in a restricted area but 7 of the 11 samples collected were above the MPC for airborne natural uranium in an unrestricted area. The question arises whether or not the roof of this building is a restricted area or an unrestricted area. The nearest point of the fence line which defines the mill grounds is approximately one mile down wind, so the building itself is well within the restricted area. It is true that the licensee no longer has control over the material when it leaves the stacks on the roof. However, it is also true that uranium mills no longer have control over liquid radioactive waste material when it seeps out of their tailings ponds into the ground. It is the inspectors' opinion, based on results obtained by the licensee and results of samples collected by the inspectors in May, 1960, that the release of uranium effluents through the stacks on the roof of the Carbonate Mill Building, at the present rate of such release, does not constitute a hazard of exposing individuals in unrestricted areas to concentrations of uranium in air in excess of the MPC. Neither does it seem probable that individuals in restricted areas are in any danger of being exposed to concentrations of airborne uranium in excess of the MPC for a restricted area, for the results of the samples collected show that an individual would have to approach within approximately 20 or 25 feet down wind of the stacks and at stack level before he would be exposed to concentrations of airborne uranium in excess of the MPC for a restricted area.

Mr. Wilde and Mr. Fitch mentioned that the Company had extended an invitation to the Division of Licensing and Regulation to send a representative to the Anaconda mill to observe the disposal well system in operation. Mr. Fitch said that he was very disappointed when DLR ignored his invitation. He said that he felt that the Anaconda Company had a worthwhile program in its disposal well test that might be of benefit to the entire uranium industry, but the attitude of the Division of Licensing and Regulation left him with the impression that the AEC didn't care whether or not the disposal well was successful. It should be noted that this office had no knowledge of the invitation tendered by the Anaconda Company or we would have tried to arrange a visit to the mill for the express purpose of checking the results of the disposal well test.

(Continued)

3. Request him to submit the anticipated completion date of modifications being made or planned to be made which will reduce concentrations of airborne natural uranium in the yellow cake area to levels below the MPC for airborne natural uranium in restricted areas.

4. Thank him for the cooperation extended during the follow-up inspection.

The above items will be checked during a follow-up inspection conducted after the completion of correspondence between DLR and the licensee.

Enclosure:
Inspection Report (4 cys)
The Anaconda Company

CC: W. B. Carlson, GJ, w/1 cy encl.
V. C. Vespe, ALOO, w/1 cy encl.
Frank K. Pittman, DRD Washington, w/o encl.

RECEIVED
U.S. ATOMIC ENERGY COMMISSION
JUL 15 1960

Form AEC-417 (4-58)

UNITED STATES ATOMIC ENERGY COMMISSION

COMPLIANCE INSPECTION REPORT

1. Name and address of licensee	2. Date of inspection
The Anaconda Company New Mexico Operations P. O. Box 638 Grants, New Mexico	April 21, 1959 May 3 - 5, 1960
	3. Type of inspection Follow-up
	4. 10 CFR Part(s) applicable 20 - 40

5. License number(s), issue and expiration dates, scope and conditions (including amendments)

License No. R-138 Issued: July 1, 1959 Expires: June 30, 1960

Scope:

"you are hereby licensed to receive possession of and title to at your plant located at Bluewater, New Mexico, raw and refined source material for resale and for processing with raw source material from your own mining operations.

"You are further licensed to transfer and deliver possession of and title to refined source material to any person licensed by the Atomic Energy Commission, within the limits of his license."

Conditions:

"As a condition of this license, you are required to maintain records of your inventories, receipts and transfers of refined source material.

"The issuance of this license does not constitute any agreement by the Commission to purchase ores and/or concentrates or other products from the licensee.

"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

(Continued)

6. Inspection findings (and items of noncompliance)

The licensee has collected air samples and had them analyzed for uranium. The licensee made available for inspection the following records: results of surveys to determine levels of external radiation; results of surveys to determine concentrations of airborne natural uranium throughout the mill and near the dust collectors' discharges on the roof of the carbonate Mill Building; film badge results on both mill employees and employees who work at the licensee's uranium mine; results of data collected on the disposal well test. The licensee has posted rooms and areas as containing radioactive materials and as being airborne radioactivity areas. A respirator program is in force for certain operations withi the mill. Equipment modifications and additions have been made in an attempt to reduce concentrations of airborne natural uranium.

Items of noncompliance observed or otherwise noted are as follows:

10 CFR 20.201 Surveys

(b) Surveys to determine exposures of all individuals in restricted areas to airborne radioactive materials have not been completed in that occupancy factors have not been applied in those areas which the licensee's surveys have shown to be above the MPC for airborne natural uranium. (Paragraph 17)

10 CFR 20.203 Caution signs, labels, and signals

(f)(2) Containers having natural uranium in excess of specified limits have not been labeled. (Paragraph 25)

7. Date of last previous inspection	8. Is "Company Confidential" information contained in this report? Yes ☒ No ☐ (Specify page(s) and paragraph(s))
January 7, 1958	Entire Report

Original signed by Robert C. Paulus

Robert C. Paulus
(Inspector)

Original signed by WILLIS B. CONNELLY

Approved by: Donald I. Walker, Director
Division of Licensee Inspection
Idaho Operations Office
(Operations office)

JUL 12 1960
(Date report prepared)

DISTRIBUTION:

DOC	HQ	(4)
Insp	ID	(1)
GJ		(1)
ALOO		(1)

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—73314-2 U. S. GOVERNMENT PRINTING OFFICE

RECOMMENDATIONS SHOULD BE SET FORTH IN A SEPARATE COVERING MEMORANDUM

9. On January 7, 1958, an initial, routine inspection of the uranium mill of The Anaconda Company, Grants, New Mexico, was conducted by Donald I. Walker, Director, Division of Licensee Inspection, ID. Accompanying the inspector were T. J. Haycock, Director, Division of Licensee Inspection, AL, and Durrel L. Brown, Concentrate Procurement Division, GJ. The compliance inspection report was submitted to Inspection Division Headquarters on March 4, 1958, and forwarded from that office to the Division of Licensing and Regulation on March 27, 1958. The licensee was contacted by letter by the Division of Licensing and Regulation on May 23, 1958, and was cited for the following items of noncompliance:

   10 CFR 20.201 Surveys
   (b) The Company has not conducted surveys necessary to determine compliance with the regulations.

   10 CFR 20.203 Caution signs, labels, and signals
   (e)(2) Areas and rooms in the plant were not posted with proper caution signs.

   (f)(2) Containers having quantities of source material in excess of specified limits were not labeled.

   The licensee was requested to respond within thirty days stating what action had been or was planned to be taken to correct the deficiencies.

10. The licensee replied to the Division of Licensing and Regulation on June 16, 1958, and stated that surveys had been conducted in December, 1957, and March, 1958, and another survey was scheduled for July, 1958. The licensee also stated that all areas and rooms in the plant had been posted with proper caution signs and requested an exemption from the requirements of 10 CFR 20.203(f)(2) with respect to shipping containers. On July 1, 1958, the Division of Licensing and Regulation replied to the licensee through Mr. A. J. Fitch, Manager, and stated that it appeared that he was taking action to correct the deficiencies which had been brought to his attention. At this time an amendment was added to the license granting an exemption from the licensing requirements of Section 20.203(f) for individual shipping containers of uranium. Copies of correspondence between the licensee and the Division of Licensing and Regulation relating to the initial inspection are attached to this report as Appendix A.

11. On August 24 - 28, 1959, a team representing the ID Division of Licensee Inspection visited the Anaconda mill to collect data that would reflect general conditions in and around the mill. The team consisted of J. H. Osloond, Health and Safety Division, ID, R. Woolsey, Division of Licensee Inspection, AL, and G. Giboney, Division of Inspection, SR. A total of 127 samples of atmospheric dust in 49 areas were collected. The samples were analyzed for uranium content by personnel of the Analysis Branch, Health and Safety Division, ID. Individual samples taken in the following areas were found to be at or above the maximum permissible concentration: weighing and drying room of the Bucking Building, yellow cake filter press area, yellow cake dryer area, and yellow cake bucking room. In addition, two samples taken at the stack discharge from the yellow cake area dust collector system showed an average concentration of 3,450 times MPC for an unrestricted area. According to Mr. Wilde, the Company loses control over the material when it leaves the stack, and in this sense the discharge point may be considered an

unrestricted area. However, it was noted by the inspectors that the stack is located on the roof of the Carbonate Mill Building, which in turn is located within the fenced mill grounds. Mr. Wilde said that access to the mill grounds is controlled by keeping a guard on duty at the gate at all times. In this sense, the discharge point of the stack may be considered to be in a restricted area. The inspectors noted that the guard was on duty at the gate during the follow-up inspection. Breathing zone samples were collected for 11 specific operations within the mill. Ten of the 15 samples, representing 7 of these operations, were in excess of MPC, the highest being 125 times MPC. The data collected showed that the yellow cake area had, at the time of these measurements, concentrations of airborne uranium which could result in excessive exposures to employees. A compilation of the data is attached to this report as Appendix B. External radiation levels were measured at 49 locations throughout the mill. The highest reading obtained was one of 5.0 mr/hr near the wooden frames of the yellow cake clarification presses. The results of these measurements are attached as Appendix C.

12. On December 4, 1959, G. H. Giboney, Deputy Director, Inspection Division, SR, inspected the survey records at the Anaconda mill. The records inspected by Mr. Giboney were exhibited to the inspectors during the follow-up inspection conducted May 3 - 5, 1960, and are described in detail in Paragraphs 15 and 16 below.

13. On the basis that there were items of noncompliance at the time of the initial inspection, it was decided by this office that a follow-up inspection be conducted. The follow-up inspection of the licensee's facilities was conducted on April 21, 1959, by Willis B. Johnston, Inspector, Division of Licensee Inspection, ID and on May 3 - 5 1960, by Robert C. Paulus, Inspector, Division of Licensee Inspection, ID. Mr. Johnston was accompanied by R. Nelson, Inspector Division of Licensee Inspection, AL, and Burdett A. Winn, Source Material Procurement Division, GJ. Mr. Paulus was accompanied by A. W. Holmes, Inspector, Division of Licensee Inspection, ID, and R. L. Miller, Inspector, Division of Licensee Inspection, AL. In each case the inspectors contacted Mr. E. C. Peterson, Assistant Manager, and Mr. Ralph Wilde, Industrial Radiological Engineer. In addition, at the time of the May 3 - 5, 1960, part of the inspection, contact was made with Mr. A. J. Fitch, Manager. Mr. Wilde told the inspectors in May, 1960, that as Industrial Radiological Engineer, he is responsible for keeping the operations of the Anaconda mill in compliance with the Federal Regulations. He mentioned that he reports directly to Mr. Peterson.

14. It should be noted that the information presented in this report, unless specifically stated otherwise, was collected by R. C. Paulus and A. W. Holmes during the period May 3 - 5, 1960. Most of the information given to Mr. Johnston was repeated to Messrs. Paulus and Holmes, and this information is reported as collected by Paulus and Holmes in May, 1960.

15. Mr. Wilde told Mr. Johnston in April, 1959, that partial surveys for external radiation and airborne uranium had been made in the Anaconda mill in December, 1956, March, 1958, July, 1958, December, 1958, and January, 1959. In addition, he said that one survey was in progress at the time of Mr. Johnston's visit. Mr. Wilde told the inspectors in May, 1960, that the above-mentioned surveys were made by personnel of the United States Public Health Service, New Mexico Department of Health,

and Associated Nucleonics, Inc., Garden City, New York. He said that mill employees had assisted in some of the surveys. Mr. Wilde stated that surveys made by Associated Nucleonics were environmental surveys and included analysis of mill waste effluents in the tailings pond, collection and analysis of air samples taken outside the mill and over a large area to determine whether or not there was any spread of radioactive materials from the tailings area and the ore stockpiles, and collection and analysis of water samples taken from 35 wells to check the concentrations of radioactive materials. Mr. Wilde said that the well sampling program covered wells in an area approximately 9 miles wide by 16 miles long. He said that of the 35 wells sampled, all but 2 were used as potable water supplies. Mr. Wilde said that the Associated Nucleonics surveys had been conducted on the following dates:

December 5-7, 1958
March 17-18, 1959
June 17-18, 1959
September, 1959
December, 1959

Mr. Wilde said that he had not received the results of the last 2 surveys made by Associated Nucleonics, but the results of the first 3 surveys indicated that there was little or no airborne contamination being spread throughout the area as a result of radioactive materials present in the tailings pond and the ore stockpiles. G. Giboney, Division of Inspection, SR, inspected these records in December, 1959, and reported that the results of the well sampling program showed that Radium-226 concentrations were less than 4×10^{-9} uc/ml for all samples except the water of the tailings pond and that of a test well located within a few hundred yards of the tailings pond and within the restricted area. Mr. Wilde told the inspectors in May, 1960, that he felt the environmental surveys made by Associated Nucleonics were of dubious value because of the methods of collection and analysis of samples which had been employed. Mr. Wilde stated that he has conducted surveys for external radiation and airborne uranium since November 19, 1959. He said that all samples of airborne uranium collected by him have been analyzed for uranium by the Nuclear Science and Engineering Corporation, Pittsburgh, Pennsylvania. Mr. Wilde stated that the Nuclear Science and Engineering Corporation had told him that they use a fluorometric method of analysis and could analyze uranium in quantities as low as 5×10^{-9} grams with an accuracy of ± 10 per cent. Mr. Wilde told Mr. Johnson in April, 1959, that the Anaconda Company planned to build a laboratory so that airborne uranium samples could be analyzed by their own personnel. Mr. Wilde told the inspectors in May, 1960, that construction of the laboratory building had been postponed because of financial difficulties, but now they plan to begin construction of the building within 2 months. Mr. Wilde mentioned that when airborne uranium samples are analyzed by mill personnel, a fluorometric method would be used to determine uranium.

16. Mr. Wilde exhibited records of the results of surveys for airborne uranium. He stated that up to April, 1959, these records were kept in units of milligrams of uranium per cubic meter of air. He said that since talking with Mr. Johnston in April, 1959, the results of airborne surveys have been kept in units of uc/ml. An examination of the records by the inspectors showed that the licensee has collected a total of 132 general air samples throughout the mill during the period November 19, 1959, through March 24, 1960, and had these samples analyzed for uranium.

The inspectors noted that the only area of the mill in which airborne uranium concentrations above the MPC had been detected by the licensee was the yellow cake area. The inspectors noted that 22 samples collected in this area were recorded as being above the MPC for airborne uranium, the highest being 14.8 times MPC for a sample collected between the yellow cake dryers on the mezzanine floor. Mr. Wilde also exhibited records of the results of breathing zone samples collected throughout the mill during the period of December 1, 1959, through March 24, 1960. The inspectors scrutinized the records and noted that 23 breathing zone samples had been collected by the licensee. Mr. Wilde stated that these samples had been analyzed for uranium content by the Nuclear Science and Engineering Corporation. The inspectors noted that of the 23 samples collected, 7 were recorded as being above the MPC for natural uranium and all 7 of these samples had been collected in the yellow cake area. The inspectors' examination of the records revealed that 3 of the samples which were recorded as being above MPC were collected while a weighman was sampling and lidding barrels of yellow cake. The inspectors noted that the results of these 3 samples were recorded as 16.8, 22.0, and 102 times MPC. Mr. Wilde stated that the weighman always wore a respirator when he sampled and lidded drums of yellow cake. He said that an efficiency factor for the respirator had not been taken into account when the results of the breathing zone samples had been calculated. The inspectors noted that the other 4 breathing zone samples which had been recorded as being above MPC were collected while a dryer operator was removing full drums of yellow cake and replacing them with empty drums. The recorded airborne uranium concentrations which this man worked in while the samples were being collected were 9.20, 10.6, 16.6, and 36.0 times MPC. Mr. Wilde stated that the dryer operator always wore a respirator while removing full drums of yellow cake and placing empty drums under the yellow cake packager. He said that an efficiency factor for the respirator had not been considered when the results of the breathing zone samples had been calculated. It should be noted that the licensee has assumed an MPC for airborne natural uranium in a restricted area of 5.0×10^{-11} uc/ml. Mr. Wilde stated that all employees of the mill work 48 hours per week. Therefore, according to 10 CFR 20.101(b), the licensee should use a value of 4.17×10^{-11} uc/ml as the MPC for airborne natural uranium. Mr. Wilde was informed of this fact. According to the licensee's records, 2 of the general air samples collected by the licensee are above the MPC on the basis of a 48-hour work week while below the MPC on the basis of a 40-hour work week. These 2 samples were collected in the yellow cake area. The licensee's records of results of breathing zone surveys indicate that only those 7 samples discussed above are above the MPC even for a 48-hour per week exposure. A copy of the licensee's results of surveys for airborne uranium is being maintained in the files of this office. Mr. Wilde stated that he used a Staplex Hi Vol pump with Whatman No. 41 filter paper for collecting general air samples and a Gast Model AD 440 pump with Millipore AA filter paper for collecting breathing zone samples. He stated that these pumps had been calibrated by personnel of the Los Alamos Scientific Laboratory. He said that 170 cubic feet of air are passed through the filter paper when a general air sample is collected. He also said that the breathing zone samples which he collects are usually taken over a period of 15 to 20 minutes. Mr. Wilde stated that his surveys for airborne uranium are now on a regular schedule which consists of surveying the entire mill every three months, the yellow cake area once per month, the ore bucking building once per month, and the stack effluent approximately once per month. He said that when the airborne uranium concentrations in those areas which are surveyed monthly are reduced to below the MPC, the frequency of surveys will probably be decreased.

