UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

Docket No. 40-3453

APR 12 1974

Note to Files

Attached is a draft of a negative declaration and an incomplete environmental appraisal which has been prepared for the proposed modification of the Atlas Uranium Mill at Moab, Utah. The environmental appraisal will be scheduled for completion when the applicant has adequately responded to questions generated by our staff.

R. B. Chitwood, Chief
Technical Support Branch

APR 12 1974

This Negative Declaration is issued by the U. S. Atomic Energy Commission, Directorate of Licensing, Fuels and Materials, in accordance with 10 CFR Part 51.7 and represents a decision by the Commission not to prepare an environmental impact statement for the re-building of an acid leach circuit and renewal of the source materials license (no. Sua 40-3453) for the Atlas Minerals Uranium Mill in Moab, Utah. The Environmental Impact Appraisal setting forth the basis for this decision is available for public inspection as required by 10 CFR Parts 51.5d and 51.55.

APR 12 1974

I. Description of the Proposed Action

This Environmental Impact Appraisal has been prepared by the U. S. Atomic Energy Commission, Directorate of Licensing, Fuels and Materials, in accordance with the Code of Federal Regulations, 10 CFR Part 51.7, and supports the Negative Declaration issued for the proposed modification and reconstruction of an acid leach circuit by the Atlas Minerals Company for the Moab Uranium Mill. The proposed modifications are:

1. Rebuilding the acid leach circuit destroyed by fire.
2. Elimination of the direct discharge to the Colorado River as authorized by the existing license.
3. Increasing the tailings dam height to accommodate plant discharge.

II. Summary Description of the Probable Impacts of the Proposed Action

The Moab Uranium Mill owned and operated by the Atlas Minerals Company is located in Grand County, 3 miles northwest of the city of Moab in the southeastern part of Utah. Coordinates of the site are 38° 35' north latitude and 109° 30' west longitude. The population distribution for a 50 mile radius is shown as Figure I. The main topographic features of the site and access roads are displayed as Figure II.

The chief product of the uranium facility is the oxide - U_3O_8 commonly called "yellow cake." By-products are vanadium as V_2O_5 or "red cake" and a cemented copper product.

The Mill has been receiving uranium bearing ore from 20 to 70 independent shippers since 1956 and at its peak processed 1700 tons per day. The alkaline circuit has processed up to 1200 tons per day recovering copper and uranium and the acid circuit up to 500 tons per day recovering uranium and vanadium.

In December 1968, a fire in the solvent extraction system of the acid circuit reduced the mill to handling high lime content ores only. Depletion of these high lime ores has lead Atlas to seek reconstruction of their acid circuit in order to process the newly acquired low lime content ores.

In order to process the lower lime ores, several modifications in Atlas' milling process will be made. This appraisal discusses each of these suggested modifications and the changes in effluent concentration associated with these modifications, and provides an evaluation of the probable environmental impact of these effluent levels.

1. Rebuilding the Acid Circuit

   The construction of a new acid circuit will take place in existing mill buildings and should not alter the appearance of the surrounding environs. Figure III is a block diagram showing the new acid circuit with a legend indicating the formerly existing units that will be reinstalled, the new units to be installed and the units that are presently in use. Of these units, those

for washing alkaline and acid tailings are the only units that will be totally new. These units will wash pulp containing uranium and vanadium and require 1170 gallons per minute less water than was required by the former process. One hundred thirty gallons per minute will be necessary to operate three counter current stages of drum filters. Along with this 130 gallons per minute of water, 500 tons per day of raffinate from the acid circuit and 250 tons per day of raffinate from the alkaline circuit will report to the tailings pond. Because of this reduced withdrawl of water from the Colorado River and the reduced operating tonnage. Any adverse impact formerly associated with this circuit will be reduced.

2. Elimination of Direct Discharge to the Colorado River

The present tailings retention system employs 2 purification ponds that precipitate radium from the tailings effluent with barium sulphate. After the barium treatment the effluent is discharged to the Colorado River having been reduced in soluble radium by about 63 percent. This treatment has shown radium removal up to 99 percent depending on the amount of barium chloride added(1).

The new approach proposed by the applicant is to discontinue the discharge of the effluent to the Colorado River. This treated liquid would be returned to an existing settling pond and the supernatant used as make up for the water system. (Possible seepage

of the remaining Ra-226 will be discussed in the section on non-gaseous radiological effluents). Automatic level control of the tailings pond would be maintained by use of a decant system which would reduce the level by decanting liquid into the settling ponds. This modification will eliminate the practice of discharging liquid effluent directly to the Colorado River with the probability of decreasing the environmental impact.

