



40-3453

RETURN ORIGINAL TO PDR, HQ.

# ATLAS CORPORATION

Republic Plaza, 370 Seventeenth Street, Suite 3150  
Denver, CO 80202  
Telephone: (303) 825-1200 Fax: (303) 892-8808

RICHARD E. BLUBAUGH  
Vice President of Environmental  
and Governmental Affairs

December 29, 1993<sup>94</sup>

URFO  
RECEIVED  
JAN - 3 10:07

CERTIFIED MAIL

Mr. Ramon E. Hall  
Uranium Recovery Field Office  
U.S. Nuclear Regulatory Commission  
P.O. Box 25325  
Denver, CO 80225

DOCKETED  
JAN 04 1994  
USNRC  
MAIL SECTION  
DOCKET CLERK

Re: License No. SUA-917  
Docket No. 40-3453  
Moab - Corrective Action Program Review

Dear Mr. Hall:

This report is submitted in accordance with License Condition No. 17 C of our Source Material License SUA-917. This Corrective Action Program (CAP) Review summarizes Atlas' progress toward attaining groundwater protection standards. Included herein are discussions on the following:

- Dewatering Wells (ALARA Demonstration)
- Seepage Collection from Toe Drains
- Natural Evaporation

Atlas' primary effort has been directed at drying the tailings impoundment, thus reducing the hydraulic head upon the groundwater immediately below the tailings facility. Water evaporation has been occurring through (a) natural evaporation, (b) evaporation from seepage collection from existing toe drains, and (c) evaporation from entrained solution recovered by the dewatering wells installed prior to July 01, 1990. The enhanced evaporation system was disconnected in 1992, and removed from the impoundment.

9402240078 931229  
PDR ADDCK 04003453  
C PDR

18-151

DESIGNATED ORIGINAL

Certified By Mary C. Hood

DF02  
111  
94-0159

Ramon E. Hall  
U.S. NRC/URFO  
Moab CAP Review  
Dec.29,'93  
Page Two

### Dewatering Wells

During 1993, approximately 1,502,000 gallons (see Table 1) of solution were recovered from the tailings via the recovery well system. This compares to the estimated 1,721,000 gallons reported for 1992.

Based on constituent analyses (see Exhibit 1) performed by Barringer Laboratories, Inc., on samples collected by Atlas personnel in July 1993, the constituent mass recovered from the tailings was calculated. Table 2, "Constituent Mass Recovered", shows the calculated results. Calculations are shown on Exhibit 2. The total dissolved mass recovered in 1993 is calculated to be 486,175 pounds, or approximately 40,515 pounds per month (compared to 36,208 pounds per month for 1992).

### Seepage Collected from Toe Drains

Included as a minor component of the CAP, is the loss of solution from the tailings facility via the existing toe drains. There is only one drain collection sump remaining on the north embankment. The sump on the south side was removed in August 1992. There was no detectable solution observed in the north sump during 1993.

### Natural Evaporation

During 1993 all of the solution in the surface pond evaporated. The surface remained dry until early October when precipitation again covered the lowest portion of the tailings impoundment. Rainfall from October through December amounted to approximately 2.37 inches, and added approximately 11 inches of solution to the surface of the pond due to runoff from the covered area of the impoundment. It is expected that this, and any additional solution will evaporate and the pond will again be dry during the summer months of 1994.

### Summary

This review indicates that activities conducted by Atlas to recover solution from within the tailings continues to decrease the hydraulic head and constituent mass from the mounded groundwater system directly beneath the tailings facility.

Ramon E. Hall  
U.S. NRC/URFO  
Moab CAP Review  
Dec.29,'93  
Page Three

I trust this review satisfies the requirement contained in License Condition 17 C. Please contact me at your convenience should you have any questions concerning the information herein.

