

## MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee

1. Atlas Corporation

3. License number

SUA-917, Amendment No. 22

2. Atlas Minerals Division  
Post Office Box 1207  
Moab, Utah 84532

4. Expiration date

June 30, 1984

5. Docket or  
Reference No.

40-3453

6. Byproduct, source, and/or  
special nuclear material7. Chemical and/or physical  
form8. Maximum amount that licensee  
may possess at any one time  
under this license

Natural Uranium

Any

Unlimited

9. The licensee is hereby authorized to possess byproduct material in the form of uranium waste tailings generated by the licensee's milling operations authorized under SUA-917.
10. Authorized Place of Use: The licensee's uranium milling facility located at Moab, Utah.
11. The average mill throughput shall not exceed 850 MT of barreled  $U_3O_8$  per year.
12. For use in accordance with statements, representations, and conditions contained in Sections 4, 5, and 7 of the licensee's application dated November 18, 1974, and supplements dated August 15 and 28, 1975. Notwithstanding the above, the licensee shall adhere to the statements and representations contained in letters dated, November 1, 1983, February 29, March 7, March 20, April 27 and May 22, 1984. Notwithstanding any conflicting statements in the February 29, 1984 submittal the licensee shall adhere to License Conditions 20, 38, 44, and 46(c) as specified in this license. Whenever the word "will" is used in the above mentioned documents, it shall denote a requirement.
13. Any changes in the effluent control systems, as described in the licensee's submittal dated April 20, 1978 shall require approval by the U.S. NRC in the form of a license amendment.
14. The licensee shall prevent release of airborne particulates from the tailings pile by maintaining water cover over the tailings. If any tailings are not covered by standing water, the applicant shall take measures to minimize dispersal of blowing tailings. The effectiveness of the measures shall be evaluated weekly by means of a documented tailings area inspection.

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15. The tailings impoundment area shall not be expanded by raising the height of the present dam or constructing a new dam without specific prior approval of the NRC obtained through application for amendment of this license.

16. Reclamation phase modifications to Moab Wash shall be as specified in the "Pilot Channel" option of the licensee's submittal dated October 13, 1983 with the following modifications:

- A. The pilot channel bottom shall be sloped at a 1% grade away from the tailings pile (i.e., to the north).
- B. Excavation material shall be used to backfill the entire length of the existing Moab Wash channel, with the fill sloped away from the tailings pile. Any remaining excavation material shall be used to construct a berm on the south side of the pilot channel to increase channel capacity.

In addition, operational phase modifications to Moab Wash shall be maintained in accordance with the licensee's submittal dated October 26, 1982.

17. Mill tailings other than samples for research shall not be transferred from the site without specific prior approval of the NRC obtained through application for amendment of this license. The licensee shall maintain a permanent record of all transfers made under the provisions of this condition.

18. A. Construction of the tailings embankment to elevation 4076 feet shall be in accordance with Appendix B of the submittal "Report of Stability Analyses, 18-Foot Raise of Tailings Embankment to Elevation 4076 Feet, Moab, Utah, for Atlas Minerals" dated June 4, 1981, with the following exceptions:

- 1. Quality control tests shall be performed at the frequencies specified below (ASTM Standard Methods):
  - a) Compaction Test, D-698 - At least five full tests prior to construction using a range of representative borrow soils followed by one-point tests at a frequency of at least one per 5000 cubic yards of fill placed. The family of curves developed from the full compaction tests shall be used in evaluating one-point test data.
  - b) Gradation test, D-422 - At least one test per 5,000 cubic yards of fill placed.
  - c) Nuclear moisture and density tests D-3017 and D-2922, respectively - At least one test per 2,500 cubic yards of fill placed.
  - d) Conventional moisture and density tests D-2216 and D-1556, respectively - Calibration of the nuclear tests specified in (c) above shall be performed using the tests specified in this section prior to beginning construction and at least once per 50,000 cubic yards of fill placed thereafter.

