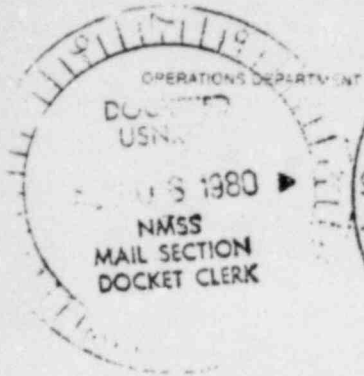


PDR

40-8064

EXXON MINERALS COMPANY, U.S.A.

POST OFFICE BOX 2180 - HOUSTON TEXAS 77001



July 24, 1980

Re: 1980 Second Quarter Report
Uranium Solution Mine Pilot
Converse County, Wyoming
License No. SUA-1064
Docket No. 40-8064

U. S. Nuclear Regulatory Commission
Uranium Recovery Licensing Branch
Division of Waste Management
Washington, D. C. 20555

Region IV
Office of Inspection and Enforcement
611 Ryan Plaza, Suite 1000
Arlington, Texas 76011

Attention Mr. John J. Linehan

Attention Mr. Glen D. Brown

Gentlemen:

The pilot test of solution mining at Highland utilizing the second well field continued through the second quarter as scheduled. Leach fluid injected and well production is summarized as follows:

| | <u>2nd Qtr.</u> | <u>Project to date</u> |
|--|-----------------|------------------------|
| M gallons leach solution injected | 6.58 | 36.40 |
| M gallons leach solution produced | 7.12 | 39.78 |
| M gallons total fluid to tailings pond | 1.09 | 9.56 |

About half of the fluid to the tailings pond was ground water production from the 3 wells located in the center of the original well field where restoration operations continued during the period.

Analyses of ground water samples from the second well field observation and monitor wells are attached. All analyses show ground water at levels of less than 1 milligram per liter uranium. Other parameters were below UCL's except for sulfate values. A single analysis for observation well 0-4 produced high chloride and sulfate values but subsequent sampling several days later indicated that this data was spurious. Analysis since then has confirmed water quality to be within baseline range.

Again this quarter, sulfate levels of individual samples have marginally exceeded the UCL on several occasions. None have been sustained and subsequent analysis showed sulfate below the UCL. Laboratory procedures for determination of sulfate has been improved and further refinement is planned

C

FEE EXEMPT 16978

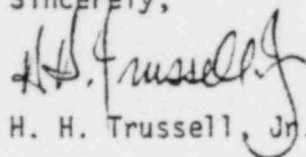
Add'l info

July 24, 1980

for analyzing future samples. However, the variability of this parameter at the same time that other excursion parameters have remained stable and well below UCL levels continues to show that sulfate is a poor indicator for excursion determination. The similarity of sulfate levels in the leached portion of the mineralized sand with those sulfate levels outside the leached area also makes sulfate a poor indicator. Our intent is to propose to the NRC, sometime during the third quarter, the deletion of sulfate as an indicator.

Should you have any questions, call me or R. S. Taylor at (713) 656-1763.