17. Mr. Wilde stated that occupancy studies had not been made in the yellow cake area where concentrations of airborne uranium exceed the MPC. He said that because of this he could not determine the exposures to which personnel in this area were being subjected. He was informed that this constituted a case of noncompliance with 10 CFR 20.201(b). Mr. Wilde said that he realized that the Anaconda mill was in noncompliance at the present time due to a lack of exposure data for individuals, but the Company had elected to approach the problem by reducing airborne uranium concentrations below the MPC in all areas of the mill so that occupancy studies would not be necessary. Mr. Wilde said that some modifications had already been made in the yellow cake area and offered the following results of surveys of airborne uranium as an indication of the improvement made in the airborne contamination situation:

Location	Uranium Concentration Times MPC		
	11-30-59	2-6-60	3-11-60
West side of barren filtrate tanks	4.80	0.12	0.57
East side of barren filtrate tanks	8.40	0.11	0.57
East side of drum scale	4.00	0.10	0.96
Beside hood in weighing room	0.74	0.07	0.26
Beside desk in weighing room	1.50	0.24	0.22
Between dryers, mezzanine floor	14.8	5.35*	3.62
East side of dryers, mezzanine floor	4.20	1.64	0.47
West side of dryers, mezzanine floor	3.40	0.68	0.05
Above dust collection tank	2.60	0.23	0.57
Press area, east side of operator's desk	5.00	5.08	1.81

* Average of 3 samples

Mr. Wilde said that he believed that the results of the surveys of February 2, 1960, and March 11, 1960, were lower than the results of the November 30, 1959, survey because the Microdyne dust collector had been vented to the roof and air agitation in the precipitation tanks had been eliminated (See Paragraph 30).

18. Mr. Wilde exhibited records of the results of a survey to determine concentrations of airborne uranium being released from the yellow cake dust collector systems through two stacks on the roof of the Carbonate Mill Building. A copy of the licensee's results is attached to this report as Appendix D. It should be noted that Mr. Wilde calculated the concentrations of airborne uranium in relation to the MPC's for both a restricted area and an unrestricted area. The licensee's data shows that of the 11 samples collected near the stacks, 7 of them exceed the MPC for concentrations of uranium in air in an unrestricted area while none of them exceed the MPC for concentrations of uranium in air in a restricted area. Mr. Wilde stated that the two stacks on the roof of the Carbonate Mill Building represented the discharge from the Microdyne dust collector and the Anaconda Dust Collector System. Mr. Wilde said that on the basis of information he obtained from the Engineering Department of the mill, the discharge point of the Microdyne stack is 61 feet above the ground while the discharge point of the Anaconda Dust Collector is 40 feet above the ground. He said that normally the wind blows from the west and northwest. Mr. Wilde also mentioned that the survey of stack effluents is not complete and he intends to determine concentrations of uranium in air at varying distances from the stacks. He said that he planned to collect samples as far away as the fence

which defines the restricted area of the mill. He mentioned that the nearest point of the fence to the stacks was approximately one mile to the south and the next nearest point was approximately 1-1/2 miles to the east. Mr. Wilde said that when he had completed his survey of stack effluents, he intended to submit the data to the Division of Licensing and Regulation and apply for an exemption from the provisions of 10 CFR 20.105(b).

19. The inspectors collected 14 general air samples in two areas of the mill, 4 general air samples on the roof of the Carbonate Mill Building in the vicinity of the yellow cake area dust collectors' discharges, and 2 breathing zone samples in the Ore Bucking Building. These samples were analyzed for uranium content by personnel of the Analysis Branch, Health and Safety Division, ID. A compilation of the results is attached to this report as Appendix E. It should be noted that the only general air samples which exceeded the MPC for airborne natural uranium in a restricted area were those collected in the yellow cake barreling enclosure (Appendix J, Photograph 5). The highest uranium concentrations detected in this area was 30.4 times MPC while the average of 5 samples collected in this area was 3.2 times MPC. Mr. Wilde mentioned that employees always wore respirators when they entered the yellow cake barreling enclosure while it was in operation. (See Paragraphs 26 and 31.) The samples collected in the vicinity of the stacks on the roof of the Carbonate Mill Building were below the MPC for airborne natural uranium in a restricted area, but 3 of the 4 samples collected in this area were above the MPC for airborne natural uranium in an unrestricted area, the highest being 9.4 times MPC. It should be noted that at the time these samples were collected on the roof of the Carbonate Mill Building, the wind was blowing from the west and west-southwest at a velocity of 10 to 15 miles per hour.

20. Mr. Wilde stated that the first complete survey for external radiation in the Anaconda mill was conducted on August 24-28, 1959, by a team representing the Division of Licensee Inspection, ID (See Paragraph 11 and Appendix C). Mr. Wilde said that he made an external radiation survey of the entire mill in April, 1960, covering the same areas surveyed by the Division of Licensee Inspection personnel, plus 5 additional locations, for a total of 54 locations. Mr. Wilde exhibited records of the results of his survey for external radiation. The inspectors examined the records and noted that all recorded radiation levels were 0.20 mr/hr or below except the following:

Location	mr/hr
By grizzly outside ore pile	0.7
Lower level ore spillage in cursher building	0.7
Surface of No. 3 conveyer in crusher building	0.5
Surface of No. 4 conveyer in crusher building	0.4
Building No. 14 - workshop area	0.7
Walkways around yellow cake press	2.5
Wood frame of yellow cake press	8.5
Walkways around yellow cake dryers	0.7
Walkways above yellow cake dryers	0.6
Ground level walkways in yellow cake area	0.5
Lower level walkways in yellow cake area	0.5
Work areas around yellow cake drums	0.7
Yellow cake laboratory and sample room	0.3
Surface of open yellow cake drum	7.5

The complete results of the licensee's external radiation survey are being maintained in the files of this office. Mr. Wilde said that the results of his external radiation survey were obtained with an Eberline Model E-112B beta-gamma survey meter with the following ranges: 0 - 0.1, 0 - 1.0, 0 - 10 mr/hr. He said that the meter had been calibrated by the manufacturer but the Anaconda Company had recently acquired a calibration source which would be used in the future.

21. Mr. Wilde stated that the Anaconda mill initiated a film badge program on July 6, 1959. He said that the film badges were supplied by Tracerlab, Inc., on a two-week basis and contained a film to measure the cumulative quarterly dose and another film to measure the two-week dose. According to Mr. Wilde, film badges were supplied to 95 mill employees, including all employees in the yellow cake area, all employees in the crushing plant, and at least one employee in each job classification in the mill. Mr. Wilde said that after a trial period of six months, the film badge program was reduced in scope so that only employees in the yellow cake area were badged. He said that this was done because the film badges of employees in all other areas showed little or no exposure. Mr. Wilde mentioned that employees in the clarification and ion-exchange area will be supplied with film badges beginning in July, 1960. He said this will be done because external radiation levels have been detected in these areas which he felt are high enough to warrant the use of film badges, at least on a trial basis. Mr. Wilde exhibited records of the results of the film badges and gave the inspectors a copy of the records. The inspectors noted that these records cover the period of July 6, 1959, through April 25, 1960, and include the biweekly exposure data as well as the cumulative 13-week exposure data as measured by the special film in the badges. The inspectors noted that the highest quarterly exposure, entered in the records, to an individual was one of 1300 mrem beta, 0 mrem gamma. However, the inspectors were informed by Mr. Wilde that the film processor had stated that this exposure may have been due to unusual heat, light, or pressure. The inspectors observed that the next highest quarterly exposure entered in the records was one of 700 mrem beta, 45 mrem gamma. A copy of licensee's records of film badge readings is being maintained in the files of this office. Mr. Wilde mentioned that the film badges, including a control badge, were kept on a rack in the change building where they were picked up by the men at the beginning of their shift and returned at the end of their shift.

22. Mr. Wilde stated that the Company had recently completed a film badge program in which employees who work at the Anaconda uranium mine were supplied with film badges. Mr. Wilde said that 50 employees were supplied with film badges for the period October 5, 1959, through April 4, 1960. He said the badged employees included all foremen and at least one man from every department. Mr. Wilde exhibited records of the results of the film badges. The inspectors noted that the highest cumulative exposure entered in the records was one of 270 mrem which, according to the records, was received over a 14-week period.

23. On September 26, 1959, the Division of Licensee Inspection, ID, supplied film badges to all the employees of the Anaconda Company's uranium mill at Grants, New Mexico. These film badges were processed monthly by employees of the Personnel Metering Branch, Health and Safety Division, ID. The film badge program was terminated on January 16, 1960. The Division of Licensee Inspection, ID, sent copies of the results of the film badges to Mr. A. J. Fitch, Manager of the Anaconda mill in Grants, New Mexico, on February 2, 1960, and to Inspection Headquarters on March 18, 1960.

24. As noted above (Paragraph 9), the licensee was cited as a result of the initial inspection for failure to post rooms and areas containing uranium in excess of specified limits. The inspectors noted that the licensee has posted signs at personnel entrances of buildings which contain uranium. The inspectors observed that the signs used by the licensee were approximately 3 feet by 3 feet, have a yellow background with a radiation caution symbol in magenta, and bear the words, "CAUTION - RADIOACTIVE MATERIALS - IN THIS BUILDING RADIOACTIVE MATERIALS ARE BEING PROCESSED." The inspectors also noted that the licensee has posted signs in the yellow cake area which are approximately 3 feet by 3 feet in size, have a yellow background and a magenta radiation caution symbol, and bear the words, "CAUTION - AIRBORNE RADIOACTIVITY AREA - WASH YOUR HANDS BEFORE EATING OR SMOKING" (Appendix J, Photograph 1). The inspectors also noted that the licensee has posted signs at the side of the access roads leading to the tailings pond. It was observed that these signs were approximately 3 feet by 3 feet in size, have a yellow background and a radiation caution symbol in magenta, and bear the words, "CAUTION - RADIOACTIVE MATERIALS - RESTRICTED AREA - RADIOACTIVE MATERIALS IMPOUNDED IN TAILINGS POND - ADMITTANCE TO AUTHORIZED PERSONNEL ONLY". Mr. Wilde stated that all access roads leading to the tailings pond were posted with signs similar to the one observed by the inspectors.

25. As noted above (Paragraph 9), the licensee was cited as a result of the initial inspection for failure to label containers having uranium in excess of specified limits. The inspectors noted that at the time of the follow-up inspection in May 1960, the licensee had not labeled containers having quantities of uranium in excess of the limits set forth in 10 CFR 20.203(f)(2). Mr. Wilde stated that he was under the impression that the Anaconda Company had been granted an exemption from the provisions of this section with regard to both shipping containers and process equipment within the mill. The history of this situation was outlined to Mr. Wilde by the inspectors and covered the following points:

    a. On February 3, 1959, Mr. A. J. Fitch wrote a letter to the Division of Civilian Application requesting an exemption from the requirements of 10 CFR 20.203(f)(2) for containers located in processing buildings.

    b. On February 6, 1959, Mr. A. J. Fitch wrote a memorandum to the files stating that he had received a telephone call from Mr. Bullis (sic) in reply to the above-mentioned request and that Mr. Bullis (sic) had advised him that the exemption granted by the Division of Licensing and Regulation on June 30, 1958, should be construed as covering all containers of any kind in the Anaconda mill.

    c. When Mr. Johnston visited the Anaconda mill on April 21, 1959, he suggested to the mill management that they might find it desirable to have written proof of the exemption from 10 CFR 20.203(f)(2).

    d. On May 14, 1959, Mr. A. J. Fitch wrote a letter to the Division of Civilian Application requesting them to send a written answer to his letter of February 3, 1959, in which he requested an exemption from 10 CFR 20.203(f)(2) for all containers located in process buildings.

e. On May 23 1959, the licensee received a letter from J. C. Delaney, Chief, Nuclear Materials Section, Licensing Branch, Division of Licensing and Regulation, which stated that pursuant to the licensee's request of May 14, 1959, an exemption "...from the labeling requirements, Section 20.203(f)(2) of the regulations, 10 CFR 20, 'Standards for Protection Against Radiation'," had been incorporated into the license. Mr. Delaney's letter mentioned that a renewal of the license was included.

f. The license in question, No. R-138, was renewed effective July 1, 1959, and contained the following condition: "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 you are exempt from the requirements of Section 20.203(f)(2) for individual shipping containers of uranium provided that areas are posted as described in your letter dated February 3, 1959 (See Paragraph 5).

g. On April 6, 1960, the Division of Licensee Inspection, ID, wrote a memorandum to Marvin M. Mann, Assistant Director for Compliance, Division of Inspection, AEC Headquarters, requesting clarification of the exemption granted to the Anaconda Company from the requirements of Section 20.203(f)(2). The request was forwarded to the Division of Licensing and Regulation on April 13, 1960. The Division of Licensee Inspection, ID, did not receive a reply to this memorandum prior to the follow-up inspection of Anaconda's facilities.

h. On May 2, 1960, the Division of Licensee Inspection, ID, called Inspection Headquarters by telephone and asked for clarification of the exemption granted to the Anaconda Company from the requirements of Section 20.203(f)(2). On May 2, 1960, Inspection Headquarters returned the call to the Division of Licensee Inspection. At that time, it was stated by Mr. W. E. Kreigsman, Division of Inspection, Headquarters, that he had been informed by the Division of Licensing and Regulation that a letter would be sent to the Anaconda Company on May 2, 1960, clarifying the status of the exemption.

i. When the inspectors left the Anaconda mill on May 5, 1960, Mr. Fitch, manager of the mill, had not heard from the Division of Licensing and Regulation.

Copies of the correspondence referred to above are attached to this report as Appendix F. Mr. Wilde and Mr. Fitch were informed at the conclusion of the inspection that under the conditions of the license, the exemption which they received from 10 CFR 20.203(f)(2) applied only to individual shipping containers, and thus their operations were being conducted in a manner to constitute noncompliance with this section in that all containers having uranium in excess of specified limits had not been labeled.

26. According to Mr. Wilde, a respirator program is in force for certain operations in the mill. He said that these operations are all in the yellow cake area and include the following:

    a. Sampling and lidding yellow cake barrels.
    b. Bucking yellow cake sample.
    c. Burning filter paper to reclaim yellow cake.
    d. All operations in the yellow cake barreling enclosure.

    Mr. Wilde said that employees use Wilson respirators with a Wilson Model No. R-436 filter. He said that the respirators are washed and sterilized daily and the filters are changed when they appear dirty or at the employees' requests. He said that usually the employees requested a change of filters before the filters became visibly dirty. Mr. Wilde mentioned that after the respirators were cleaned, they were packaged in plastic bags and stored until picked up by an employee who needed one. The inspectors observed the respirators stored in individual plastic bags (Photograph 2).

27. At the time of the April, 1959, portion of this inspection Mr. Johnston noted that there was dust in the air in the carbonate crushing plant and the carbonate grinding area. Mr. Wilde stated to the inspectors in May, 1960, that the carbonate circuit of the mill had been closed down in the latter part of May, 1959. He said that he did not expect the carbonate circuit to operate again although it could be made operable within about two weeks if the necessity to operate it ever arose.

28. During a tour of the mill the inspectors noted that there was no visible dust in the air in the sandstone crushing plant. As further indication of this, the inspectors noted the lack of any apparent Tyndall effect. Mr. Wilde stated that they haven't had any dust problems in the sandstone crushing plant due to the relatively high moisture content of the ore. He said that the water content of the ore varied from approximately 6 per cent to about 10 per cent with a year round average of approximately 7.5 per cent. The inspectors also noted that the ore belts in the crushing plant had quantities of ore on their under sides. Mr. Wilde said that this condition was caused by the dampness of the ore.

29. Mr. Wilde said that hoods had been installed recently in the Ore Bucking Building (Photograph 3). The inspectors noted that there were four hoods in each bucking room. Mr. Wilde said that all the hoods used a common exhaust, and to improve the efficiency of the hoods, only those in actual use were kept open while those not in use were kept closed. The inspectors noted a Pullman industrial-type vacuum cleaner in the Ore Bucking Building. Mr. Wilde stated that the floors are vacuumed when they are dirty. He said that the floors are wet-mopped at least once per day. Mr. Wilde mentioned that since November 19, 1959, he has collected 10 general air samples and 16 breathing zone samples in the Ore Bucking Building. He said that none of these samples were above the MPC for natural uranium. Mr. Wilde said that he has collected samples in the Ore Bucking Building quite frequently because samples collected in this area by personnel of the Division of Licensee Inspection, ID, in August, 1959, showed several areas above the MPC for natural uranium (See Appendix B).

30. Mr. Wilde pointed out some of the equipment and modifications in the yellow cake area which he said were designed to reduce levels of airborne uranium in this area. He showed the inspectors how the yellow cake dryers had been completely enclosed (Photograph 4). Mr. Wilde said that the dryers were hermetically sealed and vented through the roof. He said that he has not collected any air samples in the yellow cake area since this modification was completed so he could not evaluate its effectiveness. The inspectors observed that the yellow cake drum filling area was actually a room closed on 3 sides and the top but open in the front (Photograph 5). The inspectors noted a dust collecting system at the rear of the yellow cake drum filling room. Mr. Wilde said that this dust collecting system drew approximately 8,000 cubic feet of air per minute and exhausted it through the roof near the yellow cake dryer exhaust (Photograph 6 and 7). Mr. Wilde stated that the drum filling area dust collector formerly was exhausted into the yellow cake area until it was modified in the early part of 1960. He said that this change has lowered the concentration of airborne uranium in the yellow cake area (See Paragraph 17). Mr. Wilde said that a hood had been installed recently in the yellow cake bucking room to lower the airborne uranium concentrations in that area. According to Mr. Wilde, yellow cake samples are bucked twice each week for approximately one hour each time. He said that he had not yet collected any breathing zone samples during the yellow cake bucking operation. The inspectors noted that when the drums were being filled with yellow cake, a machine lifted each drum from its loading platform a height of approximately three inches and dropped it back down on the platform. It was observed that this operation was repeated approximately 20 to 30 times per minute. Mr. Wilde stated that this procedure was designed to pack the yellow cake tightly in the drums. He said that he felt that this type of packing procedure contributed to the levels of airborne uranium in the area because yellow cake leaked through the drum lid seal. He stated that the Company hoped to reduce the levels of airborne uranium in the yellow cake packaging area with the following planned modifications:

a. Reduction of the number of drums that are filled at one time from 8 to 2.

b. Installation of an expandable rubber gasket for a better drum lid seal.

c. Replacement of the drum beaters with vibrators.