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- e) Additional gradation testing shall be performed if the gradation of material appears to differ significantly from materials previously tested. If the gradation has changed significantly, a full compaction test shall be performed.
  2. Embankment piezometers shall be read at a weekly frequency during construction and until readings have stabilized. Thereafter, piezometers shall be read on a monthly frequency.
  3. A report describing construction activities and containing the results of all quality control testing specified in (1) above shall be submitted to the Uranium Recovery Field Office within six months of completion of construction.
- B. The licensee shall maintain a minimum of six feet of freeboard and 150 feet of beach between the embankment crest and the ponded liquid.
- C. At least ninety days prior to beginning construction, the licensee shall submit to the Uranium Recovery Field Office for review the results of the field and laboratory testing specified below:
1. At least six additional borings with standard penetration tests shall be drilled at, and toward the pond from, the final embankment crest. Three borings shall be located at each of two critical sections. The locations shall extend far enough upstream of the crest to investigate all the soils that could affect the embankment stability. The borings shall penetrate at least to the underlying foundation soils.
  2. In the borings described above and in at least two additional borings on the downstream slope, representative undisturbed fixed piston samples shall be obtained for triaxial compression testing. Samples of both the sand tailings and slime tailings at all depths shall be included. The sampling and handling procedures shall be selected to minimize disturbance and densification. Careful field measurements shall be taken to permit determination of the following data:
    - inside diameter of tube and inside diameter of cutting edge
    - total distance tube is pushed
    - gross length of sample recovered
    - net sample length after trimming
    - distance to sample and/or packer from both ends of tube, before and after handling and transport
  3. Perform consolidated undrained triaxial compression tests to large enough strains to determine post-peak (steady-state) undrained and drained strength parameters for both sand and slime tailings. Perform sufficient tests to determine any variation in strength with distance into the pond, and to define the strength envelopes over the range of consolidation

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stresses on the failure envelopes. Carefully monitor sample length and density during handling, trimming, and consolidation in the laboratory.

4. Evaluate liquefaction potential of soils at and upstream of the crest, based on blowcounts and/or cyclic triaxial test results. Include consideration of the plasticity of the soils, if appropriate. If soils are potentially liquefiable, perform additional analyses to determine effect of liquefaction on overall stability of embankments and pond.
5. Determine appropriate post-peak undrained strengths for seismic analyses from results of triaxial tests using the lower of the undrained or drained strengths. Include appropriate corrections for the density changes between the soil in situ and the samples as-tested. If the strengths determined from these additional tests are lower than the values used in the analyses, perform additional pseudostatic seismic stability analyses at critical sections.

- D. Drainage berms shall be installed over seepage areas on the embankment prior to construction of the lift. These berms shall be graded to protect against piping of the embankment material.
- E. At least ninety days prior to beginning construction, the licensee shall submit to the Uranium Recovery Field Office, USNRC, for review and approval an evaluation of the potential impact of the past disposal of metal drums containing vanadium wastes on the stability of the proposed upstream construction. This evaluation shall include the following:
  1. Information regarding the area and vertical limits of drum placement.
  2. A stability analysis of a section of the upstream constructed embankment located near the disposal area which assumes conservative shear strength values for the waste disposal zone.
  3. A settlement analysis showing the differential settlement resulting from the corrosion and collapse of the metal drums and discussing the impact of the settlement on embankment stability.

In lieu of the above evaluation, the licensee may propose to the Uranium Recovery Field Office corrective actions to eliminate any possible impacts on embankment construction. If this option is chosen, the proposed plan shall be submitted to the Uranium Recovery Field Office for review and approval at least 90 days prior to any planned construction.

19. The licensee is hereby exempted from the requirements of Section 20.203(e)(2) of 10 CFR 20 for areas within the mill, provided that all entrances to the mill are conspicuously posted in accordance with Section 20.203(e)(2) and with words, "Any area within this mill may contain radioactive material."



