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R. F. HOLLIS
 Vice President - Milling

Moab, Utah

March 29, 1965

1965 MAR 31 PM 3 43

J. S. ATOMIC ENERGY COMM.
 REGULATORY
 MAIL SECTION

Mr. Donald A. Nussbaumer, Chief
 Source and Special Nuclear Materials Branch
 Division of Licensing and Regulation
 United States Atomic Energy Commission
 Washington 25, D.C.

Dear Mr. Nussbaumer:

This report is submitted in accordance with the conditions of the April 7, 1965, amendment to Source Material License Number R-161, reference DLR:DFH 40-3453.

The results of the surveys required by the amendment are contained in the following enclosed tables:

- Table I - Tailings Pond Effluent Survey
- Table II - Colorado River Survey (Radionuclides)
- Table III - Colorado River Survey (Flowrates)

Our sampling, measuring, and decontamination programs are still as outlined in our letter dated January 27, 1964. We have been quite successful in removing radium-226 from the tailings pond effluent and are discharging concentrations which meet current 10 CFR 20 specifications.

On about July 1, 1965, a copper recovery circuit will be added to the present system. Sulfuric acid will be used to extract the copper and uranium values from a portion of the ore treated and will introduce some mildly acid solution into the feed to the tailings pond, which may change the character of the final effluent. Also, we are now receiving ores from mines which until recently were shipped to the Mexican Hat and Salt Lake City mills. We have not yet processed enough of these ores to know the extent to which they will affect the concentration of radionuclides in the effluent.

In order to evaluate the effects of these changes on the tailings pond effluent, we request that an amendment subject to the same conditions and limitations as the amendment now in effect be granted.

Very truly yours,

R. F. Hollis
 R. F. Hollis
 Vice President - Milling

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ACKNOWLEDGED

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TABLE I

Tailings Pond Effluent Survey for 1964 - Moab Mill

| <u>1964</u> <u>Month</u> | <u>Effluent Flowrate</u> <u>(GPM)</u> | <u>Ra 226</u> <u>(Nx10⁻⁸ uc/ml)</u> | <u>Th 230</u> <u>(Nx10⁻⁶ uc/ml)</u> | <u>U Natural</u> <u>(Nx10⁻⁵ uc/ml)</u> |
|---------------------------------|------------------------------------------|---------------------------------------------------|---------------------------------------------------|------------------------------------------------------|
| January | 1043 | 0.19 | 0.011 | 0.26 |
| February | 1040 | 2.49 | 0.081 | 0.17 |
| March | 1285 | 0.62 | 0.030 | 0.13 |
| April | 1366 | 1.06 | 0.014 | 0.11 |
| May | 1280 | 5.30 | 0.011 | 0.14 |
| June | 1080 | 0.74 | 0.016 | 0.17 |
| July | None ^{1/} | - | - | - |
| August | 641 | 0.25 | 0.014 | 0.23 |
| September | 504 | 0.19 | 0.015 | 0.11 |
| October | 630 | 0.48 | 0.018 | 0.11 |
| November | 918 | 0.62 | 0.033 | 0.09 |
| December | <u>943</u> | <u>0.50</u> | <u>0.031</u> | <u>0.06</u> |
| Average Flowrate 894 | | | | |
| Weighted Average Concentrations | | 1.32 | 0.025 | 0.14 |

- ^{1/} The absence of a discharge during the month of July resulted from the annual shutdown beginning the last week of June. Since July the mill has operated at a reduced tonnage rate which resulted in lower flow rates during the last six months. In March, 1965, the tonnage rate was increased to a point between that of the first six months and the last six months. It is estimated that the discharge rate during 1965 will be about 1000 gpm.

TABLE II

Colorado River Radionuclide Survey for 1964 - Moab MillJANUARY

| <u>Sampling Station</u> | <u>Radium 226</u> <u>$\text{Nx}10^{-8}$ uc/ml</u> | <u>Thorium 230</u> <u>$\text{Nx}10^{-6}$ uc/ml</u> | <u>Natural Uranium</u> <u>$\text{Nx}10^{-5}$ uc/ml</u> |
|-------------------------|-----------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------|
| 1 mile above mill | 0.08 | 0.010 | 0.0006 |
| 1/4 mile below mill | 0.07 | 0.014 | 0.017 |
| 1/2 mile below mill | 0.06 | 0.013 | 0.014 |
| 1 mile below mill | 0.07 | 0.009 | 0.002 |
| 5 miles below mill | 0.05 | 0.012 | 0.009 |
| 10 miles below mill | 0.07 | 0.011 | 0.006 |

