QUALITY CONTROL PROGRAM
FOR
ATLAS MINERALS URANIUM MILL
MOAB, UTAH

(Source Materials License No. SUA-917)

Submitted by Noel Savignac, Consultant, May 1981

The quality control program described below is a planned, systematic, and documented program for quality control of the effluent and radiological monitoring program at Atlas Minerals uranium mill near Moab, Utah. The program is submitted to the NRC in compliance with license condition 50A which states:

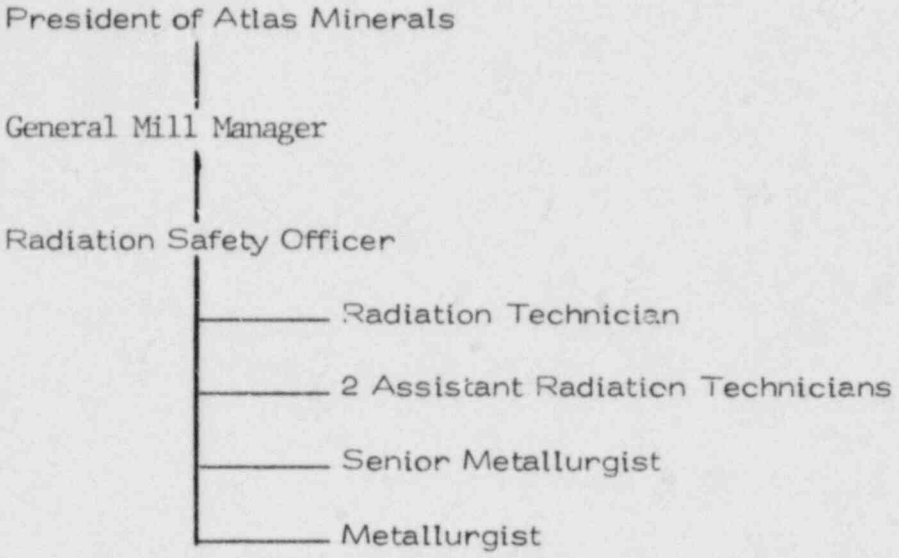
"The licensee shall submit the following information to the Uranium Recovery Licensing Branch, U. S. Nuclear Regulatory Commission, Washington, D.C. 20555, by June 1, 1981, for NRC review and approval prior to implementation:

A. Specifications for a quality assurance program. Regulatory Guide 4.15, "Quality Assurance for Radiological Monitoring Programs (Normal Operations) - Effluent Streams and the Environment" may be followed by the licensee in submitting its specifications; or the licensee may provide specifications for an equivalent quality assurance program."

The quality control program at Atlas Minerals mill is based on recommendations contained in Regulatory Guide 4.15. Additional details of the program are presented in the quality assurance section of Atlas Minerals Radiation Procedures Manual.

Organizational Structure

The organization chart for personnel at the mill is maintained in the mill personnel office. The current organization of the radiation protection staff is:



At Atlas Minerals the Radiation Safety Officer also serves as the Environmental Chemist in charge of the environmental laboratory. He has both the authority and responsibility to insure that the Qualtiy Control Program is conducted as outlined in this document.

Personnel Qualifications

The qualifications and education of each employee at the mill are contained in the employee's personnel file. Upon initial employment each

employee at the mill receives an introductory radiation and quality assurance orientation. Subsequent training sessions are conducted through the mill safety program where current radiation safety and quality control problems are addressed.

Operating Procedures

Written radiation safety procedures are maintained in the radiation safety office. Those procedures are revised as specified in the Source Materials License No. SUA-917, condition 29, which states:

> "All mill radiological and environmental moritoring, 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."

Records

Records to be maintained in the monitoring program and the quality assurance program are documented in the radiation safety procedures. The quality control records include:

A. Measurements of radioactive check sources
B. Measurements of calibration sources
C. Measurements of backgrounds
D. Measurements of blank samples
E. The preparation of working standards, and
F. The calibration of analytical balances.

These records are maintained for at least a year to allow for review

by NRC inspectors. The final results of the monitoring program are forwarded to the NRC at a minimum every six (6) months and maintained as specified in Source Materials License SUA-917, condition 38, which states:

> "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."

Sampling

Sample collection procedures are documented in the radiation safety procedures maintained in the radiation safety office. Sampling procedures are reviewed and updated as needed to incorporate new developments in sampling technology.

Standards

Radionuclide reference standards are used to determine instrument counting efficiencies for specific radionuclides, usually daily or before each use of the instruments to insure that the instruments are operating properly. These standards are obtained from commercial vendors and are traceable to NBS standards or the equivalent.

Radiation Measurement Performance Checks

Background measurements for radiation detection instrumentation are made frequently, usually daily or before each use of the instruments to

insure background levels are within the expected ranges.

As an objective in the environmental laboratory, quality control samples account for at least 5%, and typically 10% of the analytical load.

As a check on the accuracy of the measurements performed, the mill environmental laboratory participates in the EPA environmental radiological laboratory comparison studies (cross-check) program or an equivalent program. This program provides an independent outside verification of the accuracy of the analyses being performed in the laboratory as well as a verification of the computational methods used in a laboratory.

Effluent Monitors

Continuous effluent monitoring systems are calibrated on a system-by-system basis at the frequency specified in the radiation safety procedures. The frequencies depend in part on the reliability of the continuous effluent monitoring systems involved.