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20. The licensee shall conduct and document at least one inspection of the tailings embankment per day and shall immediately notify U.S. NRC, Uranium Recovery Field Office, by telephone and telegraph of any failure in the dam retention system or tailings discharge system which results in a release of radioactive material from the tailings system. This requirement is in addition to the requirements of 10 CFR 20.
21. The licensee shall reclaim the Atlas Mill tailings disposal area in accordance with the May 29, 1981 submittal "Report, Conceptual Design and Cost Estimate, Tailings Pile Reclamation, Moab, Utah, for Atlas Minerals." In addition, surety arrangements covering the tailings reclamation costs shall be maintained.
22. The licensee shall decommission the Atlas Mill site in accordance with Section 4.4.1 of the licensee's revised Safety Analysis Report of August 28, 1975 and Attachment No. 1 to SUA-917 "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct or Source Materials," dated September, 1984. A detailed decommissioning plan shall be submitted for NRC review and concurrence at least 12 months prior to planned shutdown of mill operations. In addition, surety arrangements covering the general mill site decommissioning costs shall be maintained.
23. The licensee shall establish an effective, NRC-approved financial surety arrangement, by January 1, 1983, to cover all costs for mill decommissioning, decontamination, and site reclamation and maintain these or other NRC-approved arrangements thereafter until this license is terminated by the NRC.
24. Notwithstanding the provisions of Section 5.5.4 of the licensee's revised Safety Analysis Report of August 28, 1975 and February 29, 1984, the licensee shall comply with the following:
- A. The operating Mill Foreman shall conduct and document a daily visual surveillance of all mill areas to insure proper implementation of good radiation safety practices, including good clean-up practices to minimize unnecessary surface buildup of radioactive particulates. During periods of extended mill shut down (over 30 days) the visual surveillance shall be performed once per week.
  - B. If contamination levels in the lunch rooms, shower rooms, change rooms, or offices exceed the values in Attachment No. 1 to SUA-917, dated September, 1984, the area shall be decontaminated immediately and a study performed to determine the cause of buildup and corrective measures taken to prevent recurrence.
  - C. Prior to leaving the restricted area, all mill employees shall either shower or monitor themselves after changing clothes. If clothing is not changed, then clothing shall also be monitored. An alpha radiation survey meter shall be available at the exit to the Guard House. In addition, the licensee shall perform spot surveys for alpha contamination at least quarterly on workers leaving the plant. Alpha contamination on skin or clothes greater than

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1,000 dpm/100 cm<sup>2</sup> shall be cause for additional showering or decontamination and an investigation by radiation safety staff.

25. The licensee shall minimize dispersal of dust from the ore piles by water sprinkling or other dust suppression techniques, unless a documented weekly inspection indicates that the moisture content of the ore and/or weather conditions are controlling dusting.
26. The air sampling program shall include the collection of air samples during cleanup and maintenance operations as well as during normal operating conditions to demonstrate that employee exposures to airborne radioactivity concentrations are maintained as low as reasonably achievable in accordance with Section 20.1(c) to 10 CFR 20.
27. Radiation monitoring equipment shall be calibrated after repairs and at least semiannually or at the manufacturer's suggested interval, whichever is sooner, and checked for proper operation using a radiation source prior to use. Air sampling equipment shall be calibrated after repairs and at least quarterly or at the manufacturer's suggested interval, whichever is sooner, and flow rates checked prior to use.
28. All mill radiological and environmental monitoring, bioassay, employee exposure evaluations, sampling, sample analysis, equipment calibration and related quality control programs shall be controlled by written procedure and shall be reviewed and revised every two years or as necessary by the Mill Superintendent and the Radiation Safety Officer.
29. Before engaging in any activity not previously assessed by the NRC, the licensee shall prepare and record an environmental evaluation of such activity. When the evaluation indicates that such activity may result in a significant adverse environmental impact that was not assessed, or that is greater than that assessed in the Final Environmental Statement (NUREG-0453), the licensee shall provide a written evaluation of such activities and obtain prior approval of the NRC for the activity.
30. Prior to disturbing any presently undisturbed soils for mill related activities (including borrow areas for tailings reclamation cover) in the future, the licensee shall have an archeological survey conducted of the site(s) to be disturbed. The Utah State Department of Development Services and the U.S. Department of the Interior shall be contacted by the licensee prior to the survey to provide assistance or comment in planning such a survey. The completed survey shall be submitted to the U.S. NRC for review and NRC approval to proceed shall be obtained prior to any disturbance of presently undisturbed areas.
31. If unexpected harmful effects or evidence of irreversible damage not otherwise identified in NUREG-0453 dated January 1979 are detected during construction or operations, the licensee shall provide to the NRC an acceptable analysis of the problem and a plan of action to eliminate or significantly reduce the harmful effects or damage.

