PDR 40-8380





March 31, 1980



Mr. Bill Garland, Administrator
DEQ, Water Quality Division
Hathaway Bldg.
Cheyenne, WY 82001

Dear Mr. Garland:

RE: Treated Water Reservoir, Nine Mile Lake, Permit No. 79-713

This letter is written pursuant to the conditions of Permit No. 79-713, which requires Rocky Mountain Energy Company (RMEC) to report in writing any discharge of radionuclides to the treated water reservoir in excess of the levels given in Table II-1 of the Supplement to the Application (attached).

The February monthly composite sample of water in the reservoir indicates that uranium and radium levels are higher than those projected in Table II-1. Specifically, the monthly composite shows uranium levels of 3.2 ppm versus < .1 expected, while radium was measured as 23 pCi/l versus 10 pCi/l expected (see Attachment A). Vanadium levels are also higher than anticipated, with the February composite showing about 25 ppm versus 3 ppm which was expected.

At this time, we are not certain as to the exact cause of these elevated levels; however, we believe that the most likely explanation is that pH control is more critical than was apparent from bench scale test work. The liming treatment appears to raise the pH to a point where vanadium and uranium return to solution, rather than precipitating. This theory is being tested now and we expect that better pH control will cause the uranium and vanadium to precipitate and be disposed of in the old reservoir with the solids underflow from the reactor/clarifier.

Corrective action has been initiated and we feel certain that the parameter of greatest concern, radium-226, will be returned to an acceptable level. A barium chloride precipitation step has been added to the treated water circuit in order to remove most of the soluble radium prior to discharge. We expect that radium can be lowered to 10 pCi/l with this additional process.

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Add'l info

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As sample results become available, they will be forwarded to appropriate DEQ personnel for evaluation.

If you have any questions, please feel free to call me at Nine Mile Lake (307-237-8326).

Sincerely,

Michael R. Neumann

M. R. Neumann
Field Environmental Coordinator

MRN/ph
Attachments

cc: Tom Mueller (DEQ)
Dennis Morrow (DEQ)
Jack Rothfleisch (NRC)
C. M. Bolser
R. E. Hynes
K. W. Loest
86.6.3.23

TABLE II-1

| Chemical Constituent | A (PPM) | B (PPM) |
|---|---|---|
| TDS | 7,000 - 8,000 | 5,000 - 5,500 |
| pH | 1.5 - 1.9 | 6.0 - 7.5 |
| $SO_4$ | 6,000 - 6,400 | 3,000 - |
| $Mn^{++}$ | 2 | 0.8 - 0.9 |
| $V^{+}$ | 400 - 450 | 3 |
| $Ca^{++}$ | 350 - 400 | 750 - 800* |
| $Mg^{++}$ | 150 - 175 | 140 |
| $Na^{+}$ | 450 - 525 | 450 - 525 |
| $Fe^{++}$ | 40 - 90 | 30 |
| $SiO_2^{=}$ | 100 - 150 | 50 |
| $Zn^{++}$ | 20 - 30 | 1.5 |
| $Al^{+++}$ | 40 - 80 | 0.3 |
| $Pb^{+2}$ | < 1 | < 0.2 |
| $U_3O_8$ | < 1 | < .1 |
| As | < 50 (ppb) | < 50 (ppb) |
| $Ra^{226}$ | 50 - 500 pci/L | 10 pci/L |

ATTACHMENT A

WATER QUALITY CONTROL
TREATED WATER RESERVOIR

MONTHLY COMPOSITE
February, 1980

| | | Feed | Lime Overflow | Lime Underflow |
|---|---|---|---|---|
| pH | | 1.93 | 7.95 | 8.39 |
| Sulfate | mg/l | 5333 | 3605 | 20.68% |
| Calcium | mg/l | 201 | 765 | 16.58% |
| Magnesium | mg/l | 70 | 58 | 0.64% |
| Sodium | mg/l | 418 | 434 | 0.23% |
| Iron | mg/l | 39 | 0.2 | 3.06% |
| Silicon ($SiO_2$) | mg/l | 95 | 38 | 0.01% |
| Zinc | mg/l | | 1.2 | |
| Aluminum | mg/l | 87 | 0.3 | 3.53% |
| Uranium ($U_3O_8$) | mg/l | 8.0 | 3.2 | 0.42% |
| Vanadium | mg/l | 2011 | 25 | 10.36% |
| Ra-226 | pci/l | 297 | 23.5 | 14380 |

TREATED WATER RESERVOIR
NINE MILE LAKE

COMPOSITE SAMPLE TAKEN MARCH 26, 1980*

| | |
|---|---|
| pH | 7.69 |
| EMF (MV) | 320 |
| Conductivity (umhos/cm) | 3600 |
| Uranium as $U_3O_8$ (mg/l) | 2.2 |
| Sulfate (mg/l) | 2912 |
| Vanadium (mg/l) | 11.2 |
| Calcium (mg/l) | 650 |
| Iron (mg/l) | 0.2 |

*Collected by sampling at several locations on the periphery.

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