Sincerely,



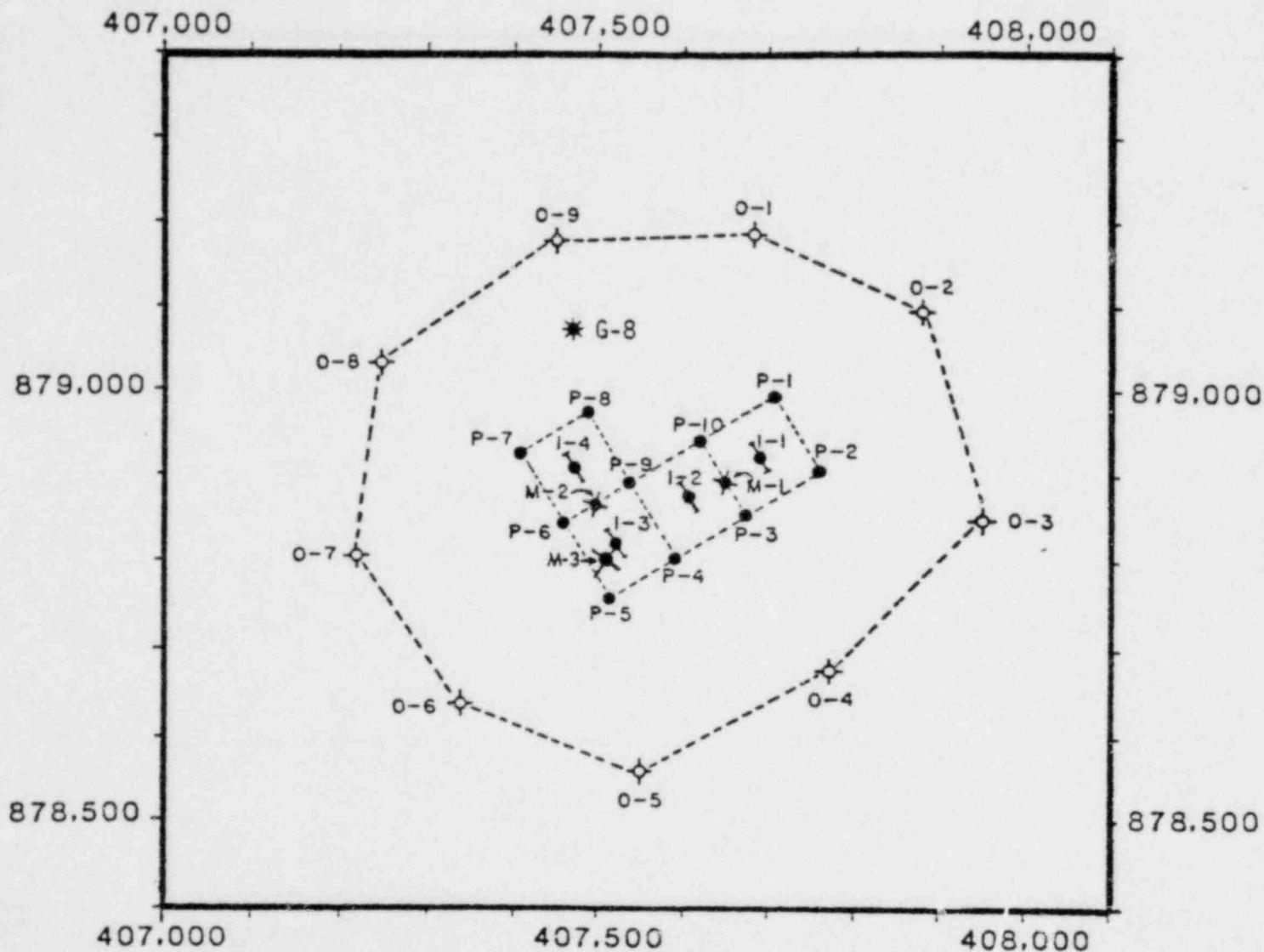
H. H. Trussell, Jr.