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32. The licensee shall insure that the automatic sprinkler system and the foam application system installed in the solvent extraction area are maintained in an operational condition to provide control over solvent fires in storage tanks. In addition, the licensee shall insure that personnel involved in operational or emergency duties in the solvent extraction system area are trained in the operation of the emergency systems installed.
33. Release of equipment or packages from the unrestricted area shall be in accordance with Attachment No. 1 to SUA-917 "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct or Source Materials" dated September, 1984.
34. An existing on-site catchment basin west of the S-X units shall be lined and the area graded so that any spillage of chemicals from hazardous chemical storage tanks will be contained in this basin. The basin shall be maintained and emptied as required to assure it is effective. Any storage tanks containing hazardous chemicals which are not located within the graded area shall be surrounded by individual containment dikes.
35. Notwithstanding the provisions of Section 5.5.5.1 of the licensee's safety analysis report revised August 28, 1975, the licensee shall implement the environmental monitoring programs specified in letters dated November 1, 1983, February 29, March 7, March 20, April 29 and May 22, 1984.
36. The licensee shall maintain sufficient records to furnish evidence of compliance with the radiological and environmental surveys and controls required by this license. Unless otherwise specified in NRC regulations, all such documentation shall be maintained for a period of at least five years.
37. The licensee shall conduct an annual survey of land use (grazing, residence, wells, etc.) in the area within two miles of the mill and submit a report of this survey annually to the U.S. NRC, Uranium Recovery Field Office. This report shall indicate any differences in land use from that described in the licensee's Environmental Report of August 31, 1973, and supplements or the previous annual report. The first annual report shall be submitted by March 1980, and by March each year thereafter.
38. The licensee shall conduct a monitoring program to determine if small animals on the mill site have experienced a buildup of arsenic in their edible tissues. If elevated arsenic levels, compared to animals from background locations, are found in small mammals on the site, the licensee shall analyze the potential impacts to raptors which may prey on the animals from the site and provide a report to the NRC that addresses the arsenic levels found, the predicted impacts, and monitoring and other measures required to mitigate any impacts to local raptor populations.
39. The licensee shall compare the quarterly results of chemical and radiological analysis of the ground water down gradient from the tailings impoundment semi-annually to determine if identifiable trends of increasing contamination exist

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down gradient from the impoundment. A report of the comparison including copies of the data used will be included in the environmental data required by Condition 40 of this license.

40. The results of the effluent and environmental monitoring programs required by this license shall be reported in accordance with 10 CFR 40, Section 40.65 with copies of the report sent directly to the U.S. NRC, Uranium Recovery Field Office. In addition, the report shall also include a correlation of environmental radon monitoring data with meteorological data (wind speed and direction) during the time of sampling. Data from the effluent and environmental monitoring program shall be reported in accordance with the format in Attachment No. 2 to SUA-917, entitled "Sample Format For Reporting Monitoring Data."

41. Operations shall be immediately suspended in the affected areas of the mill if any of the emission control equipment for the ore crushing and sampling areas or the yellowcake drying or drumming areas specified in the licensee's submittal dated April 20, 1978, is inoperative. Should any of the emission control equipment for the ore feed area be inoperative, that area shall be immediately declared a respirator-only area and shall remain so until the equipment failure has been repaired. During any period in which the emission control equipment in the ore feed area is inoperative, licensee shall increase the frequency of airborne particulate sampling for natural uranium to one (1) time per day. Daily sampling in the ore feed area shall continue until emission control equipment is again operative. If the emission control equipment for the ore feed area is inoperative for a period exceeding one (1) month, all operations shall be suspended in this area unless written authorization to continue operations is requested and obtained from the NRC.

Exposures to workers that occupy the ore feed area during periods when emission control equipment is inoperative shall be based on the daily airborne particulate samples.

42. The licensee shall install, by April 1, 1981, a new scrubber unit for the yellowcake hearth dryer exhaust. The replacement scrubber shall have a design efficiency of at least 99% removal of particulates in the 1 to 2um particle size range.