Mr. Wilde stated that modifications planned for other parts of the yellow cake area included a new sampling tool for use on the yellow cake drums and the installation of a condensing chamber above the yellow cake dryers. Mr. Wilde expressed the hope that when all the modifications mentioned above were completed, the entire yellow cake area would be below the MPC for airborne natural uranium at all times.

31. The inspectors noted that the entrance to the yellow cake area was locked, and when the door was unlocked, two flashing red lights were activated, one outside the door and the other inside the yellow cake area. Mr. Wilde stated that the locked door prevented the entry of unauthorized individuals into the yellow cake area. The inspectors also observed that all the men in the yellow cake area wore coveralls. Mr. Wilde said that the employees were required to wear coveralls in

this area and that these coveralls were changed daily. He explained that at the beginning of each shift the men removed their street clothes, hung them up in a room provided for that purpose, then picked up a pair of clean coveralls in the change room (Photograph 8). The inspectors noted that employees who entered the yellow cake packaging enclosure wore respirators. Mr. Wilde stated that a memorandum issued in December, 1958, formulated the rules regarding the use of protective equipment and the practice of personal hygiene in the yellow cake area, and provided a penalty of possible immediate discharge for failure to obey the rules. A copy of this memorandum is attached as Appendix G. The inspectors also noticed a Pullman industrial-type vacuum cleaner in the yellow cake area. Mr. Wilde said that the vacuum cleaner was used when necessary. He also said that the yellow cake area was hosed down with water when necessary.

32. Mr. Wilde stated that sets of instructions are given to responsible individuals when a shipment of yellow cake is made from the Anaconda mill. Mr. Wilde said that these instructions describe the material being shipped, list precautions to be taken, and give the procedure to be followed in case of an accident. A copy of the instructions is attached to this report as Appendix H.

33. As noted in the license conditions (Paragraph 5) the licensee has been granted an amendment to permit, for a 90-day period, the disposal of mill waste effluents into underlying rock formations by injection through a cased and cemented bore-hole. On January 20, 1960, the licensee advised the Division of Licensing and Regulation that the mill waste effluent disposal test was started that day. The inspectors observed the disposal well in operation. According to Mr. Wilde, liquid is taken from the east end of the tailings pond (Photograph 9), passed through a series of filters (Photographs 10 and 11), and piped to the disposal well about 1-1/2 miles to the northeast (Photographs 12, 13, and 14). Mr. Wilde pointed out a monitor well which had been drilled approximately 200 feet south of the disposal well (Photograph 15). He said that samples of water were collected from the monitor well to check upward leakage of material injected into the disposal well. Mr. Wilde said that results of samples collected on March 14 and 15, 1960, and on April 5, 1960, indicated that there was no contamination in the monitor well resulting from the operation of the disposal. A copy of the licensee's results of this sampling and the licensee's interpretation of the results is attached to this report as Appendix J. This information is contained in a memorandum from Mr. Wilde to Mr. E. C. Peterson, Assistant Manager of the Anaconda uranium mill. Mr. Wilde stated that on October 9, 1959, the Anaconda Company submitted, by letter, to the Division of Licensing and Regulation, information on the following aspects of the disposal well:

a. Analysis of mill waste effluent.

b. Proposed plan of injection during the 90-day test.

c. Description of the disposal well.

d. Geology - Bluewater Valley and vicinity, including surface geology and subsurface geology.

e. Underground water use and population - Bluewater Valley and vicinity.

f. Disposal well construction.

g. Test injection pressures.

h. Nature of the barrier zone between the potable aquifers and the disposal aquifers.

i. Area of invasion by the injection fluid as a result of the 90-day test.

j. Neutralization capacity of the disposal zone rocks.

k. Ion exchange capacity of the disposal zone rocks.

l. Gross radium injected during the 90-day test and its underground distribution.

m. Analysis of the potential disposal zone formation waters.

Mr. Wilde also mentioned that several employees of the Anaconda Company traveled to Washington, D. C., and met with members of the Division of Licensing and Regulation in order to explain some of the features of the disposal well. Mr. Wilde said that an invitation was extended to the Division of Licensing and Regulation to send a representative to the Anaconda mill to observe the injection system and disposal well in operation. He said that the management of the Anaconda mill was very disappointed when the invitation was ignored by the Division of Licensing and Regulation.

34. It should be noted that the amendment to License No. R-138 permitted the licensee to dispose of mill waste effluents by injection into a well for a period of 90 days and that the mill waste effluent test was to start on January 20, 1960. Mr. Wilde stated that the Company has interpreted the provisions of the amendment to mean that the test could be conducted for 90 operating days rather than for a 90-day period beginning January 20, 1960, and ending April 19, 1960. Mr. Wilde said that they have considered 90 operating days to consist of 129,600 operating minutes and that records of operation of the disposal well have been kept in terms of total minutes of operation. Mr. Wilde stated, that as of May 5, 1960, if the injection system was operated continuously for the balance of the allowable test period, the 90-day period would end at 11:41 A.M. on May 8, 1960. Mr. Wilde said that the injection system had been operated at various flow rates, but the over-all average flow rate was approximately 600 gallons per minute. He mentioned that the average discharge of liquids from the mill was approximately 1250 gallons per minute and therefore, if the Company wanted to dispose of all its liquid effluents by injection into wells, they would probably need two disposal wells. He said that if approval was obtained from the Division of Licensing and Regulation to permit the Company to dispose of all its liquid waste by injection into wells, the Company would probably build a settling pond of about five acres to allow the solids to settle out, filter the liquid, and then inject the remaining liquid into two wells. He said that the Company has considered a plan to bury the solids which settle out in the pond as well as the filters which are used to remove additional solids. Mr. Wilde said that he felt the Company would present its plans to the Division of Licensing and Regulation when the data collected during the operation of the test well was submitted.

35. Mr. Wilde exhibited records of the quantities of Radium-226, Thorium-230, and natural uranium which had been injected into the disposal well during January, 1960, and February, 1960. Carbon copies of these records are being maintained in the files of this office. According to the records, the following amounts of material were injected into the disposal well during January and February of 1960:

Month	Natural Uranium Curies	Natural Uranium Grams	Thorium-230 Curies	Thorium-230 Grams	Radium-226 Curies	Radium-226 Grams
uary, 1960	0.77	1,130,000	12.9	662	0.032	0.032
ruary, 1960	0.72	1,060,000	9.9	508	0.038	0.038

was also noted in the records that the licensee has injected the lowing volumes of liquid into the disposal well:

Month	Liquid Injected (Gallons)
January, 1960	12,645,194
February, 1960	14,893,874

Wilde stated that the results of amounts of material injected into well were obtained from a composited 100 milliliter sample collected day the injection system was operating. He said the samples were zed by Tracerlab, Inc., Waltham, Massachusetts, and the total t of material disposed of calculated from a knowledge of the e of liquid injected. He said the latter figure was determined the graphs of the recording flowmeters which were used to measure low into the well.

tember 30, 1958, the Division of Licensee Inspection, ID, received uest from M. M. Mann, Assistant Director for Compliance Division Inspection, HQ, to investigate at the time of the next follow-up inspection, a possible overexposure to radiation of (b)(6) a former employee of the Anaconda Company. This request was repeated on September 1, 1959, in a memo route slip from E. G. Outten, Division of Inspection, HQ, to D. I. Walker, Director, ID Licensee Inspection Division. W. B. Johnston made inquiry into this case and reported his findings to Mr. Outten in memorandums dated November 3, 1959, and November 23, 1959. Copies of these memorandums are attached to this report as Appendix I. Mr. Wilde told the inspectors in May, 1960, that as far as he knew, no further developments had taken place since Johnston's inquiry in November, 1959. Mr. Wilde said that he believed the case was closed. Mr. Wilde also said that another former employee of Anaconda, (b)(6) has filed suit against the Company for ills allegedly caused by exposure to radiation while he was an employee of the Anaconda Company. Mr. Wilde said that the suit was being filed on the basis of a statement made by (b)(6) (b)(6) 5056 Federal Boulevard, Denver 21, Colorado. Mr. Wilde showed the inspectors statements made by 4 physicians who had examined the subject employee and had affirmed that the ills of the employee were not occupational. These statements were signed by the following physicians:

(b)(6)
Albuquerque, New Mexico
Albuquerque, New Mexico
Albuquerque, New Mexico
, Denver, Colorado

Mr. Wilde said that (b)(6) had been examined by one chiropractor who had attested that (b)(6) illness had not been caused by his employment with the Anaconda Company. Mr. Wilde said that he felt that the case would never go to court.

37. At the conclusion of the inspection, the inspectors met with Mr. A. J. Fitch, Manager, Mr. E. C. Peterson, Assistant Manager, and Mr. Ralph M. Wilde, Industrial Radiological Engineer, and discussed the results of the inspection. The items of noncompliance were reviewed and Mr. Fitch assured the inspectors that each of them would be corrected. Mr. Fitch stated that he wished the inspection would have taken place in September or October of 1960, because he felt that all areas of the mill would be in compliance by that time.

APPENDIX A

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U. S. ATOMIC ENERGY COMMISSION
Washington 25, D. C.

May 23, 1958

DLR:RFB
40-665

The Anaconda Company
P. O. Box 638
Grants, New Mexico

Attention: Mr. A. J. Fitch

Gentlemen:

This refers to the inspection made by AEC inspectors on January 7, 1958, of your Company's operations at Grants, New Mexico, licensed under Source Material License No. R-138 dated March 27, 1957.

Based upon our review of the information obtained during the inspection, it appears that certain of the Company's operations were not conducted in full compliance with the Atomic Energy Commission's "Standards for Protection Against Radiation," Part 20 of Title 10, Code of Federal Regulations, in that:

A. The Company has not conducted surveys necessary to determine compliance with the regulation (see Section 20.201(b), 'Surveys").

B. Areas and rooms in the plant were not posted with proper caution signs as required by Section 20.203(e)(2) and containers in which quantities of source material were being used or stored were not labeled with proper labels as required by Section 20.203(f)(2).

It is requested that you notify this office within 30 days of the action you have taken or plan to take to correct these deficiencies and the date such correction will be or has been achieved.

Attached for your information are circulars entitled "Radiation Surveys of Uranium Ore Processing Mills" and "Air Sampling," which you may find helpful in enabling you to comply with the regulations in Part 20 referred to herein. The methods for surveying and sampling as described in these circulars are not intended to be mandatory but rather suggest useful ways to assure safe operating conditions. Other methods, of course, may be equally effective.

Very truly yours,

H. L. Price, Director
Division of Licensing and Regulation

Enclosures:
1. General Statement on Surveys
2. Details on Air Sampling
3. 10 CFR Part 20

THE ANACONDA COMPANY

New Mexico Operations

P. O. Box 638, Grants, New Mexico

C O P Y

A. J. Fitch
Manager

June 16, 1958

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

Re: DLR:RFB
40-665

Dear Mr. Price:

In accordance with your request of May 23, 1958, that your office be notified of the action taken to correct certain deficiencies noted in the AEC inspection on January 7, 1958, of our operations at Grants, New Mexico, I am pleased to submit the following:

A. Surveys of our operations were conducted jointly during the periods of November 30 to December 3, 1957, and March 3 to 12, 1958, by representatives of the United States Public Health Service, New Mexico Department of Health, United States Atomic Energy Commission, and ourselves. A full report is now at hand containing the data derived from these surveys. An additional survey is scheduled to be conducted in early July this year. It is believed that we will be able to demonstrate that our operations are in full compliance with Part 20, Title 10, Code of Federal Regulations.

B. Posting with proper caution signs of all areas and rooms in our plant as required by Section 20.203(e)(2) has been accomplished.

We find it impossible under the present circumstances to fully comply with the requirements of Section 20.203(f)(2) in that our contract with the Commission for the production of uranium concentrate sets forth rigid specifications for shipping containers which do not permit the application of the labels required. I respectfully request, therefore, that we be granted exemption from the requirements of Section 20.203(f)(2) with respect to shipping containers.

I shall be pleased to hear from you should the foregoing fail to set forth all of the information desired.

Yours very truly,

A. J. FITCH

AJF:MA

U. S. ATOMIC ENERGY COMMISSION
Washington 25, D. C.

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July 1, 1958

DLR:CMF
40-665

The Anaconda Company
P. O. Box 638
Grants, New Mexico

Attention: Mr. A. J. Fitch

Gentlemen:

We wish to acknowledge the receipt of your letter of June 16, 1958. It appears that you are taking action to correct those deficiencies in your source material program which were brought to your attention in our letter of May 23, 1958.

Enclosed you will find an amendment to Source Material License No. R-138 granting an exemption from the licensing requirements of Section 20.203(f) for individual shipping containers of uranium.

Your cooperation is appreciated.

Very truly yours,

Lyall Johnson, Chief
Licensing Branch
Division of Licensing and Regulation

Enclosure:
Amendment to SML No. R-138
Distribution:
Formal Docket File
Suppl. Docket File
Div. & Br. rfs

APPENDIX B

THE ANACONDA COMPANY
Post Office Box 638
Grants, New Mexico

Samples Collected By
Licensee Inspection Division
Idaho Operations Office
August 24-28, 1959

Uranium
General Air Samples

Location	No. of Samples	μc/ml x 10^{-12} Low	High	Ave.	Times MPC
Building #15 - Primary Crusher Area					
Sample tower - 1st to top levels	8	< 0.07	< 1.4	< .54	
Crusher area - ground level	4	0.2	3.7	1.09	
By conveyor belts #1-5	9	< 0.07	3.1	1.52	
Fine Ore Bin Area					
Top, bottom, by conveyor belt	3	< 0.07	< 2	< 0.9	
Rod Mill and Leaching Area					
Around and over rod mills	8	0.08	< 2	< 0.72	
Acid leach and classifier area	11	< 0.07	< 1.0	< 0.47	
Ground level - general area	3	0.4	0.5	0.4	
1st and 2nd levels - tailings test tower	2	0.4	0.4	0.4	
Metallurgical lab	2	1.7	< 2.0	< 2.0	
Building #14 - RIP Section					
General Area	3	0.9	3.9	2.3	
Laboratory	1			< 2.0	
Ion Exchange Building					
General areas	21	0.09	1.5	0.72	
Building #51 - Bucking Room					
Weighing and drying room	1			16.5	3.3
Main corridor	1			< 0.07	
Feed hopper to primary crusher	1			< 0.08	
Yellow Cake Building					
Press areas	2	25.6	36.3	28.0	3.6
Drier areas	8	1.3	11.2	6.3	1.26
Loading platform - not working	1			4.0	
Outside drum loading area	1			1.5	
Bucking room - not working	1			4.3	
Bucking room - during bucking	3	14.5	384	1.1	44
Machine shop	1			0.14	
Lunch room	1			0.10	

The Anaconda Company

Uranium
General Air Samples
August 24-28, 1959

Location	Samples	μc/ml x 10^{11} Low	High	Ave.	Times MPC
General Areas					
General office - main entrance	1			< 0.2	
General office - safety engineer office	1			< 0.3	
Guard post - main plant entrance	1			0.35	
Power plant - chemical test bench	1			0.05	
Fire and ambulance station	1			0.05	
Change and laundry room	1			0.6	
Change room in change house	1			0.03	
Time office in change house	1			0.03	
Acid manufacturing plant	1			0.05	
Mill office, #1	1			0.11	
Mill office, #2	2	0.9	< 1.4	< 1.2	
Mill office, #3	1			0.10	
Department office, #18	1			0.05	
Chem. lab #2	1			0.06	
Chem. lab balance room weighing uranium oxide	1			1.3	
Warehouse, #3	1			< 0.3	
Warehouse office, #3	1			< 0.3	
Machine shop, #4	1			< 0.4	
Paint shop, #5	1			0.11	
Rubber repair shop, #7	1			< 0.3	
Carpenter shop, #8	1			< 0.3	
Engineering building, #9	1			< 0.3	
Electrical shop, #10	1			0.35	
Garage, #11 - east end	1			0.35	
Garage, #11 - west end	1			0.35	
Stack discharge from dust collector tank	2	15	1159	587	3450.