3. Return of Sludge from River Water Treatment Plant to the Tailing Pond

This plant uses a conventional cold lime process. The slurry from the reactivator will no longer be discharged to the Colorado River but will be returned to the tailings pond. When a compartment fills up with solids, after several years of operation, it will be left to evaporate and subsequently the solids will be transferred to the tailings pond Fig. IV. This modification will have two positive effects. The first will be the removal of sludge from the Colorado River and return of the water through natural evaporation. The second will be to place the dried solids on the tailings pond which will decrease the relaxation length for Radon. This length is a measurement of the effective depth that is required for certain type soils in order to decrease the flux of radon from piles[(2)]. Accumulation of solids from the river water treatment plant will amount to 12 dry tons.

APR 12 1974

B. Effluents from the Moab Mill

There are four types of effluent from the Moab Plant. These include Non-Gaseous, Non-Radioactive effluent, Gaseous, Non-Radioactive effluent, Non-Gaseous, Radioactive effluent, and Gaseous, Radioactive effluent.

1) Non-Gaseous, Non-Radioactive Effluents

a) The largest amount of solid non-radicactive effluent from the mill will be in the form of slurried ore which will accrue at an approximate rate of 330,000 tons per year. Part of this material contains reagents used in the milling process. Table I shows the tailings make up.

The sludge from the river water treatment plant will amount to 12 dry tons per year which will also be added to the tailings pile. In order to have the tailings pile blend in with the natural environment, Atlas has agreed to determine the most suitable material in the area to support vegetation, Russian Thistle is now being used and this vegetation will continue to be planted in the soil covering which will be placed on the pile. The applicant has agreed to restrict use of the pile and has already began to blend in the pile with the natural environment. No significant impact is expected from this pile.

b) A very limited amount of dust or particulate matter is expected to cross the plant boundary. Calculations for particulate matter show dust concentrations from the plant stacks should not exceed 6.98×10^{-6} which is a value based on present through put. The mill will reduce through put from the present 1200 tons per day to 750 tons per day and this should result in a decrease in dust concentrations from the stacks. The primary ambient air quality standard for particulate emissions is 75 micrograms per cubic meter. This value represents .95 percent of the standard. No significant impact is expected from these dust concentrations.

ii. Gaseous, Non-Radioactive Effluents

In this category the gases of most concern are carbon monoxide, ammonia, carbon dioxide, sulphur dioxide and hydrogen sulphide.

a) Carbon Monoxide

Carbon Monoxide produced at the mill will come chiefly from the copper cementation process. This release is far short of the Environmental Protection Agency Standard of 10 milligrams per cubic meter. The calculated concentration of carbon monoxide released at the nearest site boundary in the direction of the prevailing wind is 1.9×10^{-9} milligrams per cubic meter. No significant impact is expected from this source.

b) Carbon Dioxide

Carbon dioxide is released at the rate of 102,000 pounds per day and is only a concern as a local nuissance if proper ventilation is not maintained. Much of this gas is removed by use of a wet scrubber and the remainder is vented to the atmosphere. No probable impact will come from this pollutant.

c) Ammonia

Ammonia is added in the autoclaves for alkaline leaching. Monitoring near these autoclaves show little traces of ammonia and stack concentrations are undetectable.

d) Sulphur Dioxide

Oxides of sulphur were tested as SO_2 and this contaminant has as it sources the alkaline leaching tanks, copper cementation tanks, peroxide precipitation tanks, and acid leach tanks. Total emission from these sources result in about 1.8 pounds per day of sulphur dioxides as SO_2 [3]. Calculated site boundary concentrations in the direction of the prevailing wind indicate an average concentration of .0723 micrograms per cubic meter or $.0723 \times 10^{-6}$ ppm. This amounts to .09 percent of the Environmental Protection Agency Standard for primary ambient air quality. It is reported that concentrations of .03 part per million are necessary in order to damage plants [4]. No significant impact is expected from this pollutant.