The licensee shall, during all periods of yellowcake dryer operations, assure that the scrubber is operating within the manufacturer's recommended ranges for water flow and air pressure differential necessary to achieve design performance. These operational checks may be accomplished by either performing hourly checks on the scrubber unit or installing remote instrumentation that will signal an audible alarm in an occupied area of the mill or offices. If an audible alarm is used its function shall be checked daily. All hourly checks of the scrubber unit or daily checks of the alarm system shall be documented. Drying operations shall be immediately suspended if the water flow or air pressure differential fall below specified levels.

43. The licensee shall follow the lower limits of detection (LLD) contained in Attachment No. 3 to SUA-917 "Lower Limits of Detection (LLD) for Sample



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Analysis" for the analysis of samples collected pursuant to the Environmental Monitoring Program of License Condition 35.

44. The licensee shall implement the embankment inspection program as specified on pages 8-1, 8-2, and 8-3 of their submittal "Response to NRC Requests for Additional Information, Proposed Tailings Embankment Raise, Moab, Utah, for Atlas Minerals," dated May 17, 1982. In addition to the above program, the licensee shall comply with the following:

- A. Embankment piezometer readings and pond elevation readings shall be maintained in graphical form.
- B. An annual technical evaluation of embankment performance, including reviews of all embankment instrumentation data, shall be performed by an individual familiar with the design, construction and operation of embankments. A copy of this annual report shall be submitted to the Uranium Recovery Field Office within one month of completion.

45. The licensee shall sample new monitor wells ATP-2-S-82, ATP-2-D-82, MW-1-R and MW-2-R on a quarterly basis. New well ATP-3-82 shall be sampled monthly for the first three months and quarterly thereafter.

All samples shall be analyzed for U-nat, Ra-226, Th-230, Pb-210, Po-210, Cl, SO<sub>4</sub>, NO<sub>3</sub>, As, Se, TDS, conductivity and pH. Data from the groundwater sampling program specified above shall be included in the reports required by Condition No. 40 of this license.

46. Notwithstanding any statement to the contrary in Section 5 of the licensee's revised Safety Analysis Report (SAR) dated August 28, 1975, the licensee shall comply with the following:

- A. The line of authority between the Radiation Safety Coordinator (Mill RSO) and the individual onsite with the final responsibility for site operations shall not include any positions having production responsibilities. In addition, the responsibilities of the positions of Radiation Safety Supervisor and General Superintendent as specified in Section 5.5.3 of the licensee's revised SAR of August 28, 1975 shall be assumed by the Radiation Safety Coordinator (RSO) and the Regulatory Affairs Manager, respectively.
- B. The RSO shall be responsible for all aspects of the mill radiation safety program and shall have the following minimum qualifications:
  - 1. A bachelor's degree in the physical sciences, industrial hygiene, or engineering from an accredited college or university, or equivalent relevant experience in uranium mill radiation protection. Two years of relevant experience shall be considered equivalent to one year of education.

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2. At least one year of work experience in applied health physics or radiation protection.
3. At least four weeks of specialized training in health physics applicable to uranium milling, followed by refresher training every two years.

C. An audit committee which includes the RSO shall perform a comprehensive annual audit of the mill radiation protection program, and shall prepare a report documenting the audit for distribution to the President of Atlas Minerals and the U.S. Nuclear Regulatory Commission, Uranium Recovery Field Office. The audit report shall address all items listed in Section 2.3.3 of Regulatory Guide 8.31 entitled "Information Relevant to Ensuring That Occupational Radiation Exposures at Uranium Mills Will Be As Low As Is Reasonably Achievable," and shall also summarize environmental monitoring data and discuss trends in the data.

D. The licensee shall implement the program specified in Section 10.7 of their report "Radiation Safety Procedures Manual for Atlas Minerals Uranium Mill, Moab, Utah," submitted by letter dated December 4, 1981.

47. The installation of the ion exchange column at the Velvet Mine shall be in accordance with pages 17 and 18 of the licensee's submittal dated November 1, 1983, with the exception that sampling for airborne uranium shall be performed at least monthly.

48. The licensee shall not dispose of materials other than uranium mill tailings, spent resins, raffinate, vanadium waste residues, or liquid sanitary wastes in the tailings pond or beach without the specific authorization of the Uranium Recovery Field Office, USNRC. If liquid sanitary wastes are to be discharged to the tailings pond, written authorization shall first be obtained from the Utah Bureau of Water Pollution Control. A copy of the written authorization shall be submitted to the Uranium Recovery Field Office prior to the discharge of the liquid sanitary wastes.