Data Review

At a minimum the data from sample analyses and from quality control analyses are reviewed and examined prior to the submission of each semi-annual effluent report. In practice this review and examination process occurs daily during the routine analyses of all samples.

Audits

Atlas Minerals conducts audits of its radiation safety and quality

assurance programs using independent qualified personnel. In addition, the NRC will perform "team appraisals" as specified below in the April 8, 1981, letter to Atlas Minerals from Victor Stello of the NRC:

"This is to inform you that during 1981, the NRC will be performing special team appraisals at NRC-licensed operating uranium mills. The purpose of this special effort is to evaluate the overall adequacy and effectiveness of the licensed health and safety program. In so doing, the teams may identify areas of significant inadequacies in addition to items of noncompliance. You will be expected to respond to all such findings which will be identified during the exit meeting and documented in the appraisal report.

The special team appraisal will be performed in lieu of the routine inspection of your facilities. The team will be composed of both NRC personnel and contractor personnel who will be acting as representatives of the NRC. Each team will include an IE inspector from the NRC Region IV Office as team leader, one or two contractor professional health physicists, and, in some instances, other members from the NRC staff. The on-site phase of this appraisal will require approximately one week. Each operating uranium mill will be notified by the Regional Office several weeks in advance of the arrival of the appraisal team on-site. The scope of these appraisals will include Organization and Training, Exposure Control, Facilities and

Equipment, and Effluent Controls and Environmental Monitoring.

You are requested to provide your full cooperation to the team during the performance of the uranium mill appraisal. As part of this cooperation, it is expected that the appraisal team will be permitted unfettered access to the facility.

We appreciate your cooperation. Should you have any questions concerning these special team appraisals, please contact the NRC Regional Director."

SOURCE MATERIALS LICENSE NO. SUA-917

AMENDMENT NO. 5, ITEM 51

"Lower Limits of Detection for Sample Analysis"

Submitted by Noel Savignac - May, 1981

Table I, column 6, presents the lower limits of detection (LLD) for sample analyses in the environmental laboratory at Atlas Minerals uranium mill in Moab, Utah. The parameters used to calculate the LLDs, the NRC recommended LLDs, and typical analytical results are presented in the other columns.

Atlas Minerals requests that the NRC review and approve Atlas's LLDs with the following stipulations:

1. Atlas Minerals can submit LLDs for Pb-210 in air, water and vegetation for subsequent approval when those analyses are performed in their own environmental laboratory as opposed to an outside commercial lab.
2. Atlas Minerals can submit LLDs for Th-230 or Po-210 in vegetation if these parameters are required in the sampling and monitoring program.
3. Atlas Minerals can submit LLDs for uranium when the NRC indicates a preferred method of calculating LLDs for flourometric analyses. Regulatory Guide 4.14 only presents LLD calculational methods for radionuclide activity determinations which are based on Poisson distribution statistics. Thus the method in Regulatory Guide 4.14 does not apply to flourometric determinations of uranium.

TABLE I

ATLAS MINERALS LOWER LIMITS OF DETECTION

Radionuclide Medium	Sample Volume in ml	Total Counts back-ground	Total Time back-ground in Minutes	Overall Efficiency	Atlas LLD in $\frac{\mu Ci}{ml}$	NRC LLD in $\frac{\mu Ci}{ml}$	Typical Low Analytical Result in $\frac{\mu Ci}{ml}$
Th-230, or Ra-226 in air	1.05×10^{6}(a)	10	30	0.36(b)	6×10^{-13}	1×10^{-16}	$< 6 \times 10^{-13}$
Pb-210 in air	NA(c)	NA(c)	NA(c)	NA(c)	NA(c)	2×10^{-15}	4×10^{-15}
Rn-222 in air	1400	1	30	0.59	2×10^{-10}	2×10^{-10}	2×10^{-10}
Th-230, or Ra-226 in water	1000	10	30	0.36(b)	6×10^{-10}	2×10^{-10}	8×10^{-10}
Po-210 in water	250	10	30	0.36(b)	3×10^{-9}	1×10^{-9}	$< 3 \times 10^{-9}$
Pb-210 in water	250(c)	10(c)	30(c)	0.36(b)(c)	3×10^{-9}(c)	1×10^{-9}	3×10^{-9}
Th-230, or Ra-226 in soil	3g	10	30	0.36(b)	2×10^{-7}	2×10^{-7} µCi/g	2×10^{-6} µCi/g
Th-230, or Po-210 in vegetation	Not required under current sampling and monitoring program						
Ra-226 vegetation	1 kg(c)	10(c)	30(c)	0.36(b)(c)	6×10^{-7} µCi/kg(c)	5×10^{-8} µCi/kg	$< 6 \times 10^{-7}$ µCi/kg
Pb-210 in vegetation	NA(c)	NA(c)	NA(c)	NA(c)	NA(c)	1×10^{-6} µCi/kg	1×10^{-3}

(a) Sample volume based on 40 l/min. for one calendar quarter and the analysis of 20% of the sample.

(b) Overall efficiency calculated by (chem. eff. = 0.85)(instrument eff. = 0.42) = 0.36

(c) Analyses are currently performed by a commercial laboratory. Values presented are estimates.