iii. Non-Gaseous, Radioactive Effluents

Airborne radioactive particulate is in the form of Uranium Oxide and its daughter products that are in secular equilibrium. In order to determine site boundary concentrations for the Moab site a study of uranium dust concentrations from airborne sampling data was necessary since inadequate meteorological data was available for the site. The site itself presented topographical problems because the mill is located in a valley surrounded by cliffs which border the east and west boundaries rising to a height of 4000 feet above mean sea level in some places. Such topographic features leads one to suggest that uniform mixing was the meteorological condition of the valley and that concentrations of airborne materials would show no correlation with distance from the mill with the data following a random distribution. Figure V is a log normal plot of percent of population or probability versus concentration of uranium dust for cumulative years 1968, 1969, 1970 and 1971 which indicates a random distribution is followed. A plot for separate years also shows the decrease in uranium dust concentrations with operating tonnage and shows a fall off of through-put for the years 1968, 1969, 1970 and 1971 (Fig. VI). These concentrations have a geometric mean of 4.5×10^{-15} micro-curies per milliliter. The geometric standard deviation for this plot gives $Sg = \pm .553$. This value represents .0064

percent MPC for natural uranium, .014 percent MPC for Ra 226, .23 percent MPC for thorium 230 and 4.5×10^{-6} percent for Rn-222. No significant impact to the environment should be expected from these concentrations.

[Radium and thorium seepage to be covered after applicant response]

iv. Gaseous-Radioactive Effluents

The emanation of Rn-222 presents the only concern of this type of plant effluent. Its' primary sources are the tailings pile (exposed ore tailing) and the fine ore storage bins. In order to handle boundary concentrations associated with this pollutant, a box model which simulates the uniform mixing, observed to exist from analysis of uranium dust samples, was employed. Calculations show that the maximum concentration that can be expected will be 1.03×10^{-10} micro-curies per milliliter or 3.4 percent of the maximum permissible concentration for an unrestricted area. No adverse effects on the environment should be found from this concentration.

iii. Basis for the Decision that no Environmental Impact Statement Should be Prepared

Though formerly allowed to discharge up to 20 times MPC for Ra in the Colorado River, the applicant has proposed to eliminate all direct discharges to the Colorado River and has offered other proposals to effectively decrease the impact on the

Human Environment. Therefore it has been determined that preparation of an Environmental Impact Statement is not in the best interest of the Atomic Energy Commission. Environmental Project Manager for this case is LeRoy S. Person.

Docket file

APR 12 1974

Docket No. 40-3453

Note to Files

Attached is a draft of a negative declaration and an incomplete environmental appraisal which has been prepared for the proposed modification of the Atlas Uranium Mill at Moab, Utah. The environmental appraisal will be scheduled for completion when the applicant has adequately responded to questions generated by our staff.

R. B. Chitwood, Chief
Technical Support Branch

Distribution
RBChitwood H. Lowenberg
LPerson
L:TS R/F
L:R/F
L:F&M R/F
Docket file 40-3453

OFFICE ➤	L:TS LPerson/icm	L:TS RBChitwood				
SURNAME ➤						
DATE ➤	4/9/74	4/9/74				

Form AEC-318 (Rev. 9-53) AECM 0240 GPO C43 16 81465-1 520-284

APR 12 1974

This Negative Declaration is issued by the U. S. Atomic Energy Commission, Directorate of Licensing, Fuels and Materials, in accordance with 10 CFR Part 51.7 and represents a decision by the Commission not to prepare an environmental impact statement for the re-building of an acid leach circuit and renewal of the source materials license (no. Sua 40-3453) for the Atlas Minerals Uranium Mill in Moab, Utah. The Environmental Impact Appraisal setting forth the basis for this decision is available for public inspection as required by 10 CFR Parts 51.5d and 51.55.

APR 12 1974

I. Description of the Proposed Action

This Environmental Impact Appraisal has been prepared by the U. S. Atomic Energy Commission, Djrectorate of Licensing, Fuels and Materials, in accordance with the Code of Federal Regulations, 10 CFR Part 51.7, and supports the Negative Declaration issued for the proposed modification and reconstruction of an acid leach circuit by the Atlas Minerals Company for the Moab Uranium Mill. The proposed modifications are:

1. Rebuilding the acid leach circuit destroyed by fire.
2. Elimination of the direct discharge to the Colorado River as authorized by the existing license.
3. Increasing the tailings dam height to accommodate plant discharge.

II. Summary Description of the Probable Impacts of the Proposed Action

The Moab Uranium Mill owned and operated by the Atlas Minerals Company is located in Grand County, 3 miles northwest of the city of Moab in the southeastern part of Utah. Coordinates of the site are 38° 35' north latitude and 109° 30' west longitude. The population distribution for a 50 mile radius is shown as Figure I. The main topographic features of the site and access roads are displayed as Figure II.