The licensee is authorized to dispose of by-product contaminated solid wastes in the sump collection pond resulting from Atlas' Moab Milling Activities as described in the licensee's submittal dated February 29, 1984. Notwithstanding statements to the contrary, the licensee shall submit to NRC for review and approval in accordance to License Condition 18(E) a detailed analyses to dispose of any wastes in the tailings pond other than those approved in this condition.

49. The licensee shall implement a ground water detection monitoring program to ensure compliance to 40 CFR 192.32(a)(2) which includes the following elements:

A. The licensee shall monitor at the temporary point of compliance and background wells for the following indicator parameters: Arsenic, Selenium and pH. The licensee shall utilize analytical techniques capable of providing lower limits of detection of 0.005 mg/l and 0.001 mg/l for arsenic and

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selenium, respectively. Measurements of pH shall be reported to the nearest 1/10 standard unit.

- B. The determination of compliance shall be based upon sampling Well MW-3.
- C. The determination of background levels for the parameters specified in subsection (A) shall be defined by sampling Well ATP-3.
- D. The licensee shall sample for those parameters specified in subsection (A) at those wells designated in subsections (B) and (C) on a monthly basis for a period of one (1) year and at least twice annually thereafter. The first monthly sample shall be taken within 30 days of the date of this Order. All semiannual samples shall be taken at least four months apart.
- E. The licensee shall, within 60 days of collection of the last of the twelve monthly samples, propose for USNRC review and approval in the form of a license amendment background levels for indicator parameters and a statistical procedure for identifying significant changes (95% confidence level) between data from the wells specified in subsections (B) and (C).
- F. The licensee shall report the data required by subsection (D) semiannually along with those data required by License Condition No. 40 in accordance to the reporting format, Attachment No. 4 to SUA-917, "Sample Format for Reporting Detection Monitoring Data." These monitoring requirements are in addition to the requirements specified in License Condition No. 35.
- G. The licensee shall report at least annually in accordance to reporting requirements specified in subsection (F) the rate and direction of ground water flow under the tailings impoundment.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date JUL 19 1985

BY /s/  
R. Dale Smith, Director  
Uranium Recovery Field Office  
Region IV, Denver, CO

OFC :	URFO :	URFO :	RIV :	ELD :	:	:
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Docket File 3453  
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URFO:GRK  
 Docket No. 40-3453  
 SUA-917, Amendment No. 21  
 04003453491E

MEMORANDUM FOR: Docket File No. 40-3453

FROM: Gary R. Konwinski, Project Manager  
 Licensing Branch 2  
 Uranium Recovery Field Office, RIV

SUBJECT: AMENDMENT NO. 21 TO SOURCE MATERIAL  
 LICENSE SUA-917 FOR ATLAS MINERALS  
 MOAB MILL

By letter dated September 28, 1984, Atlas Minerals submitted the details of their proposed detection monitoring program in response to URFO's July 10, 1984 letter outlining the staff's criteria for an acceptable detection monitoring program as detailed in 40 CFR 192. The July 10 letter informed Atlas that their existing groundwater monitoring program at that time did not appear to meet NRC staff criteria 6 and 7. The purpose of this memorandum is to review Atlas' proposed detection monitoring program against the staff-developed acceptance criteria and make recommendations for licensing action to implement this program.

Criterion 1

The program must be reliable in indicating the presence of hazardous constituents in the uppermost aquifer under the impoundment. Reliable indication shall be based on the analyses of ground water samples for specified chemical-physical parameters, waste constituents, or reaction products that are reliable indicators of the leakage of hazardous constituents disposed in the impoundment.

Atlas currently monitors 14 ground water parameters. These parameters include highly mobile ions which are used in the mill circuit for the

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extraction of uranium, are concentrated in the tailings pond liquor above background level in the ground water and therefore represent reliable indicators of the presence of tailings impoundment seepage. A review of existing water quality data indicates that all wells downgradient from the tailings impoundment show some elevation in levels of the mobile ions above normal background levels. The staff concludes that tailings impoundment seepage is actively occurring at this site.