The Anaconda Company

Uranium
Breathing Zone Samples
August 24-28, 1959

Location	Sample Time	$\mu c/ml \times 10^{11}$ Low	High	Ave.	Times MPC	Remarks
General Areas						
On catwalk under ore feed bin while cleaning one opening	3 min.			< 4		
Building 31 - Bucking mine sample	7 min.			< 1.4		
Building 21 - Bucking tailings sample	8 min.			< 1.2		
Building 31 - Core dividing process	3 min.			32.0	6.4	1 hr/day
Building 31 - Block Assembling samples	10 min.			4.3		8 hrs/day
Building 31 - Crushing ore samples	5 min.			8.6	1.7	
Building 31 - Bucking heads, one complete cycle	27 min.			43	8.6	
Building 14 - Preparing tailings - Metallurgical section 50 per cent of cycle	14 min.			6.6	1.3	Respirator worn
Yellow Cake Building						
Removing and capping filled yellow cake drums	3 ½ min.			16	3	
Removing and capping filled yellow cake drums	3 min.			11	2	
Removing and capping filled yellow cake drums	3 min.			24	4.9	
Bucking yellow cake sample	5 min.			626	125	2 hrs ever four days Respirator worn
Bucking yellow cake sample for U_3O_8 analysis	5 min.			7.1	1.4	Respirator worn
Bucking yellow cake sample for U_3O_8 analysis	5 min			177	35	Respirator worn
Bucking yellow cake sample for U_3O_8 analysis	5 min			1.7		Respirator worn

APPENDIX C

THE ANACONDA COMPANY
Grants, New Mexico

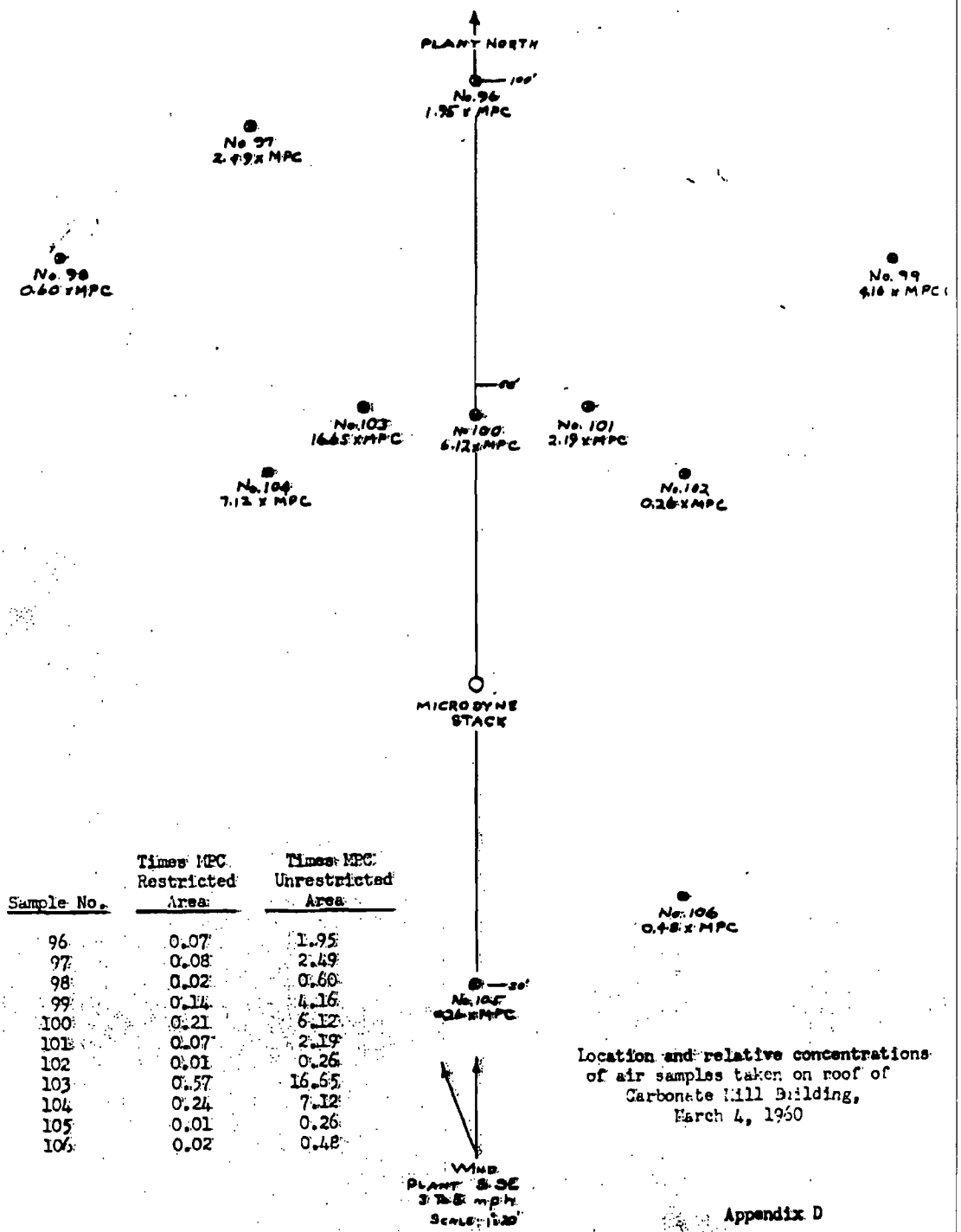
External Radiation Levels
measured by
Division of Licensee Inspection
Idaho Operations Office
August 24-28, 1959

Location	mr/hr
Primary Crusher Area	
By grizzly outside ore pile	.06
Lower level walkways	.06
Lower level ore spillage	.15
Ground level walkways	.06
Catwalk along No. 1 conveyer	.07
Catwalk along No. 2 conveyer	.06
Catwalk top of No. 2 conveyer	.07
Catwalk along No. 3 conveyer	.07
Surface of No. 3 conveyer	.13
Walkway along No. 4 conveyer	.08
Surface of No. 4 conveyer	.25
Sample Tower	
Desk (screen enclosed area)	.07
Sample collection bin	.07
Catwalks and walkways	.08
Storage Bins	
Walkways above bins	.10
Bottom of bins	.15
Walkways at ground level	.06
Walkways between conveyer belts	.08
Rod Mill and Wet Processing Area	
Upper levels	.06
Catwalks around rod crusher	.08
Walkways above leaching tanks	.15
Walkways around classifier tanks	.15
Under leaching tanks	.10
Under classifiers	.10
Mill repair shop	.07
Tailings sampling stations	.07
Office area	.07
Building No. 14	
Tailings sampling room	1.20
Walkways in sampling room	0.50
Metallurgical laboratory	.06
Fluorimetric laboratory	.05
Walkways over precipitation tanks	.12
Around ion exchangers	.07
Walkways under ion exchangers	.10
Walkway under precipitation tanks	.20
Walkways in pump and tank area	.15
Workshop area	1.00
Yellow Cake Area	
Walkways around yellow cake process	1.20
Wood frames from yellow cake process	5.0
Walkways around presses	0.30
Walkways around driers	1.00
Walkways above driers	.20
Ground level walkways	.10

The Anaconda Company

External Radiation Survey
August 24-28, 1959

Location	mr/hr
Lower level walkways	.50
Work areas around drums	.50
Laboratory and sample room	.20
Tailings Pond	
Roadway around pond	.10
Wooden catwalk above pond	.04
Surface of liquid soaked catwalk	.06



Sample No.	Times MPC Restricted Area	Times MPC Unrestricted Area
96	0.07	1.95
97	0.08	2.49
98	0.02	0.60
99	0.14	4.16
100	0.21	6.12
101	0.07	2.19
102	0.01	0.26
103	0.57	16.65
104	0.24	7.12
105	0.01	0.26
106	0.02	0.48

Location and relative concentrations of air samples taken on roof of Carbonate Hill Building, March 4, 1960

Appendix D

APPENDIX E

THE ANACONDA COMPANY
Post Office Box 638
Grants, New Mexico

Samples Collected By
Division of Licensee Inspection
Idaho Operations Office
May 3-5, 1960

Uranium
General Air Samples

Location	No. of Samples	μc/ml x 10^{11} Low	High	Ave.	Times MPC[1]
Yellow Cake Building					
Barreling enclosure	5	3.6	30.4	13.2	3.2
Near east drier	1			0.16	
Near west drier	1			< 0.17	
Between driers	1			0.32	
Sample desk near filters	1			0.32	
Ore Bucking Building					
Tails bucking room	1			< 0.17	
Heads bucking room	2	0.054	< 0.055	< 0.055	
Moisture room	2	0.16	< 0.17	< 0.17	

[1] MPC of 4.17 x 10^{-11} μc/ml used since employees work 48 hours per week.

Uranium
Stack Effluent Samples

Location	No. of Samples	μc/ml x 10^{11}	Times MPC[1] for Restricted Area	Times MPC for Unrestricted Area
Roof of Carbonate Mill Building				
35 feet NE of Dust Collector Discharge	1	1.6	0.38	9.4
35 feet ENE of Dust Collector Discharge	1	0.32	0.08	1.9
85 feet NE of Dust Collector Discharge	1	0.16	0.04	0.9
85 feet E of Dust Collector Discharge	1	0.63	0.15	3.7

[1] MPC of 4.17 x 10^{-11} μc/ml used.

Uranium
Breathing Zone Samples

Location	No. of Samples	μc/ml x 10^{11}	Times MPC
Ore Bucking Building			
Tails bucking room - sample being bucked	1	< 0.35	
Heads bucking room - sample being bucked	1	< 0.10	

THE ANACONDA COMPANY

New Mexico Operations

P. O. Box 638, Grants, New Mexico

C O P Y

February 3, 1959

Atomic Energy Commission
1901 Constitution Avenue NW
Washington 25, D. C.

Attention: Division of Civilian Application

Reference: Source Material License No. R-138

Gentlemen:

Due to conditions which exist in the normal operations of processing uranium ores in our mill, we find that it would be extremely difficult to comply with Section 20.203(f) of 10 CFR Part 20 with respect to labeling of containers in which natural uranium is transported, stored, or used.

The ore processing methods which we employ require that the uranium contained in the ore flow in a continuous manner through all processing steps until it leaves the processing area either as uranium concentrate or tailings. In the course of this flow there are of necessity numerous storage bins, grinding mills, tanks, sumps, pipelines, and other containers which contain quantities of uranium in excess of ten times the quantity specified in Appendix C of Part 20.

All of the containers referred to in the above paragraph are located within our processing buildings. We have posted caution signs on all doorways to processing buildings in compliance with Section 20.203(e) of Part 20. These signs bear the radiation caution symbol and the words:

CAUTION
RADIOACTIVE MATERIALS

**

IN THIS BUILDING
RADIOACTIVE MATERIALS
ARE BEING PROCESSED

In view of the difficulties which would be encountered in an attempt to comply strictly with Section 20.203(f), and in view of the fact that the containers are housed in buildings posted with radiation caution signs, we respectfully request that we be granted an exemption from the requirements of Section 20.203(f) for containers located in processing buildings.

In order to indicate the numerous vessels and containers involved in such compliance, flow sheets of the milling processes are attached which indicate such vessels and containers throughout plant operations. These flowsheets may be helpful to your realization of our problem of compliance.

Very truly yours,

A. J. FITCH, MANAGER

APPENDIX F

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THE ANACONDA COMPANY

New Mexico Operations

Grants, New Mexico

INTER-OFFICE MEMORANDUM

TO: MEMORANDUM FOR THE RECORD

DATE: February 6, 1959

SUBJECT: Exemption from the provisions of Section 20.205(f), Part 20, Title 10, CFR

Mr. Bullis(?) telephoned me today in reply to our application of February 5, 1959, for exemption from the provisions of Section 20.205(f), Part 20, Title 10, CFR, with respect to labelling of containers in our processing plants.

Mr. Bullis advised that the exemption granted by the Division of Licensing and Regulations in their letter dated June 30, 1958, should be construed as covering all containers of any kind in our plants.

/s/ A. J. FITCH

A. J. FITCH, Manager

AJF:MA

cc: Mr. E. C. Peterson
Mr. R. M. Wilde
Mr. J. O. Marshall

Thermo-fax copied for Dr. W. Johnston, AEC
4/21/59

THE ANACONDA COMPANY

New Mexico Operations

P. O. Box 638, Grants, New Mexico

C O P Y

May 14, 1959

United States Atomic Energy Commission
1901 Constitution Avenue, N. W.
Washington 25, D. C.

Attention: Division of Civilian Application

Re: Source Material License No. R-138

Gentlemen:

On June 16, 1958, application was made for exemption from the requirements of Section 20.203(f)(2) of 10 CFR Part 20 with respect to the labeling of shipping containers of uranium. This exemption was granted by your letter to us dated June 30, 1958.

On February 3, 1959, application was made for exemption from the requirements of Section 20.203(f) with respect to the labeling of containers located in processing buildings and used in our milling operations.

On February 6, 1959, a telephone call was received from your office advising that the exemption granted in your letter to us dated June 30, 1958, should be construed as covering all containers of any kind in our plants.

During a recent inspection tour of our mill, Dr. W. B. Johnston, Division of Licensee Inspection, Idaho Operations Office, advised us that the telephone call of February 6, 1959, was not sufficient confirmation for the granting of an exemption. On the advice of Dr. Johnston, I respectfully request that, for our records, you send us a written answer to our letter of application for exemption dated February 3, 1959.

Yours very truly,

A. J. FITCH

U. S. ATOMIC ENERGY COMMISSION
Washington 25, D. C.

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40-665
LRL:ND

May 25, 1959

The Anaconda Company
New Mexico Operations
P. O. Box 638
Grants, New Mexico

Attention: Mr. A. J. Fitch

Gentlemen:

Enclosed is renewal of your Source Material License R-138.

In reference to your request of May 14, 1959, we have incorporated into your license the exemption from the labeling requirements, Section 20.203(f)(2) of the regulations 10 CFR 20, "Standards for Protection Against Radiation".

Very truly yours,

J. C. Delaney
Chief, Nuclear Materials Section
Licensing Branch
Division of Licensing and Regulation

Enclosures:
R-138
10 CFR 20

C
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TO: Marvin M. Mann, Asst. Director for Compliance
Division of Inspection, AEC Headquarters

April 6, 1960

FROM: Donald I. Walker, Director, Division of
Inspection, Idaho Operations Office

SUBJECT: EXEMPTION FROM 10 CFR 20.203(f)(2) FOR INDIVIDUAL SHIPPING CONTAINERS AT THE ANACONDA COMPANY URANIUM MILL, GRANTS, NEW MEXICO

SYMBOL: LI:WBJ

Enclosed you will find copies of the following correspondence between DLR and The Anaconda Company, New Mexico Operations, P. O. Box 658, Grants, New Mexico:

a. Letter dated February 3, 1959, from A. J. Fitch, Manager, The Anaconda Company, New Mexico Operations, Grants, New Mexico, to Division of Civilian Application, AEC.

b. Letter dated May 14, 1959, from A. J. Fitch to Division of Civilian Application, AEC.

c. Letter dated May 23, 1959, from J. C. Delaney, Chief, Nuclear Materials Section, Licensing Branch, Division of Licensing and Regulations to A. J. Fitch.

d. Copy of Source Material License No. R-138, effective July 1, 1959, and expiring June 30, 1960; issued to The Anaconda Company, Grants, New Mexico.

You will note in the license that DLR's exemption from 10 CFR 20.203(f)(2) provides for exemption from posting only individual shipping containers. You will further note that Mr. Fitch asked, in his letter of February 3, 1959, for an exemption to include all containers in the mill. As you know, this exemption has been granted to other uranium ore processing mills. In Mr. Fitch's letter of May 14, 1959, he has called attention to the fact that they had no written confirmation (only a telephone call of February 6, 1959) that this exemption should be construed as covering all containers of any kind in the plant. Since this office has no record of a letter being sent to the licensee confirming the telephone conversation, we have no way of knowing that this is actually the interpretation to be made in this case. Inasmuch as we have an inspection tentatively scheduled for The Anaconda Mill this month, we would appreciate your clearing this question with DLR as soon as possible.

Enclosures:
As stated above

BCC: R. D. Jamtgaard w/o enclosure

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TO: H. L. Price, Director
Division of Licensing and Regulation

FROM: Marvin M. Mann, Assistant Director for Compliance
Division of Inspection

SUBJECT: EXEMPTION FROM 10 CFR 20.203(f)(2) FOR INDIVIDUAL SHIPPING CONTAINERS AT THE ANACONDA COMPANY URANIUM MILL, GRANTS, NEW MEXICO

SYMBOL: IN5:LDL

We would appreciate receiving the information requested by D. I. Walker, Director, ID Inspection Division in his memorandum dated April 6, 1960, a copy of which is attached. Your early attention to this matter would be appreciated since ID would like to conduct an inspection of the Anaconda mill this month.

Enclosure:
Cpy memo, Walker to Mann, 4/6/60

cc: D. I. Walker, ID

C
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APPENDIX G

December 17, 1958

MEMORANDUM TO: Yellow Cake Supervisors

SUBJECT: The Use of Protective Equipment and the Practice of Personal Hygiene in the Yellow Cake Section.

All of the protective equipment listed by Mr. Roberts in his memorandum of November 6, 1958, is available as needed by men working in the Yellow Cake Section.

The following rules will apply to all men who are required to work in the Yellow Cake Section whether members of the operating crew or members of an outside department. Failure to obey these rules will be grounds for immediate discharge for personnel under your jurisdiction. In the case of service personnel, upon infraction of these rules the man will be asked to immediately leave the section and I will be informed at once of the circumstances so that appropriate action can be taken.

HARD HATS:

Hard hats will be worn by all operating personnel. Spare hats are available for temporary use by members of outside departments when working where there is a possibility of yellow cake falling or dripping from overhead.

COTTON PROTECTIVE CLOTHING (COVERALLS):

Coveralls will be worn by all operating personnel. Service personnel will be provided with coveralls as necessary and at the discretion of the Yellow Cake Shift Boss. Coveralls issued on this basis will not be worn from the section and will be returned to the shift boss when the job is finished.

SAFETY-TOED RUBBER SHOES:

Safety-toed rubber shoes will be worn as necessary by all men working in the Yellow Cake Section.

Service department personnel will obtain rubber shoes through the foreman of their own department.

RESPIRATORS:

Respirators will be worn by all men working in the following locations:

1. Under an operating dryer.
2. On the floor dryers.
3. At the furnace.
4. Sampling drums.
5. Discarding samples.
6. In any area where, in the opinion of the Yellow Cake Shift Boss, a dust hazard exists.

Facilities for repairing and sterilizing respirators are to be provided so it will be possible to furnish respirators to men from outside departments on a temporary basis.

The Use of Protective Equipment and the Practice of Personal Hygiene in the Yellow Cake Section. December 17, 1958

RUBBERIZED GLOVES:

Rubberized gloves will be worn by all operating personnel and service department personnel as necessary.

Cotton gloves will no longer be issued to Yellow Cake personnel as they tend to become saturated with yellow cake and may irritate the hands.

GOGGLES AND SAFETY GLASSES:

These items will be kept by the shift boss and issued on request or when a job requires their use. This equipment will be returned to the shift boss when the work requiring its use is finished.

PERSONAL HYGIENE:

All men working in the Yellow Cake Section will be required to washtheir hands before eating or smoking.

The last 15 minutes of each shift has been provided to allow every member of the operating crew to take a shower before leaving the job. Since this time is part of the working day it is required that each man actually take a shower as part of his job.