Sincerely,

*Richard E. Blubaugh for*

Richard E. Blubaugh  
Vice President, Environmental  
and Governmental Affairs

REB:jed

Enclosures: Table 1 (Gallons Pumped by Recovery Wells)  
Table 2 (Constituent Mass Recovered)  
Exhibit 1 (Constituent Analysis)  
Exhibit 2 (Calculations)

cc: (regular mail w encl.) C. Dixon  
D. Edwards  
(hand delivery w encl.) M. Gross

TABLE 1

## Moab Uranium Tailings Impoundment

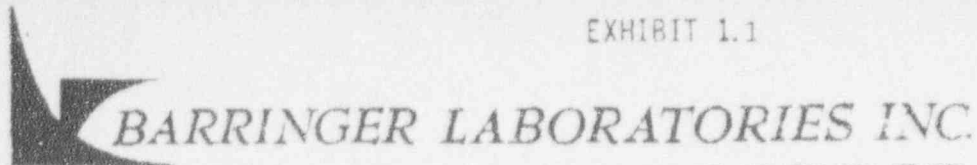
Gallons Pumped  
by  
Recovery Wells

| <u>1993</u>       | <u>Gallons Measured</u> |
|-------------------|-------------------------|
| January           | 158,800                 |
| February          | 143,500                 |
| March             | 138,300                 |
| April             | 133,800                 |
| May               | 132,159                 |
| June              | 110,630                 |
| July              | 104,220                 |
| August            | 121,965                 |
| September         | 117,734                 |
| October           | 114,718                 |
| November          | 112,446                 |
| December          | 114,000 (estimated)     |
| TOTAL (estimated) | 1,502,272               |

TABLE 2

**Moab Uranium Tailings Impoundment  
Constituent Mass Recovered**

| Parameter                    | JAN    | FEB    | MAR    | APR    | MAY    | JUN    | JUL    | AUG    | SEP    | OCT    | NOV    | DEC    | Total (lbs.)    |
|------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----------------|
| Ra 228 (x10 <sup>-11</sup> ) | 1.29   | 1.16   | 1.12   | 1.09   | 1.07   | .897   | .845   | .999   | .955   | .930   | .912   | .925   | 1.22x10/<br>-10 |
| Ra 226 (x10 <sup>-7</sup> )  | 1.99   | 1.80   | 1.73   | 1.67   | 1.65   | 1.39   | 1.31   | 1.53   | 1.47   | 1.44   | 1.41   | 1.43   | 1.88x10/<br>-6  |
| U (Uranium)                  | 32     | 29     | 28     | 27     | 26     | 22     | 21     | 24     | 24     | 23     | 23     | 23     | 302             |
| TDS (Tot. Dis. Sol.)         | 51,160 | 46,465 | 44,782 | 43,324 | 42,793 | 35,822 | 33,746 | 39,492 | 38,122 | 37,146 | 36,410 | 36,913 | 486,175         |
| Se (Selenium)                | .58    | .52    | .51    | .49    | .48    | .40    | .38    | .45    | .43    | .42    | .41    | .42    | 5.49            |
| V (Vanadium)                 | 2.65   | 2.40   | 2.31   | 2.23   | 2.21   | 1.85   | 1.74   | 2.03   | 1.97   | 1.92   | 1.88   | 1.90   | 25.09           |
| Ag (Silver)                  | .013   | .012   | .012   | .011   | .011   | .009   | .009   | .010   | .010   | .010   | .009   | .010   | .126            |
| Ni (Nickel)                  | .79    | .72    | .69    | .67    | .66    | .55    | .52    | .61    | .59    | .57    | .56    | .57    | 7.5             |
| Mo (Molybdenum)              | 3.45   | 3.11   | 3.00   | 2.90   | 2.87   | 2.40   | 2.26   | 2.65   | 2.56   | 2.49   | 2.44   | 2.47   | 32.60           |
| Pb (Lead)                    | .40    | .36    | .35    | .34    | .33    | .28    | .26    | .30    | .29    | .29    | .28    | .29    | 3.77            |
| Cr (Chromium)                | .013   | .012   | .012   | .011   | .011   | .009   | .009   | .010   | .010   | .010   | .009   | .010   | .126            |
| NO <sub>3</sub> (Nitrate)    | 191    | 172    | 166    | 161    | 159    | 133    | 125    | 146    | 141    | 138    | 135    | 137    | 1,804           |
| SO <sub>4</sub> (Sulfate)    | 37,500 | 33,887 | 32,659 | 31,596 | 31,209 | 26,125 | 24,611 | 28,802 | 27,802 | 27,090 | 26,554 | 26,921 | 354,756         |
| Cl (Chloride)                | 1,458  | 1,317  | 1,269  | 1,228  | 1,213  | 1,015  | 956    | 1,119  | 1,081  | 1,053  | 1,032  | 1,046  | 13,787          |
| Na (Sodium)                  | 9,210  | 8,323  | 8,021  | 7,760  | 7,665  | 6,417  | 6,045  | 7,074  | 6,829  | 6,654  | 6,522  | 6,612  | 87,132          |