In their submittal, Atlas did not propose to monitor any specific indicator species, but chose rather to monitor all those constituents which are currently part of their environmental monitoring program. The staff has determined in its previous generic review document that arsenic, selenium and pH be monitored as indicator species at all mills. These parameters are considered to be good indicators of seepage that has a high probability of containing hazardous constituents. The staff desires to utilize a minimum yet adequate number of indicators to monitor for the probable occurrence of hazardous constituents. Therefore, the staff will limit reporting of indicator species to Arsenic, Selenium and pH. Although some data exists for these species (Table 1), continued monitoring will be necessary for these species to develop an adequate data base to accurately assess changes in ground water quality.

#### Criterion 2

The program must provide samples representative of the ground water passing under the impoundment at the point of compliance. Representative samples shall be determined by the sufficiency in number of sampling wells and the adequacy of their locations, including depths, with respect to the uppermost aquifer and its direction(s) of flow. Point of compliance is specified to provide prompt indication of leakage from the impoundment should it occur.

Atlas does not currently have in place true point of compliance wells. As seepage has already been detected at the site, the staff has concluded that true point of compliance wells are not necessary at this time. Temporary point of compliance wells will therefore be designated.

In their submittal, Atlas did not propose a temporary point of compliance well. However, they do have several wells which will function for this purpose. Based on a review of available data, Well MW-3 was chosen as a temporary point of compliance well. This well is hydrologically downgradient of the tailings management system, samples the surficial

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TABLE 1, ATLAS MINERALS MOAB MILL MILL WATER QUALITY DATA

MW3 - Temporary Point of Compliance Well

<u>Date</u>	<u>Indicator Species</u>		
	<u>As(mg/l)</u>	<u>Se(mg/l)</u>	<u>pH(units)</u>
1084	.005	-.002	6.9
0984	-.001	.017	7.0
0584	.006	.021	7.7
0284	-.005	.012	7.3
0184	.002	.017	7.2
1083	.07	.11	7.3
0683	.006	.003	7.1
0383	-.001	-.002	7.2
1082	-.001	.007	7.2
0682	.01	-.01	7.3
0382	-.1	-.5	7.3
0182	-.1	-.01	7.1

ATP3 - Background Well

<u>Date</u>	<u>Indicator Species</u>		
	<u>As(mg/l)</u>	<u>Se(mg/l)</u>	<u>pH(units)</u>
1184	-.001	-.001	8.1
0984	-.001	-.005	7.9
0284	.005	.001	7.8
0184	.002	-.005	7.8
1083	.03	.21	7.9
0683	-.002	.005	7.4
0383	-.001	-.002	7.7
1082	-.004	-.006	7.7
0682	-.01	-.01	7.9
0382	-.1	-.5	7.7

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- When a concentration is preceded by a -, this indicates that the indicator species was undetectable at this lower limit of detection.

aquifer in contact with the tailings impoundment and has the greatest data base.

### Criterion 3

The program must include sampling locations suitable to determine background levels of monitored parameters and constituents and to detect leakage of hazardous constituents from the impoundment should it occur. Suitability of sampling locations shall be determined by the placement of sampling wells upgradient (background) and downgradient (leakage) of the surface impoundment.

Atlas proposed to use Well ATP-3 as a background well. It is located upgradient of the tailings management system, completed in an appropriate portion of the aquifer and is representative of background water quality. The staff therefore recommends that Well ATP-3 be designated as the background well.

### Criterion 4

The program, to be fully operational, must have available reliable data on background levels of monitored parameters and constituents, or a procedure implemented for determining background levels of monitored parameters and constituents.

As indicated in the staff review under Criterion 1, Atlas has a limited data base developed for the background well. The data base consists of 2 years of sampling for the recommended indicator species. However, few absolute numbers exist. Over 50 percent of the samples designate less than specified lower limit of detection. Due to this, an adequate statistical base can not be developed for the indicator species at this time. Although Atlas currently monitors on a quarterly frequency, the staff recommends that sampling for arsenic, selenium and pH be done on a monthly frequency for the initial year of sampling in order to establish baseline levels of the indicators in a reasonably short time. This will allow for a more complete data base to be developed.