The chief product of the uranium facility is the oxide - U_3O_8 commonly called "yellow cake." By-products are vanadium as V_2O_5 or "red cake" and a cemented copper product.

The Mill has been receiving uranium bearing ore from 20 to 70 independent shippers since 1956 apd at its peak processed 1700 tons per day. The alkaline circuit has processed up to 1200 tons per day recovering copper and uranium and the acid circuit up to 500 tons per day recovering uranium and vanadium.

In December 1968, a fire in the solvent extraction system of the acid circuit reduced the mill to handling high lime content ores only. Depletion of these high lime ores has lead Atlas to seek reconstruction of their acid circuit in order to process the newly acquired low lime content ores.

In order to process the lower lime ores, several modifications in Atlas' milling process will be made. This appraisal discusses each of these suggested modifications and the changes in effluent concentration associated with these modifications, and provides an evaluation of the probable environmental impact of these effluent levels.

1. Rebuilding the Acid Circuit

   The construction of a new acid circuit will take place in existing mill buildings and should not alter the appearance of the surrounding environs. Figure III is a block diagram showing the new acid circuit with a legend indicating the formerly existing units that will be reinstalled, the new units to be installed and the units that are presently in use. Of these units, those

for washing alkaline and acid tailings are the only units that will be totally new. These units will wash pulp containing uranium and vanadium and require 1170 gallons per minute less water than was required by the former process. One hundred thirty gallons per minute will be necessary to operate three counter current stages of drum filters. Along with this 130 gallons per minute of water, 500 tons per day of raffinate from the acid circuit and 250 tons per day of raffinate from the alkaline circuit will report to the tailings pond. Because of this reduced withdrawl of water from the Colorado River and the reduced operating tonnage. Any adverse impact formerly associated with this circuit will be reduced.

2. Elimination of Direct Discharge to the Colorado River

The present tailings retention system employs 2 purification ponds that precipitate radium from the tailings effluent with barium sulphate. After the barium treatment the effluent is discharged to the Colorado River having been reduced in soluble radium by about 63 percent. This treatment has shown radium removal up to 99 percent depending on the amount of barium chloride added(1).

The new approach proposed by the applicant is to discontinue the discharge of the effluent to the Colorado River. This treated liquid would be returned to an existing settling pond and the supernatant used as make up for the water system. (Possible seepage

of the remaining Ra-226 will be discussed in the section on non-gaseous radiological effluents). Automatic level control of the tailings pond would be maintained by use of a decant system which would reduce the level by decanting liquid into the settling ponds. This modification will eliminate the practice of discharging liquid effluent directly to the Colorado River with the probability of decreasing the environmental impact.

3. Return of Sludge from River Water Treatment Plant to the Tailing Pond

This plant uses a conventional cold lime process. The slurry from the reactivator will no longer be discharged to the Colorado River but will be returned to the tailings pond. When a compartment fills up with solids, after several years of operation, it will be left to evaporate and subsequently the solids will be transferred to the tailings pond Fig. IV. This modification will have two positive effects. The first will be the removal of sludge from the Colorado River and return of the water through natural evaporation. The second will be to place the dried solids on the tailings pond which will decrease the relaxation length for Radon. This length is a measurement of the effective depth that is required for certain type soils in order to decrease the flux of radon from piles[2]. Accumulation of solids from the river water treatment plant will amount to 12 dry tons.

APR 1 2 1974

B. Effluents from the Moab Mill

There are four types of effluent from the Moab Plant. These include Non-Gaseous, Non-Radioactive effluent, Gaseous, Non-Radioactive effluent, Non-Gaseous, Radioactive effluent, and Gaseous, Radioactive effluent.

1) Non-Gaseous, Non-Radioactive Effluents

a) The largest amount of solid non-radioactive effluent from the mill will be in the form of slurried ore which will accrue at an approximate rate of 330,000 tons per year. Part of this material contains reagents used in the milling process. Table I shows the tailings make up.