T. R. Beck, Ass't. Mill Sup't.
In Charge of Carbonate Mill

TRB:cig
cc: A.J.F.
E.C.P.
W.J.R.
F. Welch
R. Wilde
J. O. Marshall

RAILROAD CARRIER INSTRUCTIONS

Car No. _____ Bill of Lading No. _____ Lot No. _____

YOUR CARGO IS URANIUM CONCENTRATE

THIS MATERIAL:

1. is not explosive.
2. can be approached without danger. Radiation is insignificant.
3. will not burn.
4. should not be breathed.
5. should not be swallowed or put in mouth.

IN THE EVENT OF ACCIDENT, AS SOON AS POSSIBLE:

1. Take preliminary precautions below. Display these instructions as necessary to local authorities on the scene [illegible] their help. (See 3 below)
2. Evaluate the situation by answering all questions on reverse.
3. Call (or have local authority call for you) W. J. Roberts, Mill Superintendent, or R. M. Wilde, Industrial Re[illegible] Engineer The Anaconda Company, Grants, New Mexico, telephone TRinity 6-2211, TRinity 6-2369 or TRinity 6-2324 [illegible] officer, and report all answers to questions on reverse. If possible, have local law officer or civil authority participate in call
4. Make no other statements or phone calls except on instructions from your dispatcher or The Anaconda Company.

Preliminary Precautions

A. **CONTAINERS ARE NOT LEAKING, and are not seriously damaged. Containers may or may not be thrown from railroad car Railroad car may or may not be damaged.**

1. Caution people not to tamper with the containers. Use civil authorities to help you if necessary
2. It is not necessary to have a specific distance between humans and the container [illegible] case of [illegible] ing the situation, ask people to stay back 10-15 feet.
3. If closed containers are lying on the right of way, obtain assistance from wha[illegible] to move tainers to the side of right of way.
4. Assure local authorities that there is no danger in handling closed containers

B. **CONTAINERS ARE LEAKING OR DAMAGED TOO SERIOUSLY to be moved.** Railroad car may [illegible] damaged

1. Caution humans to stay away from the material. Keep them at a distance of at least 25 [illegible] not cessary. Use civil authorities for help if necessary
2. Assure local authorities that there is no danger from radiation but that people [illegible] from [illegible] material.
3. Avoid trackage of material by humans or vehicle. Obtain help from local civil authorities if necess[illegible] route traf[illegible] around the spill area.
4. Keep material from running into streets, gutters, sewers, etc., if possible. A simple method for do[illegible] trench around the material or throw up an earthen dike several inches high.
5. Prevent the material from being scattered by the wind by carefully covering it with canvas or di[illegible]
6. Avoid breathing dust from the material. When covering the material, obtain a simple respi[illegible] available, work around the material in such a manner as not to stir up excessive dust

C. **FIRE involving railroad car or in immediate vicinity of railroad car.**

1. Isolate the railroad car from other humans and property if possible. Use civil authorities [illegible]
2. Obtain fire fighting help from local groups.
3. The material you are hauling will not burn.
4. Keep fire away from uranium containers if possible.
5. Use respirator if necessary to avoid breathing smoke from any fire involving your cargo because of possibility [illegible] particles, if the drums are ruptured.
6. Do not spray water into open or leaking containers. There is no reaction with water, but a heavy stream [illegible] will spread the material and make cleanup more difficult.

EVALUATION QUESTIONAIRE

Name of Individual in Charge of Train or Truck

Carrier

Bill of Lading Number | Destination

Time and Place of Accident

Describe Preliminary Precautions You Have Taken:

Describe Any Spillage, Leaking, or Damaged Containers:

Name of Any Law Officer or Civil Authority on the Scene.

Are You Under Any Arrest, Restraint, or Instructions From Local Authorities?

Is Car or Truck Roadworthy?

Can you Proceed to Destination?

Where Can You be Reached by Phone?

Additional Remarks:

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APPENDIX I

TO: E. G. Outten, Division of Inspection
Washington, D. C.

November 5, 1959

FROM: Willis B. Johnston, Inspector, Idaho Operations Office

SUBJECT: ALLEGED OVEREXPOSURE OF (b)(6) EMPLOYEE, THE ANACONDA COMPANY, GRANTS, NEW MEXICO, LICENSE NO. R-138

SYMBOL: LI:WBJ

Inasmuch as a follow-up inspection of the Anaconda Company facilities at Grants, New Mexico has not yet been made, I investigated the subject exposure (referred to in M. M. Mann's memo of September 30, 1958, and your memo route slip of September 1, 1959, to this office) during a telephone conversation on October 13, 1959 with Ralph Wilde, Industrial Radiological Engineer for the Anaconda Company at Grants, New Mexico. During the conversation, Mr. Wilde made the following statements concerning (b)(6) and the alleged overexposure that he presumably suffered while an employee of the Anaconda Company, Grants, New Mexico.

(b)(6) was originally hired as a (b)(6) in the carbonate leach mill by the Anaconda Company, Grants, New Mexico on (b)(6)

In (b)(6) he was transferred to the yellow cake section of the mill as a (b)(6).

On (b)(6) he was made a (b)(6) in the yellow cake section.

4. From (b)(6) he served in the capacity of (b)(6)

5. On (b)(6) he (b)(6) and (b)(6) (b)(6) he has not worked in the mill.

6. (b)(6)

7. (b)(6) by the Anaconda Company (b)(6)

8. (b)(6) has never filed a claim with the Workman's Compensation Commission of New Mexico.

9. (b)(6) has taken no known legal action against the Anaconda Company for (b)(6) (b)(6)

10. Anaconda Company's insurance carrier, Travelers Insurance Company, made a complete investigation of the (b)(6) case for the AEC.

(Continued)

Attached to this memo you will find a letter dated October 15, 1959, from Ralph Wilde to me, discussing briefly some of the more pertinent correspondence concerning this case. Included, also, is the correspondence Mr. Wilde discusses. You will note that Mr. Wilde has included only that correspondence which, in his opinion, is most germane to the case. If you feel that additional information is necessary, please contact this office, and we will arange to obtain the information.

As you will note, I have marked the enclosure as "Company Confidential." It is the opinion of this office that this information should remain confidential within the AEC. We do not feel that we can be in the position of gathering information for private, state or Federal agencies (other than AEC) and maintain a working relationship with our licensees.

It should be further noted that the alleged exposure occurred prior to the advent of the Federal Regulations which now govern such activities.

The Anaconda Company survey records divulge the fact that no surveys were made for either external radiation or airborne radioactive contamination prior to November, 1956.

Enclosure:
Ltr dtd 10/15/59 from
Ralph Wilde to W. B. Johnston
with enclosures

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APPENDIX I

TO: Ellyson G. Outten, Division of Inspection, AEC Headquarters

November 13, 1959

FROM: Willis B. Johnston, Inspector, Div. of Licensee Inspection
Idaho Operations Office

SUBJECT: (b)(6) CASE INVOLVING ANACONDA COMPANY, GRANTS, NEW MEXICO

SYMBOL: LI:WBJ

You will find enclosed a copy of a letter from Mr. Ralph M. Wilde, Industrial Radiological Engineer for the Anaconda Company at Grants, New Mexico. Included also is additional information on the (b)(6) case which Mr. Wilde discovered subsequent to my original contact with him concerning the case.

During a telephone conversation on November 12, 1959, Mr. Wilde stated that he had been mistaken concerning an investigation by Traveler's Insurance Company of this case for the AEC. According to Mr. Wilde, such an investigation was not made for the AEC. I hope that this clears up any misinformation which appeared in my memo of 11/3/59.

If we can be of any further service to you, please feel free to contact this office.

Enclosure:
As stated above

DCC: R. D. Jamtgaard, ID Liaison Officer, Wash. w/o encl.

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APPENDIX J

April 14, 1960

MEMORANDUM TO: E. C. Peterson, Assistant Manager

FROM : R. M. Wilde, Industrial Radiological Engineer

SUBJECT : Radiological and Chemical Analyses of Samples from Monitor Well No. 1

On March 14 and 15, 1960, and again on April 5, 1960, water samples were taken from Monitor Well No. 1, USGS Location 12.10.8.332, for chemical and radiological analyses.

On March 14 and 15, 1960, six samples of San Andreas-Glorieta formation water were taken by swabbing after completion of the Monitor Well. Prior to the first sampling, the well bore was flushed with 3,500 gallons of water from Anaconda Well No. 1. During the 19 hours of swabbing on March 14 and 15, 1960, approximately 60,000 gallons of water were removed from the Monitor Well.

On April 4 and 5, 1960, the Monitor Well was again swabbed and sampled. During the 11 hours of swabbing on April 4 and 5, 1960, approximately 35,000 gallons of water were removed from the Monitor Well.

The radiological analytical results of these samplings are presented in the following table. Also included in the tabulation are the gross alpha and gross beta activities of the San Andreas-Glorieta formation water sampled during January 1959 from the Disposal Well. All samples, except were otherwise noted, were analysed by Tracerlab, Inc.

Sample Description	Gross Alpha μc/ml	Gross Beta μc/ml
Disposal Well January 1959	95×10^{-9}	43×10^{-9}
Rad. #1 0700 hrs. 3-14-60	94×10^{-9}	46×10^{-9}
Rad. #2 0700 hrs. 3-15-60	95×10^{-9}	23×10^{-9}
Rad. #3 1040 hrs. 3-15-60	95×10^{-9}	27×10^{-9}
Rad. #4 1200 hrs. 3-15-60	122×10^{-9}	17×10^{-9}
Rad. #5 1410 hrs. 3-15-60	147×10^{-9}	20×10^{-9}
Rad. #6 1600 hrs. 3-15-60	129×10^{-9}	21×10^{-9}
Rad. #7 0200 hrs. 4-5-60	162×10^{-9}	25×10^{-9}
Rad. #7 0200 hrs. 4-5-60*	20×10^{-9}	14×10^{-9}

*Analysed by Nuclear Science & Engineering Corporation

The MPC for either unidentified (gross) alpha activity or unidentified (gross) beta activity in water in an unrestricted area is 100×10^{-9} μc/ml. It should be understood that the MPC is the permissible concentration of radioactivity over and above the natural background. It may be that the activity found in the January 1959 sample of San Andreas water from the Disposal Well represents the natural background condition. On review of the Geological Department exploration files relative to exploration holes drilled in the San Andreas-Glorieta formation, definite radioactive anomalies of low intensity were found to exist in an area south of Highway 66, near Bluewater.

For your information and comparison the gross activities, as determined by the Associated Nucleonics Survey of June 17-18, 1959, of San Andreas-Glorieta wells in the vicinity of the Disposal Well, are given below.

Sample Description	Gross Alpha μc/ml
Anaconda Well No. 1	31×10^{-9}
Anaconda Well No. 2	41×10^{-9}
Anaconda Well No. 3	17×10^{-9}
Berryhill Section 5	23×10^{-9}
North Well	6.5×10^{-9}

A sample of drilling fluid (mud) was taken on March 7, 1960, when the Monitor Well had reached a total depth of 364 feet. This sample contained drilling mud, blow sand and drill cuttings from the Chinle formation. The analytical results for this sample were as follows: Gross Alpha, $8,600 \times 10^{-9}$ μc/ml; Gross Beta, $2,900 \times 10^{-9}$ μc/ml. These levels of activity are typical of the drilling fluid samples which were analysed during the drilling of the Disposal Well.

The chemical results of samples taken from Monitor Well No. 1 are presented in the following tabulation. Also included are the chemical analyses of the San Andreas-Glorieta formation water sampled during January 1959 from the Disposal Well.

	Disposal Well, January 1959		Monitor Well No. 1, TAC Analyses		
	TAC Analysis	Earlougher Analysis	1200 hrs 3-15-60	1600 hrs 3-15-60	0200 hrs 4-5-60
	ppm	ppm	ppm	ppm	ppm
SO_4	636	600	689	689	680
NO_3	2	- -	14	15	25
Cl	158	184	141	143	145
Na	186	283	231	235	233
Ca	185	208	208	207	215
Mg	65	61	68	70	67
Fe	Nil	9.1	Nil	Nil	Nil
Mn	Nil	- -	Nil	Nil	Nil
K	- -	- -	5	5	10
Total Dissolved Solids	1608	1940	1685	1690	1726
pH	7.5	7.4	7.1	7.4	6.9

Based on the interpretation of the chemical analyses of North Well, Berry-Hill Section 5 Well, Disposal Well and Monitor Well in relation to their geographical location and hydrological environment, it seems very likely that the water quality as shown by the January 1959 analyses of the San Andreas-Glorieta water from the Disposal Well represents the natural background condition. The current chemical analyses from the Monitor Well water samples exhibit similar quantitative values. In view of the foregoing, there is no evidence of chemical contamination of the Monitor Well samples as a result of Disposal Well operations.

With respect to the radiological analyses, the slight discrepancies between the activities found in the Disposal Well and Monitor Well may be explained by analytical variations and/or by the variations in the concentrations of natural occurring radioactive deposits. A critical examination of chemical analyses also supports these conclusions.

Based on the foregoing presentation, it is evident that there is no contamination in Monitor Well No. 1 resulting from the operation of the Disposal Well.