FEBRUARY

| <u>Sampling Station</u> | <u>Radium 226</u> <u>$\text{Nx}10^{-8}$ uc/ml</u> | <u>Thorium 230</u> <u>$\text{Nx}10^{-6}$ uc/ml</u> | <u>Natural Uranium</u> <u>$\text{Nx}10^{-5}$ uc/ml</u> |
|-------------------------|-----------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------|
| 1 mile above mill | 0.06 | 0.011 | 0.0002 |
| 1/4 mile below mill | 0.43 | 0.010 | 0.014 |
| 1/2 mile below mill | 0.40 | 0.013 | 0.014 |
| 1 mile below mill | 0.14 | 0.012 | 0.001 |
| 5 miles below mill | 0.12 | 0.014 | 0.0005 |
| 10 miles below mill | 0.08 | 0.009 | 0.0005 |

MARCH

| <u>Sampling Station</u> | <u>Radium 226</u> <u>$\text{Nx}10^{-8}$ uc/ml</u> | <u>Thorium 230</u> <u>$\text{Nx}10^{-6}$ uc/ml</u> | <u>Natural Uranium</u> <u>$\text{Nx}10^{-5}$ uc/ml</u> |
|-------------------------|-----------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------|
| 1 mile above mill | 0.03 | 0.015 | 0.0009 |
| 1/4 mile below mill | 0.08 | 0.014 | 0.0090 |
| 1/2 mile below mill | 0.06 | 0.023 | 0.0006 |
| 1 mile below mill | 0.04 | 0.018 | 0.0006 |
| 5 miles below mill | 0.03 | 0.017 | 0.0006 |
| 10 miles below mill | 0.03 | 0.020 | 0.0003 |

TABLE II

Colorado River Radionuclide Survey for 1964 - Moab Mill

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APRIL

| <u>Sampling Station</u> | <u>Radium 226</u> <u>$\text{Nx}10^{-8}$ uc/ml</u> | <u>Thorium 230</u> <u>$\text{Nx}10^{-6}$ uc/ml</u> | <u>Natural Uranium</u> <u>$\text{Nx}10^{-5}$ uc/ml</u> |
|-------------------------|-----------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------|
| 1 mile above mill | 0.01 | 0.006 | 0.001 |
| 1/4 mile below mill | 0.06 | 0.012 | 0.003 |
| 1/2 mile below mill | 0.06 | 0.016 | 0.003 |
| 1 mile below mill | 0.02 | 0.006 | 0.002 |
| 5 miles below mill | 0.07 | 0.010 | 0.002 |
| 10 miles below mill | 0.02 | 0.007 | 0.001 |

MAY

| <u>Sampling Station</u> | <u>Radium 226</u> <u>$\text{Nx}10^{-8}$ uc/ml</u> | <u>Thorium 230</u> <u>$\text{Nx}10^{-6}$ uc/ml</u> | <u>Natural Uranium</u> <u>$\text{Nx}10^{-5}$ uc/ml</u> |
|-------------------------|-----------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------|
| 1 mile above mill | 0.11 | 0.011 | 0.0009 |
| 1/4 mile below mill | 0.15 | 0.009 | 0.0010 |
| 1/2 mile below mill | 0.14 | 0.015 | 0.0020 |
| 1 mile below mill | 0.10 | 0.010 | 0.0009 |
| 5 miles below mill | 0.08 | 0.008 | 0.0010 |
| 10 miles below mill | 0.10 | 0.013 | 0.0010 |

JUNE

| <u>Sampling Station</u> | <u>Radium 226</u> <u>$\text{Nx}10^{-8}$ uc/ml</u> | <u>Thorium 230</u> <u>$\text{Nx}10^{-6}$ uc/ml</u> | <u>Natural Uranium</u> <u>$\text{Nx}10^{-5}$ uc/ml</u> |
|-------------------------|-----------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------|
| 1 mile above mill | 0.03 | 0.006 | Nil |
| 1/4 mile below mill | 0.07 | 0.005 | Nil |
| 1/2 mile below mill | 0.05 | 0.007 | Nil |
| 1 mile below mill | 0.03 | 0.008 | Nil |
| 5 miles below mill | 0.03 | 0.007 | Nil |
| 10 miles below mill | 0.03 | 0.004 | Nil |

TABLE II

Colorado River Radionuclide Survey for 1964 - Moab Mill

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JULY

| <u>Sampling Station</u> | <u>Radium 226</u> <u>$\text{Nx}10^{-8}$ uc/ml</u> | <u>Thorium 230</u> <u>$\text{Nx}10^{-6}$ uc/ml</u> | <u>Natural Uranium</u> <u>$\text{Nx}10^{-5}$ uc/ml</u> |
|-------------------------|-----------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------|
| 1 mile above mill | 0.03 | 0.007 | 0.001 |
| 1/4 mile below mill | 0.02 | 0.011 | 0.002 |
| 1/2 mile below mill | 0.03 | 0.006 | 0.001 |
| 1 mile below mill | 0.02 | 0.007 | 0.001 |
| 5 miles below mill | 0.04 | 0.005 | 0.001 |
| 10 miles below mill | 0.07 | 0.008 | 0.001 |