The staff further concludes that sampling include sampling and analysis for arsenic, selenium and pH on the above frequency with a lower limit of detection for arsenic of 0.005 mg/l and 0.001 mg/l for selenium. Measurements of pH shall be reported to the nearest 1/10 standard unit.

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Criterion 5

The program must provide for analyses of ground water samples from all monitoring wells at a frequency of at least twice each twelve month period, where the first and last samples at any wells are spaced at least four months apart in that twelve month period. All monitoring wells means all background (upgradient) and all leakage detection (downgradient) sampling locations.

Atlas currently monitors their wells on a quarterly frequency. The staff recommends that this frequency be upgraded to monthly for the initial year of sampling of the indicators (as discussed in Criterion 4) and twice annually thereafter. This will not result in any increases in ground water sampling frequency beyond the initial one year period.

Criterion 6

The program must include determination of the rate and direction of ground water flow in the uppermost aquifer under the impoundment at a frequency of at least once each twelve month period.

In the original review of Atlas' proposed detection monitoring program, Criterion 6 was not adequately addressed. The staff therefore finds that Atlas should comply with Criterion 6 by determining rate and direction of ground water flow at least annually.

Criterion 7

The program must provide for the identification and reporting of statistically significant increases above background levels of monitored parameters and constituents in ground water samples. Statistically significant increases shall be based on factors such as: variability and values of background levels of monitored constituents and parameters, accuracy of analytical methods, limits of detection of analytical methods, and the number of samples.

In the original review of Atlas' ground water monitoring program, Criterion 7 was not adequately addressed. In their September 28, 1984 submittal, Atlas proposed to continue to use previous trend analysis as a statistical procedure. This procedure as defined in their submittal does not have a defined statistical procedure for defining statistically

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significant changes in monitored parameters. The staff therefore concludes that Atlas should collect data from the wells in the detection monitoring program on a monthly frequency for a period of one year. Upon the conclusion of the initial year of data collection Atlas should propose background levels for indicator parameters. The staff further concludes that based upon a review of this data, Atlas should propose a statistical procedure for identifying significant changes between data from the point of compliance wells and the data from the background wells at a 95% confidence level.

Based upon the above discussion, the staff recommends that SUA-917 be amended by adding a new License Condition No. 49 to read as follows:

49. The licensee shall implement a ground water detection monitoring program to ensure compliance to 40 CFR 192.32(a)(2) which includes the following elements:
  - A. The licensee shall monitor at the temporary point of compliance and background wells for the following indicator parameters: Arsenic, Selenium and pH. The licensee shall utilize analytical techniques capable of providing lower limits of detection of 0.005 mg/l and 0.001 mg/l for arsenic and selenium, respectively. Measurements of pH shall be reported to the nearest 1/10 standard unit.
  - B. The determination of compliance shall be based upon sampling Well MW-3.
  - C. The determination of background levels for the parameters specified in subsection (A) shall be defined by sampling Well ATP-3.
  - D. The licensee shall sample for those parameters specified in subsection (A) at those wells designated in subsections (B) and (C) on a monthly basis for a period of one (1) year and at least twice annually thereafter. All semiannual samples shall be taken at least four months apart.
  - E. The licensee shall, within 60 days of collection of the last of the twelve monthly samples, propose for USNRC review and approval in the form of a license amendment background levels for indicator parameters and a

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statistical procedure for identifying significant changes (95% confidence level) between data from the wells specified in subsections (B) and (C).

- F. The licensee shall report the data required by subsection (D) semiannually along with those data required by License Condition No. 40 in accordance to the reporting format, Attachment No. 4 to SUA-917, "Sample Format for Reporting Detection Monitoring Data." These monitoring requirements are in addition to the requirements specified in License Condition No. 35.
- G. The licensee shall report at least annually in accordance to reporting requirements specified in subsection (F) the rate and direction of ground water flow under the tailings impoundment.

/s/

Gary R. Konwinski, Project Manager  
Licensing Branch 2  
Uranium Recovery Field Office, RIV

/s/

Approved by:

Harry J. Pettengill, Chief  
Licensing Branch 2  
Uranium Recovery Field Office, RIV

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