15000 W. 8TH AVE. SUITE 300 GOLDEN, CO 80401 (303) 277-1687 FAX (303) 277-1689

17-Aug-93

Dale Edwards  
 ATLAS MINERALS  
 P.O. Box 1207  
 Moab, UT 84532

Page: R-2  
 Copy: 1 of 2

Attn:  
 Project:

Received: 29-Jul-93 10:45

PO #: A-7262

Job: 937910E

Status: Final

## Sample Type: Water

| Sample Id        | Gross Alpha<br>Total |       | Gross Beta<br>Total |      | U<br>Total<br>mg/l |
|------------------|----------------------|-------|---------------------|------|--------------------|
|                  | pCi/l                | + 2σ  | pCi/l               | + 2σ |                    |
| D.W. Wells Comp. | 15400                | ±1100 | 4000                | ±300 |                    |
| Sample Id        | Ra-226<br>Total      |       | Ra-228<br>Total     |      | U<br>Total<br>mg/l |
| Sample Id        | pCi/l                | + 2σ  | pCi/l               | + 2σ |                    |
| D.W. Wells Comp. | 150                  | ±10   | 3.7                 | ±3.0 | 27.1               |



**BARRINGER LABORATORIES INC.**

15000 W. 6TH AVE. SUITE 300 GOLDEN, CO 80401 (303) 277-1667 FAX (303) 277-1669

17-Aug-93

Dale Edwards  
 ATLAS MINERALS  
 P.O. Box 1207  
 Moab, UT 84532

Page: R-1  
 Copy: 1 of 2

Attn:  
 Project:

Received: 29-Jul-93 10:45

PO #. A-7252

Job: 937910E

Status: Final

Sample Type: Water

| Sample Id        | Sodium Total mg/l | Chromium Total mg/l | Lead Total mg/l | Molybdenum Total mg/l | Nickel Total mg/l |
|------------------|-------------------|---------------------|-----------------|-----------------------|-------------------|
| D.W. Wells Comp. | 6950              | <0.1                | 0.3             | 2.6                   | 0.6               |

| Sample Id        | Silver Total mg/l | Vanadium Total mg/l | Selenium Total mg/l | Chloride mg/l | NO3 mg/l |
|------------------|-------------------|---------------------|---------------------|---------------|----------|
| D.W. Wells Comp. | <0.1              | 2.0                 | 0.438               | 1100          | 146      |

| Sample Id        | TDS mg/l | pH unit | Sulfate mg/l |
|------------------|----------|---------|--------------|
| D.W. Wells Comp. | 38800    | 7.32    | 28300        |

EXHIBIT 2.1

1993  
Calculations  
re  
Radium 228 (Ra 228)

Assay = 2.7 pci/L

$$\frac{(T \ 1/2 \times \text{At wgt.}) \text{ Ra 226}}{(T \ 1/2 \times \text{At wgt.}) \text{ Element}}$$

$$\frac{(1652y)(226)}{(5.75y)(228)} \quad \frac{362052}{1311} \quad 276 \text{ ci/gm Ra 228}$$

$$\frac{1 \text{ ci}}{\text{ci/gm}} = \text{gm} \quad 1 \text{ ci} = .0036 \text{ gm Ra 228}$$

$$1 \text{ pci} = 3.6 \times 10^{-15} \text{ gm Ra 228}$$

$$(3.6 \times 10^{-15} \text{ gm/pci})(2.7 \text{ pci}) = 9.72 \times 10^{-15} \text{ gm}$$

$$\frac{(9.72 \times 10^{-15} \text{ gm})(3.785 \text{ L/gal})}{453.6 \text{ g/lb.}} = 8.11 \times 10^{-17} \text{ lbs./gal.}$$