AUGUST

| <u>Sampling Station</u> | <u>Radium 226</u> <u>$\text{Nx}10^{-8}$ uc/ml</u> | <u>Thorium 230</u> <u>$\text{Nx}10^{-6}$ uc/ml</u> | <u>Natural Uranium</u> <u>$\text{Nx}10^{-5}$ uc/ml</u> |
|-------------------------|-----------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------|
| 1 mile above mill | 0.04 | 0.018 | 0.0006 |
| 1/4 mile below mill | 0.02 | 0.012 | 0.0006 |
| 1/2 mile below mill | 0.02 | 0.014 | 0.0009 |
| 1 mile below mill | 0.04 | 0.012 | 0.0006 |
| 5 miles below mill | 0.04 | 0.021 | 0.0009 |
| 10 miles below mill | 0.04 | 0.021 | 0.0009 |

SEPTEMBER

| <u>Sampling Station</u> | <u>Radium 226</u> <u>$\text{Nx}10^{-8}$ uc/ml</u> | <u>Thorium 230</u> <u>$\text{Nx}10^{-6}$ uc/ml</u> | <u>Natural Uranium</u> <u>$\text{Nx}10^{-5}$ uc/ml</u> |
|-------------------------|-----------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------|
| 1 mile above mill | 0.004 | 0.022 | 0.001 |
| 1/4 mile below mill | 0.005 | 0.011 | 0.001 |
| 1/2 mile below mill | 0.010 | 0.028 | 0.001 |
| 1 mile below mill | 0.020 | 0.110 | 0.001 |
| 5 miles below mill | 0.020 | 0.100 | 0.001 |
| 10 miles below mill | 0.010 | 0.057 | 0.001 |

TABLE II

Colorado River Radionuclide Survey for 1964 - Moab Mill

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OCTOBER

| <u>Sampling Station</u> | <u>Radium 226</u> <u>$\text{Nx}10^{-8}$ uc/ml</u> | <u>Thorium 230</u> <u>$\text{Nx}10^{-6}$ uc/ml</u> | <u>Natural Uranium</u> <u>$\text{Nx}10^{-5}$ uc/ml</u> |
|-------------------------|-----------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------|
| 1 mile above mill | 0.06 | 0.004 | 0.0006 |
| 1/4 mile below mill | 0.01 | 0.006 | 0.0009 |
| 1/2 mile below mill | 0.01 | 0.005 | 0.0009 |
| 1 mile below mill | 0.01 | 0.007 | 0.0009 |
| 5 miles below mill | 0.07 | 0.006 | 0.0009 |
| 10 miles below mill | 0.01 | 0.008 | 0.0006 |

NOVEMBER

| <u>Sampling Station</u> | <u>Radium 226</u> <u>$\text{Nx}10^{-8}$ uc/ml</u> | <u>Thorium 230</u> <u>$\text{Nx}10^{-6}$ uc/ml</u> | <u>Natural Uranium</u> <u>$\text{Nx}10^{-5}$ uc/ml</u> |
|-------------------------|-----------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------|
| 1 mile above mill | 0.04 | 0.018 | 0.0006 |
| 1/4 mile below mill | 0.05 | 0.015 | 0.0006 |
| 1/2 mile below mill | 0.04 | 0.014 | 0.0030 |
| 1 mile below mill | 0.05 | 0.016 | 0.0006 |
| 5 miles below mill | 0.07 | 0.017 | 0.0009 |
| 10 miles below mill | 0.06 | 0.018 | 0.0006 |

DECEMBER

| <u>Sampling Station</u> | <u>Radium 226</u> <u>$\text{Nx}10^{-8}$ uc/ml</u> | <u>Thorium 230</u> <u>$\text{Nx}10^{-6}$ uc/ml</u> | <u>Natural Uranium</u> <u>$\text{Nx}10^{-5}$ uc/ml</u> |
|-------------------------|-----------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------|
| 1 mile above mill | 0.11 | 0.004 | Nil |
| 1/4 mile below mill | 0.08 | 0.008 | Nil |
| 1/2 mile below mill | 0.10 | 0.006 | Nil |
| 1 mile below mill | 0.06 | 0.011 | Nil |
| 5 miles below mill | 0.06 | 0.008 | Nil |
| 10 miles below mill | 0.07 | 0.008 | Nil |

TABLE III

Colorado River Flowrate Survey for 1964

| <u>Month</u> | <u>Flowrate (GPM)</u> |
|--------------|-----------------------|
| January | 963,125 |
| February | 943,378 |
| March | 937,992 |
| April | 1,617,026 |
| May | 6,283,200 |
| June | 5,883,768 |
| July | 2,014,663 |
| August | 1,758,847 |
| September | 1,150,723 |
| October | 1,196,052 |
| November | 1,376,470 |
| December | 1,355,825 |

Flowrates obtained from the United States Department of the Interior, Geological Survey, Water Resources Division, as determined at the Cisco, Utah, measuring station.

Note: Part of these flowrates were reported to Atlas Minerals as provisional records and are subject to revision by the Department of the Interior.