The sludge from the river water treatment plant will amount to 12 dry tons per year which will also be added to the tailings pile. In order to have the tailings pile blend in with the natural environment, Atlas has agreed to determine the most suitable material in the area to support vegetation, Russian Thistle is now being used and this vegetation will continue to be planted in the soil covering which will be placed on the pile. The applicant has agreed to restrict use of the pile and has already began to blend in the pile with the natural environment. No significant impact is expected from this pile.

b) A very limited amount of dust or particulate matter is expected to cross the plant boundary. Calculations for particulate matter show dust concentrations from the plant stacks should not exceed 6.98×10^{-6} which is a value based on present through put. The mill will reduce through put from the present 1200 tons per day to 750 tons per day and this should result in a decrease in dust concentrations from the stacks. The primary ambient air quality standard for particulate emissions is 75 micrograms per cubic meter. This value represents .95 percent of the standard. No significant impact is expected from these dust concentrations.

ii. Gaseous, Non-Radioactive Effluents

In this category the gases of most concern are carbon monoxide, ammonia, carbon dioxide, sulphur dioxide and hydrogen sulphide.

a) Carbon Monoxide

Carbon Monoxide produced at the mill will come chiefly from the copper cementation process. This release is far short of the Environmental Protection Agency Standard of 10 milligrams per cubic meter. The calculated concentration of carbon monoxide released at the nearest site boundary in the direction of the prevailing wind is 1.9×10^{-9} milligrams per cubic meter. No significant impact is expected from this source.

b) Carbon Dioxide

Carbon dioxide is released at the rate of 102,000 pounds per day and is only a concern as a local nuissance if proper ventilation is not maintained. Much of this gas is removed by use of a wet scrubber and the remainder is vented to the atmosphere. No probable impact will come from this pollutant.

c) Ammonia

Ammonia is added in the autoclaves for alkaline leaching. Monitoring near these autoclaves show little traces of ammonia and stack concentrations are undetectable.

d) Sulphur Dioxide

Oxides of sulphur were tested as SO_2 and this contaminant has as it sources the alkaline leaching tanks, copper cementation tanks, peroxide precipitation tanks, and acid leach tanks. Total emission from these sources result in about 1.8 pounds per day of sulphur dioxides as SO_2 [3]. Calculated site boundary concentrations in the direction of the prevailing wind indicate an average concentration of .0723 micrograms per cubic meter or $.0723 \times 10^{-6}$ ppm. This amounts to .09 percent of the Environmental Protection Agency Standard for primary ambient air quality. It is reported that concentrations of .03 part per million are necessary in order to damage plants [4]. No significant impact is expected from this pollutant.

iii. Non-Gaseous, Radioactive Effluents

Airborne radioactive particulate is in the form of Uranium Oxide and its daughter products that are in secular equilibrium. In order to determine site boundary concentrations for the Moab site a study of uranium dust concentrations from airborne sampling data was necessary since inadequate meteorological data was available for the site. The site itself presented topographical problems because the mill is located in a valley surrounded by cliffs which border the east and west boundaries rising to a height of 4000 feet above mean sea level in some places. Such topographic features leads one to suggest that uniform mixing was the meteorological condition of the valley and that concentrations of airborne materials would show no correlation with distance from the mill with the data following a random distribution. Figure V is a log normal plot of percent of population or probability versus concentration of uranium dust for cumulative years 1968, 1969, 1970 and 1971 which indicates a random distribution is followed. A plot for separate years also shows the decrease in uranium dust concentrations with operating tonnage and shows a fall off of through-put for the years 1968, 1969, 1970 and 1971 (Fig. VI). These concentrations have a geometric mean of 4.5×10^{-15} micro-curies per milliliter. The geometric standard deviation for this plot gives $Sg = \pm .553$. This value represents .0064

percent MPC for natural uranium, .014 percent MPC for Ra 226, .23 percent MPC for thorium-230 and 4.5×10^{-6} percent for Rn-222. No significant impact to the environment should be expected from these concentrations.

[Radium and thorium seepage to be covered after applicant response]

iv. Gaseous-Radioactive Effluents

The emanation of Rn-222 presents the only concern of this type of plant effluent. Its' primary sources are the tailings pile (exposed ore tailing) and the fine ore storage bins. In order to handle boundary concentrations associated with this pollutant, a box model which simulates the uniform mixing, observed to exist from analysis of uranium dust samples, was employed. Calculations show that the maximum concentration that can be expected will be 1.03×10^{-10} micro-curies per milliliter or 3.4 percent of the maximum permissible concentration for an unrestricted area. No adverse effects on the environment should be found from this concentration.

iii. Basis for the Decision that no Environmental Impact Statement Should be Prepared

Though formerly allowed to discharge up to 20 times MPC for Ra in the Colorado River, the applicant has proposed to eliminate all direct discharges to the Colorado River and has offered other proposals to effectively decrease the impact on the

Human Environment. Therefore it has been determined that preparation of an Environmental Impact Statement is not in the best interest of the Atomic Energy Commission. Environmental Project Manager for this case is LeRoy S. Person.