RST:dh
Attachments

c: w/attachments
Mr. G. D. Ortloff

FIGURE 1

SOLUTION MINE WELL PATTERN
HIGHLAND R&D PROGRAM
CONVERSE COUNTY, WYOMING



LEGEND

- PRODUCTION WELL
- ⊥ INJECTION WELL
- ⊥⊗ MONITOR WELL

HIGHLAND SOLUTION MINE R&D SITE
SAMPLE ANALYSIS RESULTS

Well 0-1

| <u>Sample Date</u> 1980 | <u>Carbonate</u> (mg/l) | <u>Bicarbonate</u> (mg/l) | <u>Uranium</u> (mg/l) | <u>Chloride</u> (mg/l) | <u>Conductivity</u> (µmhos) | <u>pH</u> (units) | <u>Sulfate</u> (mg/l) |
|----------------------------|----------------------------|------------------------------|--------------------------|---------------------------|--------------------------------|----------------------|--------------------------|
| <u>UCL</u> | <u>44</u> | <u>221</u> | <u>5</u> | <u>24</u> | <u>-</u> | <u>-</u> | <u>126</u> |
| 4/01/80 | <1 | 207 | <1 | 11 | 350 | 7.6 | 91 |
| 4/15/80 | <1 | 207 | <1 | 11 | 310 | 7.9 | 104 |
| 5/01/80 | <1 | 195 | <1 | 10 | 410 | 7.9 | 72 |
| 5/14/80 | <1 | 207 | <1 | 10 | 340 | 7.7 | 120 |
| 5/29/80 | <1 | 207 | <1 | 10 | 400 | 7.9 | 118 |
| 6/10/80 | <1 | 209 | <1 | 10 | 440 | 7.6 | 102 |
| 6/25/80 | <1 | 207 | <1 | 11 | 360 | 7.6 | 105 |

Well 0-2

| | | | | | | | |
|------------|-----------|------------|----------|-----------|----------|----------|------------|
| <u>UCL</u> | <u>32</u> | <u>240</u> | <u>5</u> | <u>40</u> | <u>-</u> | <u>-</u> | <u>223</u> |
| 4/01/80 | <1 | 213 | <1 | 8 | 350 | 8.0 | 100 |
| 4/15/80 | <1 | 207 | <1 | 9 | 320 | 8.3 | 97 |
| 5/01/80 | <1 | 207 | <1 | 9 | 320 | 8.7 | 62 |
| 5/04/80 | <1 | 210 | <1 | 12 | 410 | 8.2 | 149 |
| 5/28/80 | <1 | 214 | <1 | 9 | 410 | 8.4 | 122 |
| 6/10/80 | <1 | 204 | <1 | 6 | 450 | 8.1 | 81 |
| 6/24/80 | <1 | 207 | <1 | 11 | 440 | 8.3 | 30 |

HIGHLAND SOLUTION MINE R&D SITE
SAMPLE ANALYSIS RESULTS

Well 0-3

| <u>Sample Date</u> 1980 | <u>Carbonate</u> (mg/l) | <u>Bicarbonate</u> (mg/l) | <u>Uranium</u> (mg/l) | <u>Chloride</u> (mg/l) | <u>Conductivity</u> (µmhos) | <u>pH</u> (units) | <u>Sulfate</u> (mg/l) |
|----------------------------|----------------------------|------------------------------|--------------------------|---------------------------|--------------------------------|----------------------|--------------------------|
| <u>UCL</u> | <u>44</u> | <u>224</u> | <u>5</u> | <u>26</u> | <u>-</u> | <u>-</u> | <u>225</u> |
| 4/01/80 | <1 | 198 | <1 | 8 | 350 | 8.0 | 92 |
| 4/15/80 | 9 | 189 | <1 | 11 | 290 | 8.7 | 90 |
| 4/30/80 | 6 | 177 | <1 | 8 | 320 | 8.4 | 35 |
| 5/15/80 | <1 | 189 | <1 | 12 | 400 | 8.2 | 144 |
| 5/28/80 | <1 | 171 | <1 | 14 | 340 | 8.2 | 145 |
| 6/11/80 | <1 | 198 | <1 | 12 | 440 | 8.2 | 90 |
| 6/24/80 | 6 | 189 | <1 | 9 | 450 | 8.5 | 114 |