|           |  |
|-----------|--|
| January   | $(8.11 \times 10^{-17} \text{ lbs./gal.})(158,800 \text{ gal.}) = 1.29 \times 10^{-11} \text{ lbs.}$ |
| February  | $(8.11 \times 10^{-17} \text{ lbs./gal.})(143,500 \text{ gal.}) = 1.16 \times 10^{-11} \text{ lbs.}$ |
| March     | $(8.11 \times 10^{-17} \text{ lbs./gal.})(138,300 \text{ gal.}) = 1.12 \times 10^{-11} \text{ lbs.}$ |
| April     | $(8.11 \times 10^{-17} \text{ lbs./gal.})(133,800 \text{ gal.}) = 1.09 \times 10^{-11} \text{ lbs.}$ |
| May       | $(8.11 \times 10^{-17} \text{ lbs./gal.})(132,159 \text{ gal.}) = 1.07 \times 10^{-11} \text{ lbs.}$ |
| June      | $(8.11 \times 10^{-17} \text{ lbs./gal.})(110,630 \text{ gal.}) = 8.97 \times 10^{-12} \text{ lbs.}$ |
| July      | $(8.11 \times 10^{-17} \text{ lbs./gal.})(104,220 \text{ gal.}) = 8.45 \times 10^{-12} \text{ lbs.}$ |
| August    | $(8.11 \times 10^{-17} \text{ lbs./gal.})(121,965 \text{ gal.}) = 9.89 \times 10^{-12} \text{ lbs.}$ |
| September | $(8.11 \times 10^{-17} \text{ lbs./gal.})(117,734 \text{ gal.}) = 9.55 \times 10^{-12} \text{ lbs.}$ |
| October   | $(8.11 \times 10^{-17} \text{ lbs./gal.})(114,718 \text{ gal.}) = 9.30 \times 10^{-12} \text{ lbs.}$ |
| November  | $(8.11 \times 10^{-17} \text{ lbs./gal.})(112,446 \text{ gal.}) = 9.12 \times 10^{-12} \text{ lbs.}$ |
| December  | $(8.11 \times 10^{-17} \text{ lbs./gal.})(114,000 \text{ gal.}) = 9.25 \times 10^{-12} \text{ lbs.}$ |



EXHIBIT 2.2

1993  
Calculations  
re  
Radium 226 (Ra 226)

Assay = 150 pci/L

1 gm Ra 226 = 1 ci Ra 226

150 pci =  $15.0 \times 10^{-11}$  ci =  $15.0 \times 10^{-11}$  gm

$\frac{(15.0 \times 10^{-11} \text{ gm})(3.785 \text{ L/gal.})}{453.6 \text{ g/lb.}} = 1.25 \times 10^{-12} \text{ lbs./gal.}$

|           |  |
|-----------|--|
| January   | $(1.25 \times 10^{-12} \text{ lbs./gal.})(158,800) = 1.99 \times 10^{-7} \text{ lbs.}$ |
| February  | $(1.25 \times 10^{-12} \text{ lbs./gal.})(143,500) = 1.80 \times 10^{-7} \text{ lbs.}$ |
| March     | $(1.25 \times 10^{-12} \text{ lbs./gal.})(138,300) = 1.73 \times 10^{-7} \text{ lbs.}$ |
| April     | $(1.25 \times 10^{-12} \text{ lbs./gal.})(133,800) = 1.67 \times 10^{-7} \text{ lbs.}$ |
| May       | $(1.25 \times 10^{-12} \text{ lbs./gal.})(132,159) = 1.65 \times 10^{-7} \text{ lbs.}$ |
| June      | $(1.25 \times 10^{-12} \text{ lbs./gal.})(110,630) = 1.39 \times 10^{-7} \text{ lbs.}$ |
| July      | $(1.25 \times 10^{-12} \text{ lbs./gal.})(104,220) = 1.31 \times 10^{-7} \text{ lbs.}$ |
| August    | $(1.25 \times 10^{-12} \text{ lbs./gal.})(121,965) = 1.53 \times 10^{-7} \text{ lbs.}$ |
| September | $(1.25 \times 10^{-12} \text{ lbs./gal.})(117,734) = 1.47 \times 10^{-7} \text{ lbs.}$ |
| October   | $(1.25 \times 10^{-12} \text{ lbs./gal.})(114,718) = 1.44 \times 10^{-7} \text{ lbs.}$ |
| November  | $(1.25 \times 10^{-12} \text{ lbs./gal.})(112,446) = 1.41 \times 10^{-7} \text{ lbs.}$ |
| December  | $(1.25 \times 10^{-12} \text{ lbs./gal.})(114,000) = 1.43 \times 10^{-7} \text{ lbs.}$ |