/s/ RMW

Ralph M. Wilde

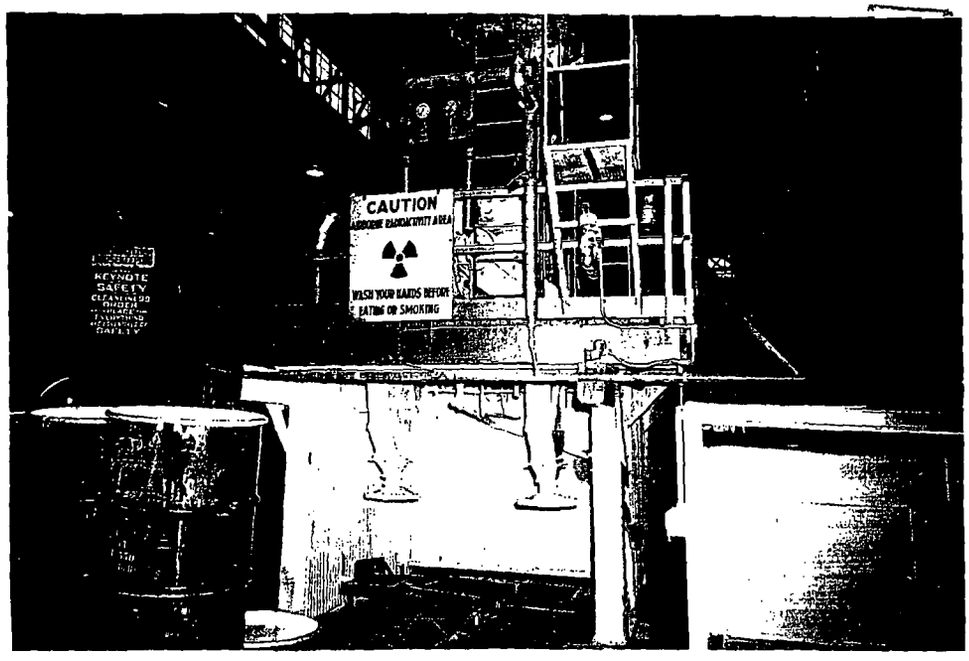
RMW:db

cc: A. J. Fitch
R. D. Lynn

THE ANACONDA COMPANY
Grants, New Mexico

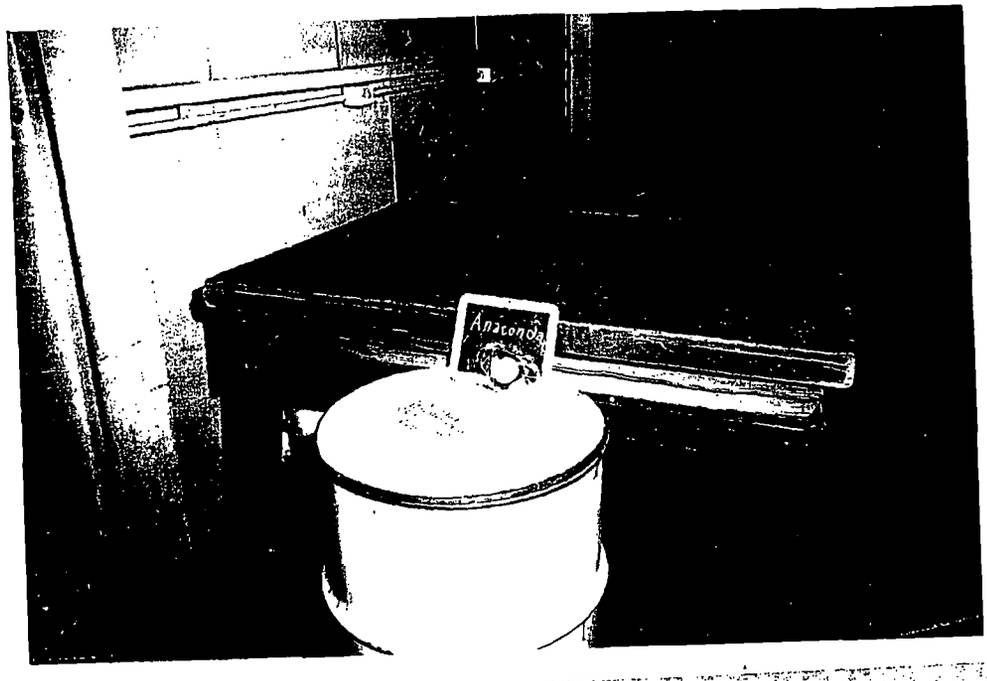
APPENDIX K
PHOTOGRAPHS

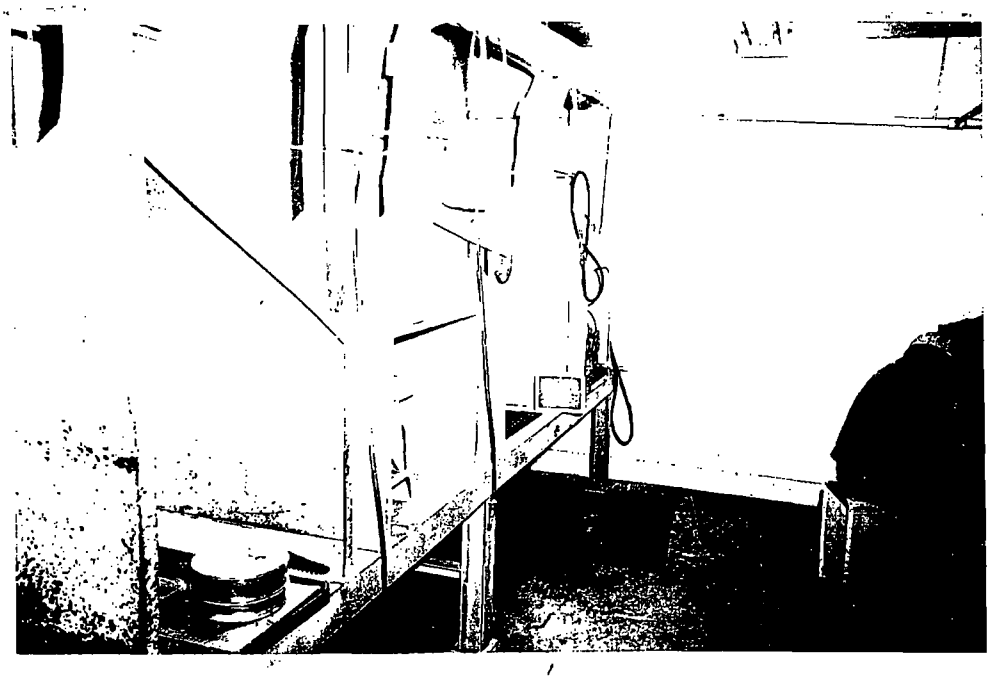
May 3 - 5, 1960



1. Yellow cake area. Note caution sign.

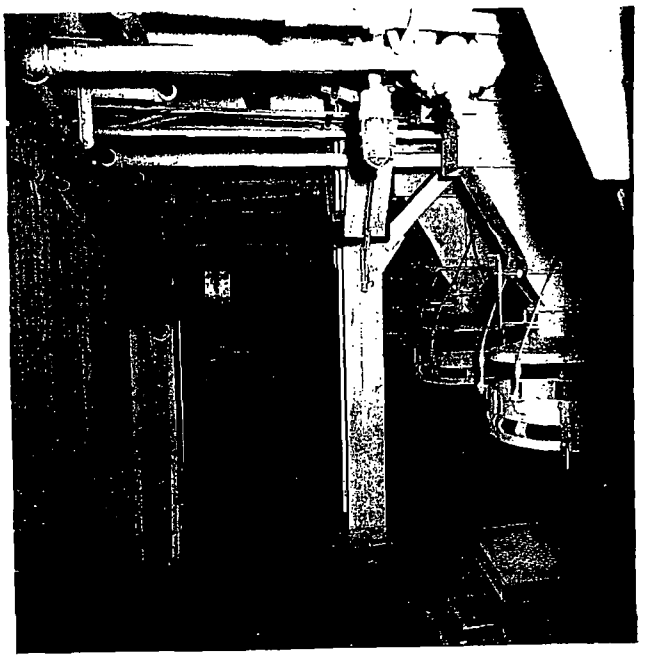
2. Respirator packaged in plastic bag.





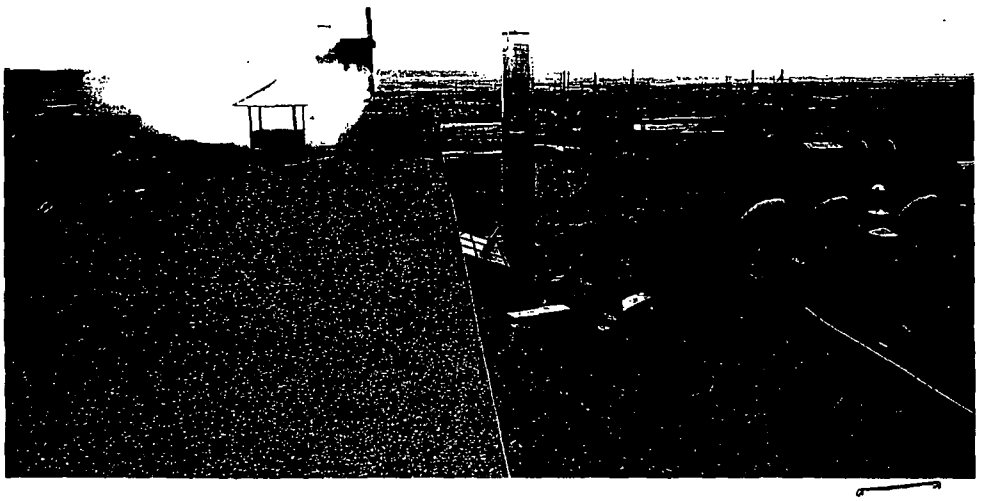
3. Hoods in one of the ore bucking rooms.

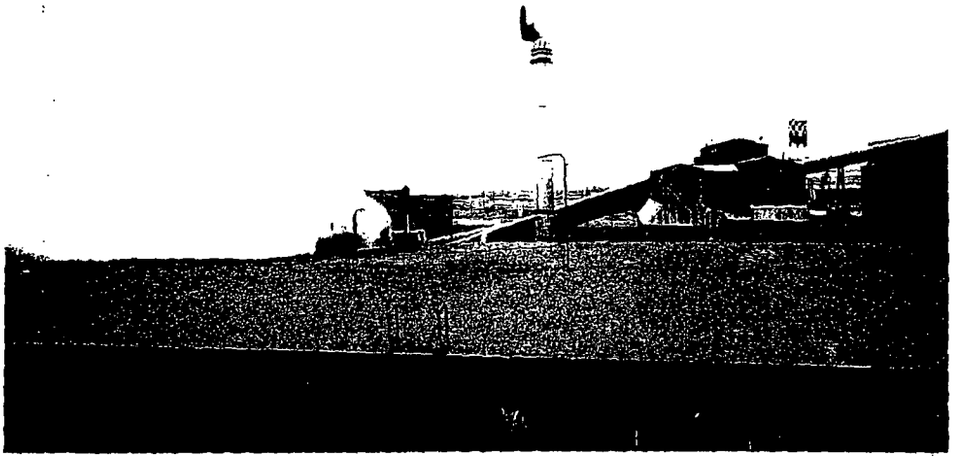
4. Bottom of yellow cake drier. Pan is hermetically sealed to drier.



5. Yellow cake barreling enclosure.

6. Roof of carbonate mill building. Microdyne discharge at right, Anaconda Dust Collector discharge at left.



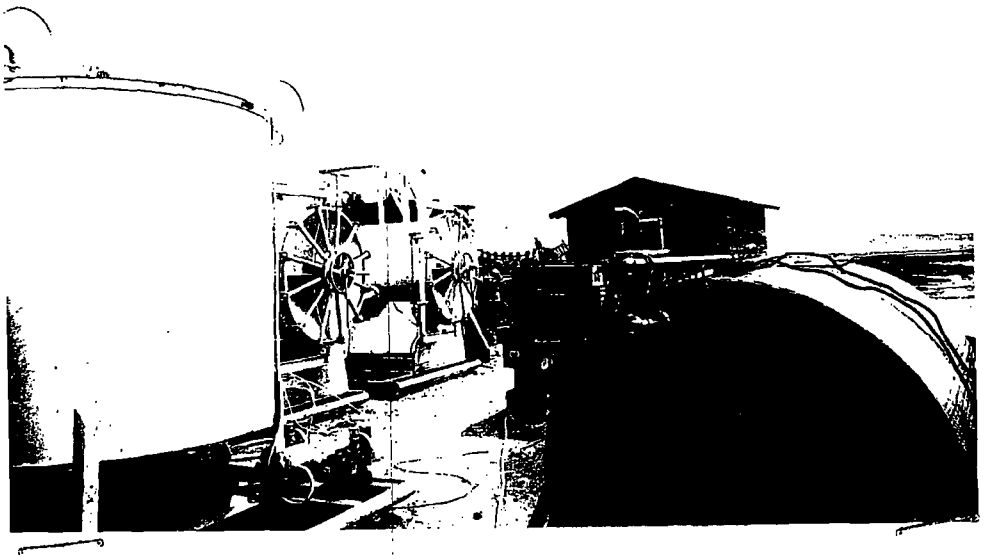


7. Roof of carbonate mill building, Microdyne discharge in center, Anaconda Dust Collector dishcarge at left.

8. Change room in yellow cake area.

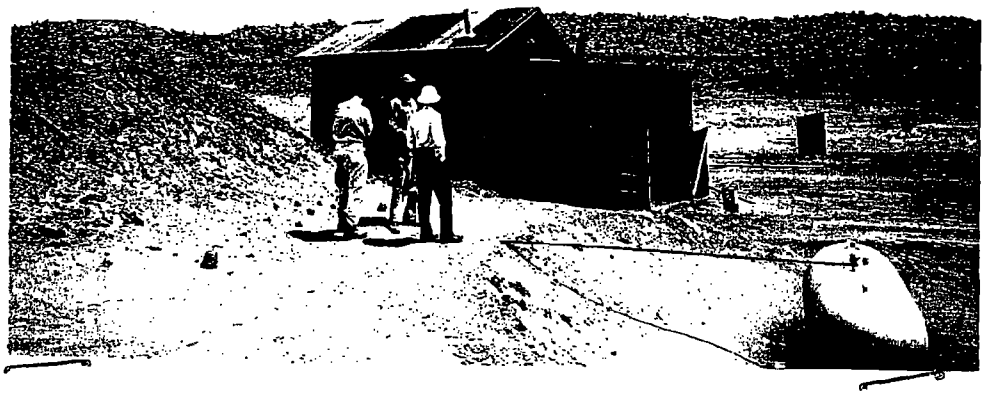
9. Tailings pond at point where liquid is pumped to filters thence to disposal well. Level of liquid was formerly about one inch above catwalk at right before disposal well test was started,

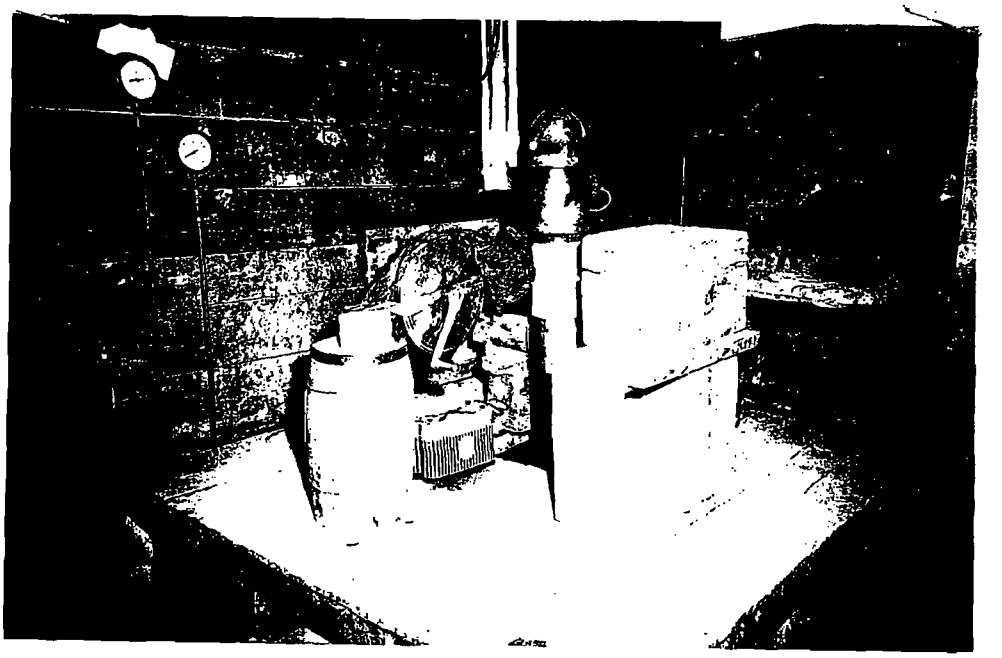
10. Filters used to filter mill waste effluent prior to injection into disposal well.



11. Filters used to filter mill waste effluent prior to injection into disposal well.

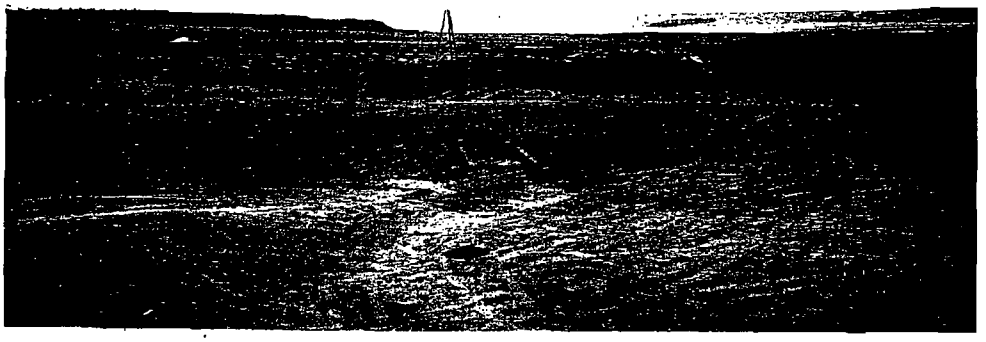
12. Disposal well building.





13. Inside disposal well building.

14. Lower portion of disposal well building showing point where pipe enters ground.



15. Monitor well located approximately 200 feet southeast of disposal well.

W. Kriegsman
Compliance
C-460

RE: ANACONDA COMPANY, LICENSE NO. R-138

Anaconda was exempted from the requirements of Section 20.203(f)(2) by amendment dated May 11, 1960, copy of which was forwarded to you previously.

R. E. Cunningham
DLR
C-233

3669 7-14-60

MEMO ROUTE SLIP
Form AEC-98 (Rev. May 14, 1947.)

See me about this.	For conc[illegible]ce.	For action.
Note and return.	For signa[illegible]e.	For information.

TO (Name and unit)	INITIALS / DATE	REMARKS
R. K. Cunningham LAR		RE: THE ANACONDA COMPANY, LICENSE NO. R-138 We would appreciate your advising us if subject licensee has received an exemption from 20.203(f)(2).
TO (Name and unit)	INITIALS / DATE	REMARKS You may recall that this matter was discussed in our memorandum, Mann to Price, dated April 13, 1960.
TO (Name and unit)	INITIALS / DATE	REMARKS
FROM (Name and unit) W. E. Kriegsman IRS		REMARKS Follow up 7/8/60
PHONE NO. 3336	DATE 6/8/60 7/11/60	

USE OTHER SIDE FOR ADDITIONAL REMARKS

U. S. GOVERNMENT PRINTING OFFICE 1951—O-[illegible]

RECEIVED
JUL 11 9 3 4 2 9

Dr. J. A. Lieberman, Chief, Environmental
& Sanitary Engineering Branch, RD

JUL 1 2 1960

L. R. Rogers, Chief, Radiation Safety Branch
Division of Licensing and Regulation

APPLICATION BY ANACONDA COMPANY, GRANTS, NEW MEXICO,
FOR DEEP WELL DISPOSAL
DOCKET NO. 40-665

SYMBOL: DLR:REC

I shall appreciate your comments and recommendations concerning Anaconda Company's proposal to dispose of waste from their uranium milling operations into deep wells.

Attachment
Letter of 7-5-60 with enclosure

OFFICE ▶	DLR RECunningham:hgs	DLR LRRogers				
SURNAME ▶						
DATE ▶	7-12-60					

Form AEC-318 (Rev. 9-53) U. S. GOVERNMENT PRINTING OFFICE 16—62761-3

MEMO ROUTE SLIP
Form AEC-93 (Rev. May 14, 1947)

☐ See me about this. ☐ For concur[illegible]ce. ☐ For action.
☐ Note and return. ☐ For signat[illegible] ☐ For information.

TO (Name and unit)	INITIALS / DATE	REMARKS
L. R. Rogers L&R		RE: THE ANACONDA COMPANY, LICENSE NO. R-138 Attached for your information is a copy of a letter from Donald I. Walker, Idaho to the licensee dated November 5, 1959. 46-6[illegible]
TO (Name and unit)	INITIALS / DATE	REMARKS
TO (Name and unit)	INITIALS / DATE	REMARKS
FROM (Name and unit)		REMARKS
L. D. Low INS LDL		
PHONE NO. 3336	DATE 11/18/59	

USE OTHER SIDE FOR ADDITIONAL REMARKS

U. S. GOVERNMENT PRINTING OFFICE : 1957—O-422007

[illegible]

November 5, 1959

The Anaconda Company
New Mexico Operations
P. O. Box 638
Grants, New Mexico

Attention: Mr. A. J. Fitch

Gentlemen:

As you are already aware, the Division of Inspection has initiated a program for the collection of samples, both air and liquid effluents for determining concentrations of radioactive materials released to unrestricted areas, for the measurement of radiation levels, and for the determination of radiation exposures to all employees at each of the uranium ore processing mills which are licensed by the Atomic Energy Commission.

Recently, a team from the Field Operations Office visited your mill for the collection of the above data and for initiating the distribution of the film badges which are furnished by the AEC.

In accordance with Title 10, Code of Federal Regulations, Part 20, Standards for Protection Against Radiation, each licensee is required to conduct surveys to determine the radiation levels of his facilities and to make corrections in equipment and processes in order that employees will not be subjected to radiation exposures in excess of the limits set forth in the above regulations. It is the responsibility of the Division of Inspection to determine, in each licensee's facility, the degree to which the licensee is conforming with the pertinent regulations. To achieve the Division of Inspection's responsibility in this program, it has been the AEC's decision to initiate the program outlined above.

It should be recognized that the collection of either air or liquid samples during a visit to each of the mills will not necessarily determine the mill's degree of compliance over a long period of time but is only a measure of compliance at

[illegible] Thus, [illegible] with a [illegible] However, an indication of a licensee's [illegible] If, for example, the results showed that, at any time, a [illegible] of radioactive material in air or water was many, many times in excess of the maximum permissible concentration, this would certainly be an indication that the average concentration in that area over a long time may be in excess of permissible limits.