Well 0-4

| | | | | | | | |
|------------|-----------|------------|----------|-----------|----------|----------|------------|
| <u>UCL</u> | <u>38</u> | <u>221</u> | <u>5</u> | <u>18</u> | <u>-</u> | <u>-</u> | <u>116</u> |
| 4/01/80 | <1 | 207 | <1 | 8 | 25 | 7.9 | 138 |
| 4/15/80 | 5 | 177 | <1 | 9 | 330 | 8.6 | 97 |
| 4/30/80 | <1 | 192 | <1 | 10 | 350 | 8.1 | 72 |
| 5/15/80 | <1 | 201 | <1 | 11 | 390 | 8.2 | 114 |
| 5/28/80 | <1 | 165 | <1 | 29 | 390 | 8.4 | 131 |
| 6/11/80 | <1 | 201 | <1 | 7 | 430 | 8.0 | 79 |
| 6/24/80 | 6 | 189 | <1 | 11 | 450 | 8.4 | 113 |

HIGHLAND SOLUTION MINE R&D SITE
SAMPLE ANALYSIS RESULTS

Well 0-5

| <u>Sample Date</u> | <u>Carbonate (mg/l)</u> | <u>Bicarbonate (mg/l)</u> | <u>Uranium (mg/l)</u> | <u>Chloride (mg/l)</u> | <u>Conductivity (µmhos)</u> | <u>pH (units)</u> | <u>Sulfate (mg/l)</u> |
|--------------------|-------------------------|---------------------------|-----------------------|------------------------|-----------------------------|-------------------|-----------------------|
| <u>UCL</u> | <u>56</u> | <u>191</u> | <u>5</u> | <u>30</u> | <u>-</u> | <u>-</u> | <u>220</u> |
| 4/03/80 | <1 | 195 | <1 | 9 | 475 | 8.1 | 198 |
| 4/16/80 | 6 | 165 | <1 | 11 | 690 | 8.4 | 169 |
| 4/30/80 | <1 | 115 | <1 | 19 | 390 | 7.4 | 149 |
| 5/16/80 | <1 | 171 | <1 | 15 | 500 | 7.5 | 264 |
| 5/29/80 | <1 | 159 | <1 | 12 | 470 | 7.9 | 211 |
| 6/11/80 | <1 | 176 | <1 | 11 | 550 | 7.8 | 172 |
| 6/25/80 | <1 | 153 | <1 | 14 | 400 | 7.9 | 204 |

Well 0-6

| | | | | | | | |
|------------|-----------|------------|----------|-----------|----------|----------|------------|
| <u>UCL</u> | <u>44</u> | <u>227</u> | <u>5</u> | <u>28</u> | <u>-</u> | <u>-</u> | <u>177</u> |
| 4/03/80 | <1 | 195 | <1 | 11 | 475 | 8.4 | 192 |
| 4/16/80 | 6 | 168 | <1 | 16 | 680 | 8.4 | 160 |
| 4/30/80 | <1 | 183 | <1 | 12 | 440 | 8.1 | 154 |
| 5/16/80 | <1 | 169 | <1 | 26 | 460 | 8.4 | 214 |
| 5/29/80 | <1 | 177 | <1 | 18 | 500 | 8.0 | 196 |
| 6/11/80 | <1 | 178 | <1 | 19 | 525 | 7.8 | 173 |
| 6/25/80 | <1 | 189 | <1 | 14 | 380 | 7.7 | 164 |

HIGHLAND SOLUTION MINE R&D SITE
SAMPLE ANALYSIS RESULTS

| <u>Sample Date</u> | <u>Well 0-7</u> | | | | <u>Conductivity</u> (μ mhos) | <u>pH</u> (units) | <u>Sulfate</u> (mg/l) |
|--------------------|----------------------------|------------------------------|--------------------------|---------------------------|--------------------------------------|----------------------|--------------------------|
| | <u>Carbonate</u> (mg/l) | <u>Bicarbonate</u> (mg/l) | <u>Uranium</u> (mg/l) | <u>Chloride</u> (mg/l) | | | |
| <u>UCL</u> | <u>44</u> | <u>240</u> | <u>5</u> | <u>90</u> | <u>-</u> | <u>-</u> | <u>112</u> |
| 4/03/80 | <1 | 146 | <1 | 17 | 390 | 8.0 | 121 |
| 4/16/80 | <1 | 217 | <1 | 18 | 410 | 8.3 | 112 |
| 4/30/80 | <1 | 122 | <1 | 18 | 400 | 8.2 | 84 |
| 5/17/80 | <1 | 104 | <1 | 41 | 400 | 8.5 | 142 |
| 5/27/80 | 6 | 110 | <1 | 21 | 350 | 8.9 | 106 |
| 6/11/80 | <1 | 143 | <1 | 18 | 400 | 7.8 | 108 |
| 6/25/80 | <1 | 159 | <1 | 15 | 360 | 7.8 | 139 |