EXHIBIT 2.3

1993  
Calculations  
re  
Uranium (U)

Assay = 27.1 mg/L

$$\frac{(27.1 \text{ mg})(3,785 \text{ L/gal.})}{(1000 \text{ mg/g})(453.6 \text{ g/lb.})} = .0002 \text{ lbs./gal.}$$

|           |                                      |
|-----------|--------------------------------------|
| January   | (.0002 lbs./gal.)(158,800) = 32 lbs. |
| February  | (.0002 lbs./gal.)(143,500) = 29 lbs. |
| March     | (.0002 lbs./gal.)(138,300) = 28 lbs. |
| April     | (.0002 lbs./gal.)(133,800) = 27 lbs. |
| May       | (.0002 lbs./gal.)(132,159) = 26 lbs. |
| June      | (.0002 lbs./gal.)(110,630) = 22 lbs. |
| July      | (.0002 lbs./gal.)(104,220) = 21 lbs. |
| August    | (.0002 lbs./gal.)(121,965) = 24 lbs. |
| September | (.0002 lbs./gal.)(117,734) = 24 lbs. |
| October   | (.0002 lbs./gal.)(114,718) = 23 lbs. |
| November  | (.0002 lbs./gal.)(112,446) = 23 lbs. |
| December  | (.0002 lbs./gal.)(114,000) = 23 lbs. |

EXHIBIT 2.4

1993  
Calculations  
re  
Total Dissolved Solids (TDS)

Assay = 38,800 mg/L

$$\frac{(38,800 \text{ mg})(3,785 \text{ L/gal.})}{(1000 \text{ mg/g})(453.6 \text{ g/lb.})} = .3238 \text{ lbs./gal.}$$

|           |  |
|-----------|--|
| January   | (.3238 lbs./gal.)(158,800) = 51,160 lbs. |
| February  | (.3238 lbs./gal.)(143,500) = 46,465 lbs. |
| March     | (.3238 lbs./gal.)(138,300) = 44,782 lbs. |
| April     | (.3238 lbs./gal.)(133,800) = 43,324 lbs. |
| May       | (.3238 lbs./gal.)(132,159) = 42,793 lbs. |
| June      | (.3238 lbs./gal.)(110,630) = 35,822 lbs. |
| July      | (.3238 lbs./gal.)(104,220) = 33,746 lbs. |
| August    | (.3238 lbs./gal.)(121,965) = 39,492 lbs. |
| September | (.3238 lbs./gal.)(117,734) = 38,122 lbs. |
| October   | (.3238 lbs./gal.)(114,718) = 37,146 lbs. |
| November  | (.3238 lbs./gal.)(112,446) = 36,410 lbs. |
| December  | (.3238 lbs./gal.)(114,000) = 36,913 lbs. |

EXHIBIT 2.5

1993  
Calculations  
re  
Selenium (Se)

Assay = .438 mg/L

$$\frac{(.438 \text{ mg})(3.785 \text{ L/gal.})}{(1000 \text{ mg/g})(453.6 \text{ g/lb.})} = 3.65 \times 10^{-6} \text{ lbs./gal.}$$