The Division of Inspection's program is intended in no way to replace or even supplement the licensee's own survey program, inasmuch as the average conditions can be most readily determined through the licensee's own continuous monitoring program.

I should like to take this opportunity to outline for you the information which we expect to obtain through this program, the methods which are currently being used to obtain it, and the reasons therefor.

Film badges are being distributed to all employees of each mill to evaluate personnel radiation exposure which they may be receiving from working with or being near radioactive materials. The information which this will provide is the exposure to beta and gamma radiation to which each employee is subjected. According to 10 CFR 20.202, each employee who receives, or is likely to receive, a dose in excess of 25 percent of the applicable limits is required to be supplied with appropriate personnel monitoring equipment. A small portion of the employees will assist those mills who do not already have their monthly badge service by determining which, if any, of their employees are subjected to radiation doses such that continuous personnel monitoring would be required. For those mills which have already established their own film badge program, this would provide no additional check for their own service.

It is intended to provide film badges to each of the mills on a monthly basis for a minimum period of three months. As you have already been informed, additional film badges, with your company's name and the individual employee's name affixed to each of the badges, will be forwarded to your company at the end of each month. The used badges, including control badges, should be returned air express collect when possible to the United States Atomic Energy Commission, Health and Safety Division, Personnel Monitoring Branch, P. O. Box [illegible], Idaho Falls, Idaho, at the end of each monthly period, after the new badges have been distributed to employees.

[illegible] levels throughout your mill were [illegible]. [illegible] the survey area [illegible] to your mill, [illegible] samples were collected to indicate the degree of [illegible] airborne [illegible]. Two [illegible] types of samples were [illegible] in your mill. The first of these, general air samples, were collected throughout all areas of the mill, to reflect general [illegible] conditions with respect to the [illegible] radioactive material, namely uranium. The second group of samples, breathing zone, were taken in those locations where an employee was accomplishing a fairly repetitive job under relatively dusty conditions. It should be noted, during the collection of these samples, that the team member attempted to keep the sampler as close to the operator's nose or "breathing zone," as possible without interfering with his work. By knowing the number of times that the employee repeats this operation each hour, day, or week, and the amount of time which he may spend in general areas, it is then feasible to calculate an average amount of airborne radioactive material to which he may be subjected during a particular work period.

The third type of air samples collected is called a process sample. The results from these samples will not assist in the evaluation of the exposures to individuals but will point out what particular items of processing equipment may be contributing substantially to the general contamination of a particular area.

Each of the above types of atmospheric, or dust, samples are collected with one of the several types of air pumps which have been calibrated to pull a known volume of air through a particular type of filter. The filter paper currently in use is Whatman No. 41. After the collection of the samples has been completed, the samples are analyzed fluorometrically for uranium. The detailed method of analysis used will be forwarded to you upon request.

During the team's visit to your mill, samples of liquid effluents, which are released into unrestricted areas (those areas to which you cannot control the access of personnel), were collected by members of the team, in order to indicate the degree of compliance with 10 CFR 20.103. If the effluent reached some river or stream, samples of those waters were also collected above and below the mill's discharge point in order to determine the relative increase of radioactive material in the stream, which may be attributable to your operations. These liquid samples are analyzed for radium and thorium. Details of the particular methods used are also available upon request.

It should be mentioned again, with respect to the concentrations of radioactive materials found in the effluent samples, that the results of these samples will only reflect conditions at the particular time

[illegible] are subject to [illegible] average concentrations for any assumed single period of time. This is particularly true of stream [illegible] since, though concentrations in mill effluents may remain essentially constant over a long period of time, the stream flow may vary considerably over the seasons, and resulting stream concentrations will then vary accordingly.

While the results of this program by the Division of Inspection will provide a measure of a particular mill's degree of compliance, such a program will be of no material value to the mill operator unless the results of the sample collection and analyses are made available to the respective mills. During the next visit to your mill, the results of our survey will be given to your mill management either verbally or visually. A copy of the results will be forwarded to you through the Division of Licensing and Regulation, Washington, D.C., upon request.

Should you have any questions or feel that any part of this needs further amplification, please do not hesitate to contact me.

Very truly yours,

Donald I. Walker, Director
Division of Licensee Inspection
Atomic Operations Office

[illegible]

DLA:RFB
40-665

MAY 2 3 1958

The Anaconda Company
P. O. Box 638
Grants, New Mexico

Attention: Mr. A. J. Fitch

Gentlemen:

This refers to the inspection made by AEC inspectors on January 7, 1958, of your Company's operations at Grants, New Mexico, licensed under Source Material License No. S-138 dated March 27, 1957.

Based upon our review of the information obtained during the inspection, it appears that certain of the Company's operations were not conducted in full compliance with the Atomic Energy Commission's "Standards for Protection Against Radiation," Part 20 of Title 10, Code of Federal Regulations, in that:

a. The Company has not conducted surveys necessary to determine compliance with the regulation (see Section 20.201(b), "Surveys").

b. Areas and rooms in the plant were not posted with proper caution signs as required by Section 20.203(c)(2) and containers in which quantities of source material were being used or stored were not labeled with proper labels as required by Section 20.203(f)(2).

It is requested that you notify this office within 30 days of the action you have taken or plan to take to correct

(continued)

these deficiencies and the date such correction will be or has been achieved.

Attached for your information are circulars entitled "Radiation Surveys of Uranium Ore Processing Mills" and "Air Sampling," which you may find helpful in enabling you to comply with the regulations in Part 20 referred to herein. The methods for surveying and sampling as described in these circulars are not intended to be mandatory but rather to suggest useful ways to assure safe operating conditions. Other methods, of course, may be equally effective.

Very truly yours,

R. W. Price, Director
Division of Licensing and Regulation

Enclosures:
1. General Guidance on Surveys
2. Details on Air Sampling
3. 10 CFR Part 20

cc: Inspection Div., IDO)
Inspection Division, Hdqtrs.)
Lyall Johnson, DLR)
R. E. Cunningham, Wash., DLR) Encls. omitted
E. Van Blarcom, Wash, DRM)
A. B. Carlson, GJOO)
Public Document Room)

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Suppl. Docket File
Div. & Br. rfs

OFFICE ▶	DLR	DLR	DLR	DLR	DLR	DLR
SURNAME ▶	RFBarker:lwj	ERRogers	JCDelaney	LJohnson	ERPrice	HLPrice
DATE ▶	5/15/58	5/16/58	5/19	5/19	5/19	5/21/58

Form AEC-318 (Rev. 9-53) U. S. GOVERNMENT PRINTING OFFICE 16—62761-3

FROM:	DATE OF DOCUMENT:	DATE RECEIVED	NO.
Harvie A. Mann Inspection	1/13/60	1/13/60	375-0

LTR.	MEMO: X	REPORT:	OTHER:
ORIG: X	CC:	OTHER:	

TO: H. L. Price

REPLY NECESSARY ☐ DATE ANSWERED: BY:

NO REPLY NECESSARY ☐

CLASSIF: U POST OFFICE REG. NO:

FILE CODE:

DESCRIPTION: (MUST BE UNCLASSIFIED)

[illegible] 10 CFR [illegible].203(a)(2) [illegible]

ENCLOSURES:

Original, subject to [illegible] 1/6/60

REFERRED TO	DATE	RECEIVED BY	DATE
Rogers	1/14		

REMARKS:

U. S. ATOMIC ENERGY COMMISSION **MAIL CONTROL FORM** FORM AEC-326S (3-52)

☆ U. S. GOVERNMENT PRINTING OFFICE: 1959 J-528128

STANDARD FORM NO. 64

Office Memorandum • UNITED STATES GOVERNMENT

TO : H. L. Price, Director
Division of Licensing and Regulation

DATE: APR 13 1960

FROM : Marvin M. Mann, Assistant Director for Compliance
Division of Inspection

SUBJECT: EXEMPTION FROM 10 CFR 20.203(f)(2) FOR INDIVIDUAL SHIPPING CONTAINERS AT THE ANACONDA COMPANY URANIUM MILL, GRANTS, NEW MEXICO

SYMBOL: INS:LDL

We would appreciate receiving the information requested by D. I. Walker, Director, ID Inspection Division, in his memorandum dated April 6, 1960, a copy of which is attached. Your early attention to this matter would be appreciated since ID would like to conduct an inspection of the Anaconda mill this month.

Enclosure:
Cpy memo, Walker to Mann, 4/6/60

Office Memorandum • UNITED STATES GOVERNMENT

TO : Marvin M. Mann, Asst. Director for Compliance, Division of Inspection, AEC Headquarters **DATE:** April 6, 1960

FROM : Donald I. Walker, Director, Division of Inspection, Idaho Operations Office

SUBJECT: EXEMPTION FROM 10 CFR 20.203(f)(2) FOR INDIVIDUAL SHIPPING CONTAINERS AT THE ANACONDA COMPANY URANIUM MILL, GRANTS, NEW MEXICO

file attached

SYMBOL: LI:WBJ

Enclosed you will find copies of the following correspondence between DLR and The Anaconda Company, New Mexico Operations, P. O. Box 638, Grants, New Mexico:

a. Letter dated February 3, 1959, from A. J. Fitch, Manager, The Anaconda Company, New Mexico Operations, Grants, New Mexico, to Division of Civilian Applications, AEC.

b. Letter dated May 14, 1959, from A. J. Fitch to Division of Civilian Application, AEC.

c. Letter dated May 23, 1959, from J. C. Delaney, Chief, Nuclear Materials Section, Licensing Branch, Division of Licensing and Regulations to A. J. Fitch.

d. Copy of Source Material License No. R-138, effective July 1, 1959, and expiring June 30, 1960, issued to The Anaconda Company, Grants, New Mexico.

You will note in the license that DLR's exemption from 10 CFR 20.203(f)(2) provides for exemption from testing only individual shipping containers. You will further note that Mr. Fitch asked, in his letter of February 3, 1959, for an exemption to include all containers in the mill. As you know, this exemption has been granted to [illegible] ore processing mills. In Mr. Fitch's letter of May [illegible] called attention to the fact that they had no written [illegible] (only a telephone call of February 6, 1959) that this [illegible] be construed as covering all containers of any kind [illegible]. Since this office has no record of a letter [illegible] confirming the telephone conversation, we have no way of knowing [illegible] this is actually the interpretation to be made in this [illegible] as we have an inspection tentatively scheduled for the Anaconda [illegible] this month, we would appreciate your clearing this [illegible] as soon as possible.

Enclosures:
As stated above

w/o enclosures

APR 11 1960 DIVISION OF LICENSING AND REGULATION U.S. A.E.C.

STANDARD FORM NO. 64

665

Office Memorandum • UNITED STATES GOVERNMENT

TO : Director,
Division of Licensing and Regulation

DATE: MAR 27 1959

FROM : Assistant Director for Compliance
Division of Inspection

SUBJECT: THE ANACONDA COMPANY, LICENSE NO. R-138, 10 CFR 40.

SYMBOL: INS: CCP

Information gathered during inspection of the subject licensee shows noncompliance with AEC regulations (or license provisions) as set out in the enclosures.

It is suggested that a letter be addressed to the licensee to inform him of the noncompliance items and request that appropriate action be taken to correct or overcome these deficiencies. When corrective action has been completed on this matter, please furnish this office with copies of pertinent correspondence (to and from the licensee) and these items will be reviewed during a follow-up inspection.

A summary of this case will be included in the March report to the Office of the General Manager.

A copy of this memorandum and the enclosure have been furnished the Office of the General Counsel.

Enclosure:
Cpy rpt dtd 3/4/58
Trans memo fm D.I. Walker, IOO
to M.M. Mann dtd 3/4/58

Marvin M. Mann, Assistant Director, Compliance
Division of Inspection, Washington

March 4, 1958

Donald I. Walker, Director, Division of
Inspection, Idaho Operations Office

ORIGINAL SIGNED BY
DONALD I. WALKER

COMPLIANCE INSPECTION REPORT - THE ANACONDA COMPANY, GRANTS, NEW MEXICO

SYMBOL: INS:DIW

Transmitted herewith are four (4) copies of subject report.

As noted in the report, the Anaconda Company possesses Contract No. AT(49-1)-550 with the Division of Raw Materials for the production of U_3O_8 concentrates. Under this contract, the licensee maintains complete records concerning all licensed material.

The general housekeeping throughout the mill, which is comparatively new, appeared to be very good. As reported, dust collection units were installed at the time of construction and additional ones are being added in the crushing and sampling areas. However, it should be noted that this additional dust collection equipment is not being installed on findings of a survey but rather on general conditions existing within the mill.

Due to the mill's remote location, any probable concentrations of radioactive material in waste effluents appear to be no problem, other than perhaps the designation of the tailings pond as a restricted area by the licensee as determined by the survey.

As noted in the report, this mill, like the others, has not posted areas, containing uranium in excess of the specified limits, nor marked containers. Section 20.501, Application for Exemptions, was discussed with Fitch and Peterson and the suggestion made that they may find an alternate method of complying with the appropriate sections of 10 CFR 20, such as posting notices at all entrances to the mill area. Presently, the licensee is limited to marking drums of final product with contract number, gross and tare weights, as specified in the contract, with Division of Raw Materials.

Other than the initiation of a study to determine possible body burdens of uranium among the employees, in conjunction with the Health Division, Los Alamos Scientific Laboratory, no attempt has been made to determine either concentrations of airborne radioactive materials or radiation levels existing within the mill areas. A

determination of these factors should inform the licensee which areas, if any, should be designated as "restricted" areas, whether personnel monitoring equipment is required, whether operational instructions should be initiated to prevent excessive exposure to personnel from either external radiation or airborne activity, and whether additional controls and equipment should be added to reduce exposures.

As far as could be determined, Mr. Fitch is in complete control of the operations at Grants. Contact concerning items of noncompliance should be forwarded to him. While I believe that neither Fitch nor Peterson fully understood our discussions, from a radiological safety point of view, I feel that they will attempt to comply with the regulations so far as possible. Here again, guide lines along which to proceed in conducting an adequate survey will undoubtedly have to come from without their organization. At Mr. Fitch's request, the list of firms conducting surveys, compiled by the Washington Office, is being forwarded to him.

This office makes the following recommendations concerning the licensee. The licensee should supply information concerning:

1. Plans for conducting a mill-wide survey, with emphasis upon existing radiation levels and concentrations of airborne radioactive materials.

2. Plans for designating such areas, as indicated by the survey, as "restricted" areas and the means by which access to such areas will be controlled.

3. Plans for complying with the intent of Sections 20.203(e)(2) and 20.203(f)(2), for posting areas and marking containers, which have amounts of uranium in excess of specified limits.

We regret that Appendix A, containing photographs of the facility, does not include the final product packaging area. Photographs were taken; however, none of the films from this area were usable.

Enclosure:
Compliance Inspection Report
The Anaconda Company (4)

CC: W. B. Carlson, GJOO w/1 cy of encls.

Form AEC-117
(3-57)

UNITED STATES ATOMIC ENERGY COMMISSION

COMPLIANCE INSPECTION REPORT

1. Name and address of licensee or permit holder
The Anaconda Company
P. O. Box 638
Grants, New Mexico

Attention: Mr. A. J. Fitch

2. Date of inspection
January 7, 1958

3. Type of inspection
Initial (Routine)

4. 10 CFR part(s) applicable
20 - 40

5. License (or permit) number(s) and expiration date(s), scope and conditions (including amend.).

Number	Date	Exp. date
R-138	3/27/57	4/1/58

~~Number Date Exp. date~~

Scope: "to receive possession of and title to raw and refined source material without limitation as to quantity, for resale and for processing with raw source material from your own mining operations.

"You are further licensed to transfer and deliver possession of and title to refined source material to any person licensed by the Atomic Energy Commission, within the limits of his license."

~~6. Scope of license(s) and permit~~

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."

~~7. Special conditions and limitations of license(s) or permit~~

6. ~~8.~~ Inspection findings (and items of noncompliance).
The licensee is engaged in the refining of uranium ores, producing uranium concentrates under Contract No. AT(49-1)-550, with the Division of Raw Materials, AEC. Records of all licensed material are maintained by the licensee (See Par. 11). Licensed materials are stored within fenced areas of the mill. The only items of noncompliance noted during the inspection are as follows:

10 CFR 20.201 - Surveys.
No surveys to determine radiation levels or concentrations of airborne radioactive material have been made. (See Par. 15).

~~9. Items of noncompliance~~

10 CFR 20.203 - Caution signs, labels, and signals.
(e)(2) Areas containing licensed material in excess of specified limits are not posted. (See Par. 14.)

(Continued)

7. ~~10.~~ Give date of last previous inspection: None

8. ~~11.~~ Is "Company Confidential" information contained in this report? ~~Yes~~
(Specify page(s) and paragraph(s)) Paragraph 10

ORIGINAL SIGNED BY
DONALD I. WALKER

DISTRIBUTION:
Insp. Div., Hq. (4)
Insp. Div., IDO (1)
Manager, GJOO (1)

Donald I. Walker
(Inspector)

Approved by: Donald I. Walker

Idaho Operations Office
(Operations office)

MAR 4 1958
(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.

RECOMMENDATIONS SHOULD BE SET FORTH IN A SEPARATE COVERING MEMORANDUM

U. S. GOVERNMENT PRINTING OFFICE 16—78814-1

9. An initial, routine inspection of the Anaconda Company, Grants, New Mexico, was conducted on January 7, 1958. Personnel contacted were Albert J. Fitch, Manager; E. C. Peterson, Assistant Manager; and James Marshall, Safety Engineer. Accompanying the inspector were T. J. Haycock, Director, Division of Inspection, Albuquerque Operations Office, and Durrel L. Brown, Concentrate Procurement Division, Grand Junction Operations Office. The license is issued to the above company, Attention: Mr. A. J. Fitch, said company being a division of the Anaconda Copper Company, Butte, Montana.