Well 0-8

| | | | | | | | |
|------------|-----------|------------|----------|-----------|----------|----------|-----------|
| <u>UCL</u> | <u>44</u> | <u>252</u> | <u>5</u> | <u>20</u> | <u>-</u> | <u>-</u> | <u>94</u> |
| 4/02/80 | <1 | 213 | <1 | 9 | 400 | 7.8 | 100 |
| 4/16/80 | 9 | 198 | <1 | 9 | 500 | 8.8 | 91 |
| 4/30/80 | <1 | 201 | <1 | 9 | 440 | 8.1 | 112 |
| 5/16/80 | <1 | 180 | <1 | 16 | 350 | 8.3 | 131 |
| 5/29/80 | <1 | 214 | <1 | 10 | 400 | 8.0 | 128 |
| 6/11/80 | <1 | 214 | <1 | 13 | 470 | 7.8 | 106 |
| 6/25/80 | <1 | 207 | <1 | 11 | 350 | 7.5 | 90 |

HIGHLAND SOLUTION MINE R&D SITE
SAMPLE ANALYSIS RESULTS

Well 0-9

| <u>Sample Date</u> | <u>Carbonate (mg/l)</u> | <u>Bicarbonate (mg/l)</u> | <u>Uranium (mg/l)</u> | <u>Chloride (mg/l)</u> | <u>Conductivity (umhos)</u> | <u>pH (units)</u> | <u>Sulfate (mg/l)</u> |
|--------------------|-------------------------|---------------------------|-----------------------|------------------------|-----------------------------|-------------------|-----------------------|
| <u>UCL</u> | <u>68</u> | <u>238</u> | <u>5</u> | <u>128</u> | <u>-</u> | <u>-</u> | <u>106</u> |
| 4/01/80 | 72 | 18 | <1 | 55 | 400 | 9.9 | 94 |
| 4/15/80 | 66 | <1 | <1 | 62 | 370 | 11.0 | 103 |
| 5/01/80 | 60 | 24 | <1 | 62 | 500 | 9.4 | 96 |
| 5/14/80 | 12 | 63 | <1 | 87 | 490 | 10.7 | 135 |
| 5/28/80 | 66 | <1 | <1 | 15 | 490 | 10.9 | 96 |
| 6/10/80 | 54 | <1 | <1 | 57 | 590 | 10.4 | 93 |
| 6/25/80 | 66 | <1 | <1 | 58 | 500 | 10.7 | 101 |

HIGHLAND SOLUTION MINE R&D SITE
SAMPLE ANALYSIS RESULTS

| <u>Sample Date</u> | <u>Well M-1</u> | | | | | | |
|--------------------|-------------------------|---------------------------|-----------------------|------------------------|-----------------------------|-------------------|-----------------------|
| | <u>Carbonate (mg/l)</u> | <u>Bicarbonate (mg/l)</u> | <u>Uranium (mg/l)</u> | <u>Chloride (mg/l)</u> | <u>Conductivity (µmhos)</u> | <u>pH (units)</u> | <u>Sulfate (mg/l)</u> |
| <u>UCL</u> | <u>44</u> | <u>227</u> | <u>5</u> | <u>22</u> | <u>-</u> | <u>-</u> | <u>234</u> |
| 4/02/80 | <1 | 183 | <1 | 11 | 450 | 7.6 | 232 |
| 4/14/80 | <1 | 165 | <1 | 12 | 450 | 8.1 | 188 |
| 4/29/80 | <1 | 159 | <1 | 12 | 490 | 7.4 | 167 |
| 5/17/80 | <1 | 177 | <1 | 13 | 510 | 8.2 | 189 |
| 5/28/80 | <1 | 165 | <1 | 12 | 560 | 8.4 | 226 |
| 6/10/80 | <1 | 183 | <1 | 11 | 560 | 8.2 | 186 |
| 6/28/80 | <1 | 177 | <1 | 15 | 640 | 8.3 | 211 |