|           |   |
|-----------|---|
| January   | (3.65 x 10 <sup>-6</sup> lbs./gal.)(158,800) = .58 lbs. |
| February  | (3.65 x 10 <sup>-6</sup> lbs./gal.)(143,500) = .52 lbs. |
| March     | (3.65 x 10 <sup>-6</sup> lbs./gal.)(138,300) = .51 lbs. |
| April     | (3.65 x 10 <sup>-6</sup> lbs./gal.)(133,800) = .49 lbs. |
| May       | (3.65 x 10 <sup>-6</sup> lbs./gal.)(132,159) = .48 lbs. |
| June      | (3.65 x 10 <sup>-6</sup> lbs./gal.)(110,630) = .40 lbs. |
| July      | (3.65 x 10 <sup>-6</sup> lbs./gal.)(104,220) = .38 lbs. |
| August    | (3.65 x 10 <sup>-6</sup> lbs./gal.)(121,965) = .45 lbs. |
| September | (3.65 x 10 <sup>-6</sup> lbs./gal.)(117,734) = .43 lbs. |
| October   | (3.65 x 10 <sup>-6</sup> lbs./gal.)(114,718) = .42 lbs. |
| November  | (3.65 x 10 <sup>-6</sup> lbs./gal.)(112,446) = .41 lbs. |
| December  | (3.65 x 10 <sup>-6</sup> lbs./gal.)(114,000) = .42 lbs. |

EXHIBIT 2.6

1993  
Calculations  
re  
Vanadium (V)

Assay = 2.0 mg/L

$$\frac{(2.0 \text{ mg})(3.785 \text{ L/gal.})}{(1000 \text{ mg/g})(453.6 \text{ g/lb.})} = 1.67 \times 10^{-5} \text{ lbs./gal.}$$

|           |   |
|-----------|---|
| January   | (1.67 x 10 <sup>-5</sup> lbs./gal.)(158,800 gal.) = 2.65 lbs. |
| February  | (1.67 x 10 <sup>-5</sup> lbs./gal.)(143,500 gal.) = 2.40 lbs. |
| March     | (1.67 x 10 <sup>-5</sup> lbs./gal.)(138,300 gal.) = 2.31 lbs. |
| April     | (1.67 x 10 <sup>-5</sup> lbs./gal.)(133,800 gal.) = 2.23 lbs. |
| May       | (1.67 x 10 <sup>-5</sup> lbs./gal.)(132,159 gal.) = 2.21 lbs. |
| June      | (1.67 x 10 <sup>-5</sup> lbs./gal.)(110,630 gal.) = 1.85 lbs. |
| July      | (1.67 x 10 <sup>-5</sup> lbs./gal.)(104,220 gal.) = 1.74 lbs. |
| August    | (1.67 x 10 <sup>-5</sup> lbs./gal.)(121,965 gal.) = 2.03 lbs. |
| September | (1.67 x 10 <sup>-5</sup> lbs./gal.)(117,734 gal.) = 1.97 lbs. |
| October   | (1.67 x 10 <sup>-5</sup> lbs./gal.)(114,718 gal.) = 1.92 lbs. |
| November  | (1.67 x 10 <sup>-5</sup> lbs./gal.)(112,446 gal.) = 1.88 lbs. |
| December  | (1.67 x 10 <sup>-5</sup> lbs./gal.)(114,000 gal.) = 1.90 lbs. |

EXHIBIT 2.7

1993  
Calculations  
re  
Silver (Ag)

Assay = < .01

$$\frac{(.01 \text{ mg/L})(3.785 \text{ L/gal.})}{(1000 \text{ mg/g})(453.6 \text{ g/lb.})} = 8.34 \times 10^{-8} \text{ lbs./gal.}$$

|           |   |
|-----------|---|
| January   | (8.34 x 10 <sup>-8</sup> lbs./gal.)(158,800 gal.) = .013 lbs. |
| February  | (8.34 x 10 <sup>-8</sup> lbs./gal.)(143,500 gal.) = .012 lbs. |
| March     | (8.34 x 10 <sup>-8</sup> lbs./gal.)(138,300 gal.) = .012 lbs. |
| April     | (8.34 x 10 <sup>-8</sup> lbs./gal.)(133,800 gal.) = .011 lbs. |
| May       | (8.34 x 10 <sup>-8</sup> lbs./gal.)(132,159 gal.) = .011 lbs. |
| June      | (8.34 x 10 <sup>-8</sup> lbs./gal.)(110,630 gal.) = .009 lbs. |
| July      | (8.34 x 10 <sup>-8</sup> lbs./gal.)(104,220 gal.) = .009 lbs. |
| August    | (8.34 x 10 <sup>-8</sup> lbs./gal.)(121,965 gal.) = .010 lbs. |
| September | (8.34 x 10 <sup>-8</sup> lbs./gal.)(117,734 gal.) = .010 lbs. |
| October   | (8.34 x 10 <sup>-8</sup> lbs./gal.)(114,718 gal.) = .010 lbs. |
| November  | (8.34 x 10 <sup>-8</sup> lbs./gal.)(112,446 gal.) = .009 lbs. |
| December  | (8.34 x 10 <sup>-8</sup> lbs./gal.)(114,000 gal.) = .010 lbs. |