10. The licensee is engaged in the processing of uranium ores for the extraction of U_3O_8, under Contract No. AT(49-1)-550 with the Division of Raw Materials, said contract being administered by the Grand Junction Operations Office. The following production figures, as reported by Mr. Fitch, are considered Company Confidential information. The mill is presently processing, daily, 3,000 tons of uranium ore containing approximately 0.20% U_3O_8. Mill intake averages 12,000 pounds of U_3O_8 (10,200 pounds of contained uranium). Recovery averages about 90%. Final product produced daily is about 10,800 pounds of U_3O_8 (9,200 pounds of contained uranium). Average inventory is about 950,000 pounds of U_3O_8 (810,000 pounds of contained uranium), including stockpiled ore, ore in process and in storage and final product in process and packaged.

11. As required by their contract with the Commission, the licensee submits a monthly report, to Grand Junction Operations Office, of the amounts of ore received from each shipper together with U_3O_8 content, the date of the shipment, the amount of ore stockpiled and in process, the amount of final product in process, on hand, and shipped to the Commission. Daily inventories of licensed material are also maintained by the licensee for internal use.

12. The major part of the ore is conveyed to the mill by railroad cars and unloaded in front of the "grizzly", a 12" x 12" iron grating. Photograph 1, Appendix A, shows the railroad car unloader with the "grizzly" in the right foreground. The ore passes through a primary crusher where it is sampled to determine U_3O_8 concentrations. When the rate of crushing exceeds mill feed, the ore is stockpiled in the crushing area as shown in Photograph 2. Crushing and sampling areas are equipped with dust collection ducts though the number of locations of dust collection ducts is being increased. See Photograph 3 and 4. The ore is passed through a secondary crusher and then through a ball mill. Approximately 65% of the ores, which have a low alkaline content, undergo acid leaching to extract uranium. The remainder undergoes carbonate leaching. Sands are separated from the uranium bearing slimes, the slimes flowing into the resin-in-pulp (RIP) baskets which remove the uranium by means of ion exchange resins. After elution, the uranium is precipitated as the diuranate, which is filtered, dried and packaged in 55-gallon drums. The drums are stored within the fenced area of the mill (See Photograph 5).

13. The Anaconda mill is located approximately 8 miles from Grants, New Mexico. The wastes, process water, sands and slimes, from the milling process are released into a tailings area, covering an estimated 300-500 acres (See Photographs 6, 7 and 8). The tailings area is located 3 to 5 miles from the Rio San Jose River. None of the effluents are released directly into the river, but are removed by percolation and seepage into the surrounding water table and by evaporation into the atmosphere. The licensee is presently experimenting with evaporation pits, approximately 200 x 200 feet, from which it is anticipated can be recovered the dissolved salts from the process waste waters. The pits are located adjacent to the tailings pond.

14. The entire mill area is fenced and is considered by Mr. Fitch to be a restricted area, in that access of personnel is controlled. None of the areas of the processing mill are posted as required by Section 20.203(e)(2). Similarly, none of the containers within the mill are marked as required by Section 20.203(f)(2). Both the areas and the containers (processing equipment and final product drums) contain amounts of uranium in excess of the limits prescribed in the above sections of 10 CFR 20.

15. At the time of inspection, no surveys had been conducted by the licensee to determine the existence of possible radiological hazards resulting from the processing of licensed material (uranium). Mr. Peterson stated that a urinalysis program for employees had been initiated in conjunction with Dr. T. L. Shipman, Director of the Health Division, Los Alamos Scientific Laboratory, Los Alamos, New Mexico. Mr. Peterson stated that some of the results on four of their employees had been returned, but that the results had been so high that they were considered to be in error due to contamination of the samples. The results were not made available to the writer. Mr. Peterson stated that due precautions would be taken with future samples to eliminate contamination. Concentrations of airborne radioactive materials and radiation levels in and around the mill have not been determined.

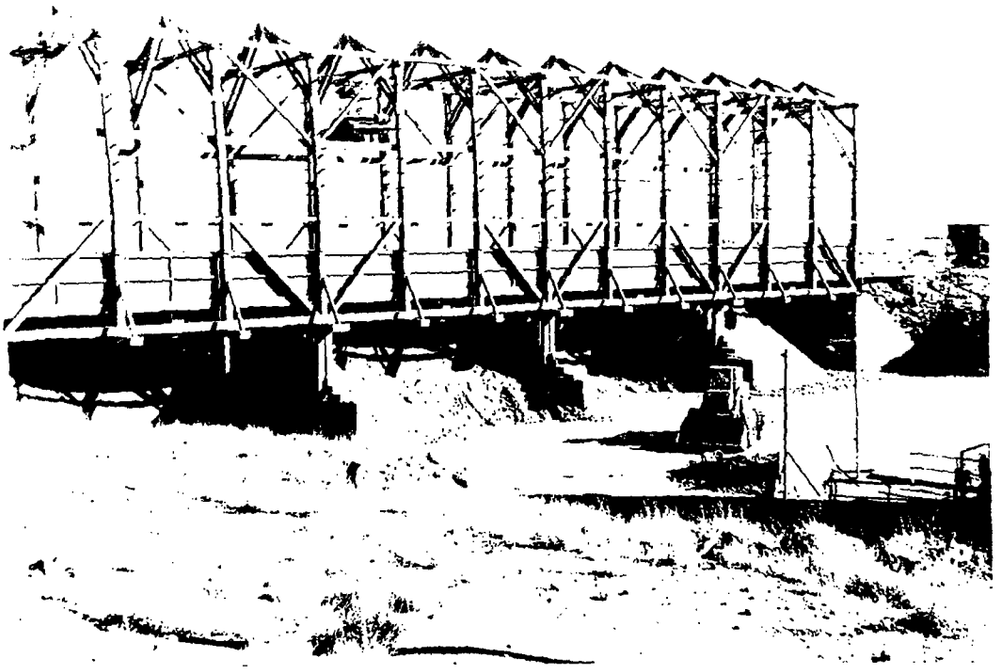
16. Housekeeping throughout the mill is good. Dust collection units are utilized in various processes to reduce atmospheric dust, though none had been installed in the final product packaging area. Respirators were being worn by employees engaged in some of the operations.

The Anaconda Company
P. O. Box 638
Grants, New Mexico

APPENDIX A

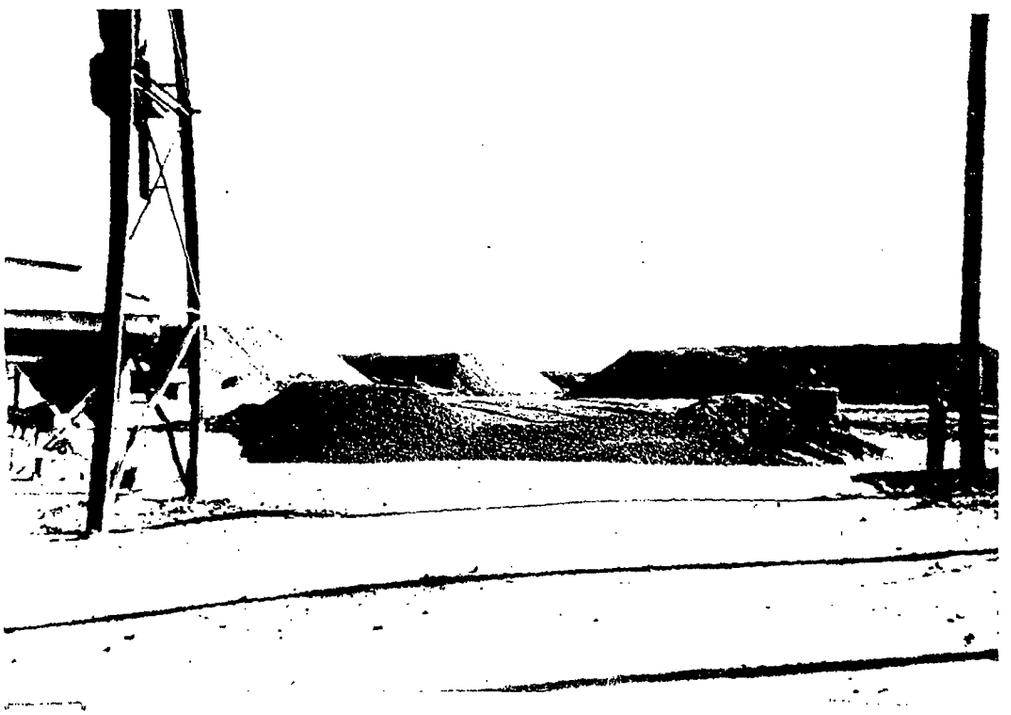
PHOTOGRAPHS

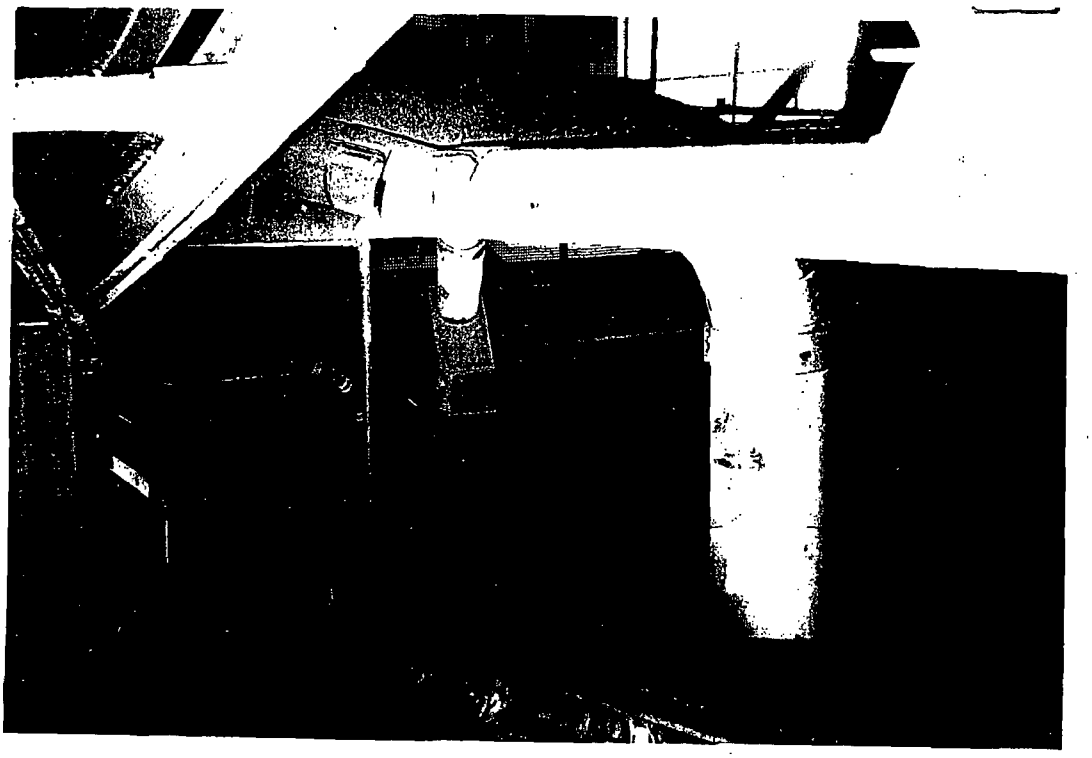
January 7, 1958



1. Railroad car unloader. "Grizzly" for primary crusher immediately in front of the Michigan loader.

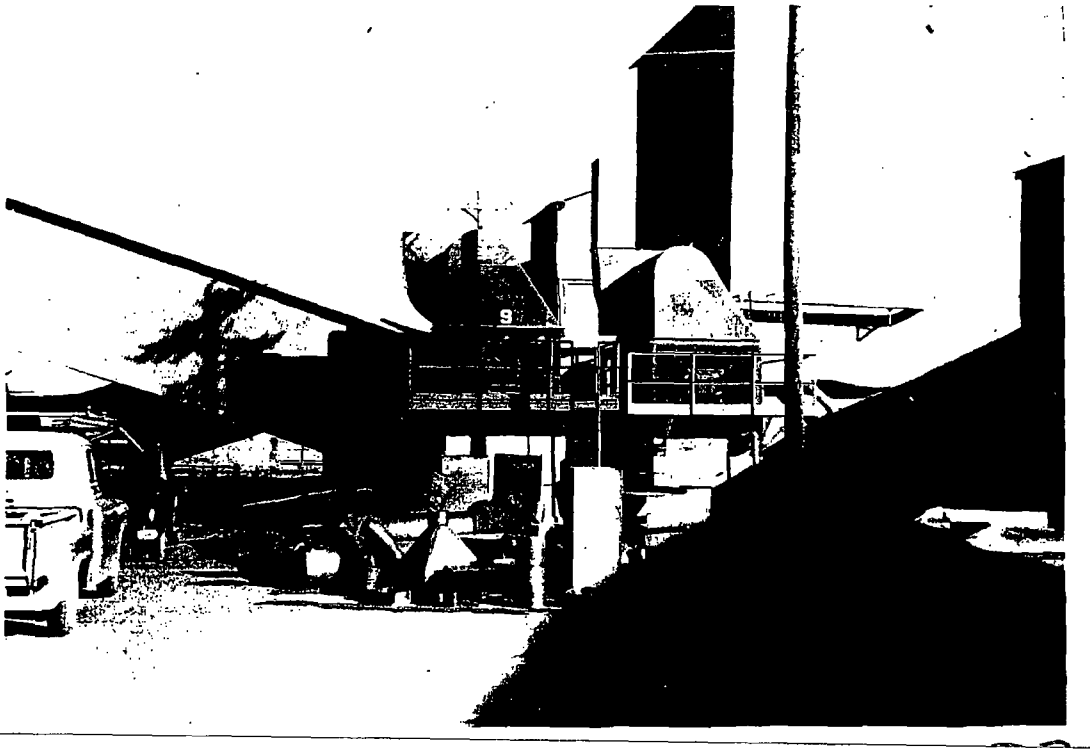
2. Stockpiled ore after passing through primary crusher.

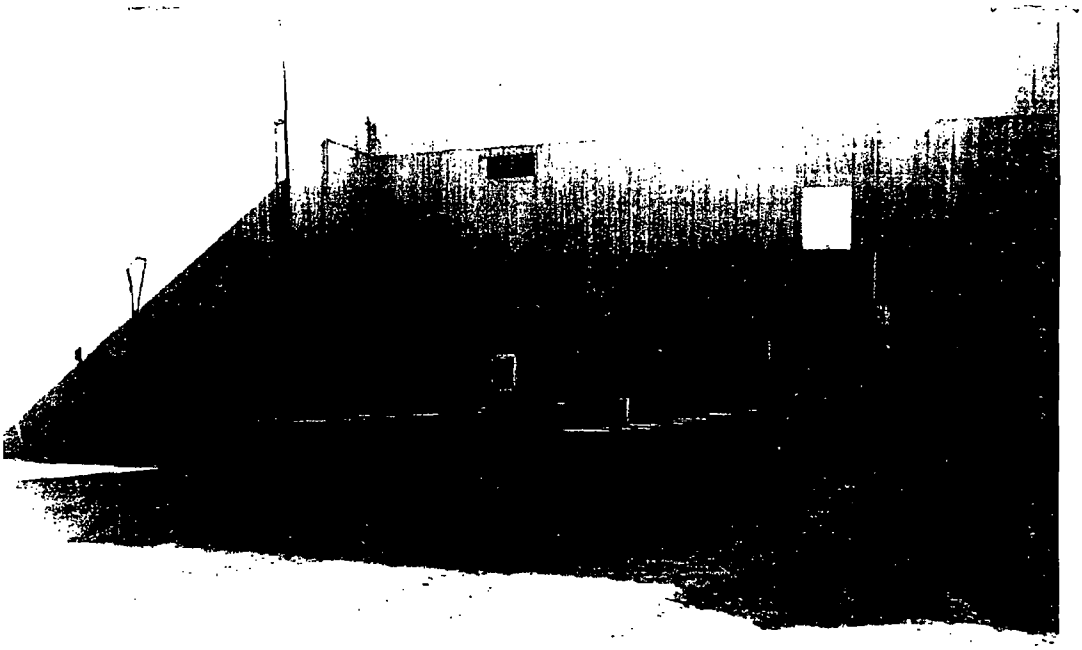




3. Dust collection ducts over ore transfer point in crushing building.

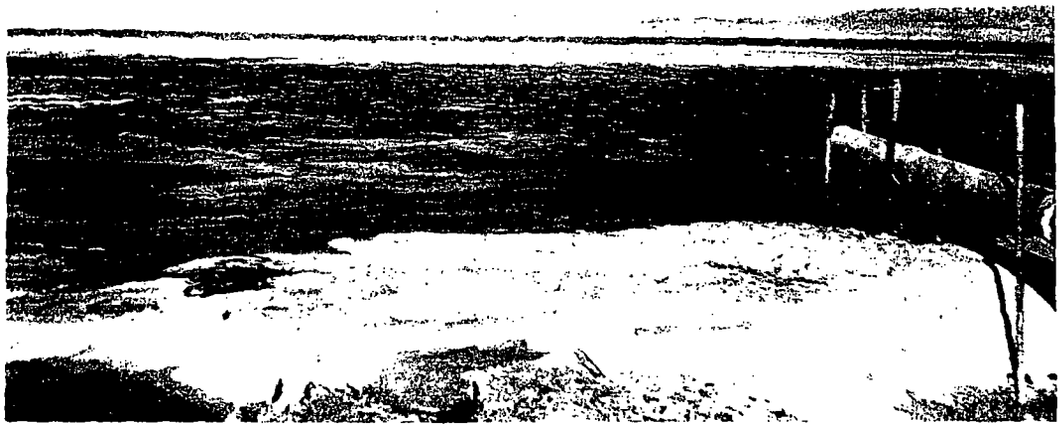
4. Installation of dust collection equipment in crushing and sampling area.





5. Final product in storage prior to shipment.

6. Tailings area. Estimated to cover several hundred acres.



7. Sands discharge into tailings pond.

8. Tailings area.