| <u>Well M-2</u> | | | | | | | |
|-----------------|-----------|------------|----------|-----------|----------|----------|------------|
| <u>UCL</u> | <u>56</u> | <u>190</u> | <u>5</u> | <u>36</u> | <u>-</u> | <u>-</u> | <u>124</u> |
| 4/01/80 | 12 | 37 | <1 | 23 | 250 | 8.9 | 97 |
| 4/15/80 | 6 | 51 | <1 | 26 | 250 | 9.4 | 122 |
| 4/30/80 | 18 | 61 | <1 | 19 | 280 | 9.4 | 59 |
| 5/14/80 | <1 | 92 | <1 | 19 | 300 | 8.0 | 117 |
| 5/29/80 | 6 | 61 | <1 | 15 | 350 | 9.5 | 96 |
| 6/11/80 | 22 | 47 | <1 | 14 | 330 | 9.4 | 76 |
| 6/25/80 | 20 | 50 | <1 | 15 | 280 | 9.6 | 81 |

HIGHLAND SOLUTION MINE R&D SITE
SAMPLE ANALYSIS RESULTS

| <u>Sample Date</u> | <u>Well M-3</u> | | | | | | <u>Sulfate (mg/l)</u> |
|--------------------|-------------------------|---------------------------|-----------------------|------------------------|-----------------------------|-------------------|-----------------------|
| | <u>Carbonate (mg/l)</u> | <u>Bicarbonate (mg/l)</u> | <u>Uranium (mg/l)</u> | <u>Chloride (mg/l)</u> | <u>Conductivity (µmhos)</u> | <u>pH (units)</u> | |
| UCL | | | | | | | |
| 3/31/80 | <1 | 195 | <1 | 15 | 575 | 7.4 | 238 |
| 4/15/80 | <1 | 165 | <1 | 14 | 540 | 8.0 | 142 |
| 4/30/80 | <1 | 165 | <1 | 17 | 700 | 7.6 | 324 |
| 5/14/80 | <1 | 174 | <1 | 21 | 700 | 7.7 | 312 |
| 5/27/80 | <1 | 122 | <1 | 12 | 650 | 7.6 | 320 |
| 6/10/80 | <1 | 194 | <1 | 16 | 780 | 7.6 | 262 |
| 6/25/80 | <1 | 183 | <1 | 16 | 640 | 7.6 | 318 |

Well 0-8

| | | | | | | | |
|-------------------------|-----------|------------|----------|------------|----------|----------|------------|
| <u>UCL for Well 0-9</u> | <u>68</u> | <u>238</u> | <u>5</u> | <u>128</u> | <u>-</u> | <u>-</u> | <u>106</u> |
| 4/02/80 | <1 | 207 | <1 | 11 | 360 | 7.9 | 140 |
| 4/15/80 | 6 | 189 | <1 | 11 | 340 | 8.4 | 133 |
| 4/29/80 | <1 | 189 | <1 | 8 | 400 | 8.0 | 102 |
| 5/17/80 | <1 | 207 | <1 | 10 | 420 | 8.3 | 95 |
| 5/28/80 | <1 | 214 | <1 | 8 | 410 | 8.3 | 90 |
| 6/10/80 | <1 | 214 | <1 | 12 | 490 | 8.3 | 106 |
| 6/25/80 | <1 | 210 | <1 | 10 | 430 | 8.4 | 104 |