EXHIBIT 2.8

1993  
Calculations  
re  
Nickel (Ni)

Assay = .60 mg/L

$$\frac{(.60 \text{ mg/L})(3.785 \text{ L/gal.})}{(1000 \text{ mg/g})(453.6 \text{ g/lb.})} = 5.00 \times 10^{-6} \text{ lbs./gal.}$$

|           |   |
|-----------|---|
| January   | $(5.00 \times 10^{-6} \text{ lbs./gal.})(158,800) = .79 \text{ lbs.}$ |
| February  | $(5.00 \times 10^{-6} \text{ lbs./gal.})(143,500) = .72 \text{ lbs.}$ |
| March     | $(5.00 \times 10^{-6} \text{ lbs./gal.})(138,300) = .69 \text{ lbs.}$ |
| April     | $(5.00 \times 10^{-6} \text{ lbs./gal.})(133,800) = .67 \text{ lbs.}$ |
| May       | $(5.00 \times 10^{-6} \text{ lbs./gal.})(132,159) = .66 \text{ lbs.}$ |
| June      | $(5.00 \times 10^{-6} \text{ lbs./gal.})(110,630) = .55 \text{ lbs.}$ |
| July      | $(5.00 \times 10^{-6} \text{ lbs./gal.})(104,220) = .52 \text{ lbs.}$ |
| August    | $(5.00 \times 10^{-6} \text{ lbs./gal.})(121,965) = .61 \text{ lbs.}$ |
| September | $(5.00 \times 10^{-6} \text{ lbs./gal.})(117,734) = .59 \text{ lbs.}$ |
| October   | $(5.00 \times 10^{-6} \text{ lbs./gal.})(114,718) = .57 \text{ lbs.}$ |
| November  | $(5.00 \times 10^{-6} \text{ lbs./gal.})(112,446) = .56 \text{ lbs.}$ |
| December  | $(5.00 \times 10^{-6} \text{ lbs./gal.})(114,000) = .57 \text{ lbs.}$ |

EXHIBIT 2.9

1993  
Calculations  
re  
Molybdenum (Mo)

Assay = 2.6 mg/L.

$$\frac{(2.6 \text{ mg/L})(3,785 \text{ L/gal.})}{(1000 \text{ mg/g})(453.6 \text{ g/lb.})} = 2.17 \times 10^{-5} \text{ lbs./gal.}$$

|           |   |
|-----------|---|
| January   | (2.17 x 10 <sup>-5</sup> lbs./gal.)(158,800 gal.) = 3.45 lbs. |
| February  | (2.17 x 10 <sup>-5</sup> lbs./gal.)(143,500 gal.) = 3.11 lbs. |
| March     | (2.17 x 10 <sup>-5</sup> lbs./gal.)(138,300 gal.) = 3.00 lbs. |
| April     | (2.17 x 10 <sup>-5</sup> lbs./gal.)(133,800 gal.) = 2.90 lbs. |
| May       | (2.17 x 10 <sup>-5</sup> lbs./gal.)(132,159 gal.) = 2.87 lbs. |
| June      | (2.17 x 10 <sup>-5</sup> lbs./gal.)(110,630 gal.) = 2.40 lbs. |
| July      | (2.17 x 10 <sup>-5</sup> lbs./gal.)(104,220 gal.) = 2.26 lbs. |
| August    | (2.17 x 10 <sup>-5</sup> lbs./gal.)(121,965 gal.) = 2.65 lbs. |
| September | (2.17 x 10 <sup>-5</sup> lbs./gal.)(117,734 gal.) = 2.56 lbs. |
| October   | (2.17 x 10 <sup>-5</sup> lbs./gal.)(114,718 gal.) = 2.49 lbs. |
| November  | (2.17 x 10 <sup>-5</sup> lbs./gal.)(112,446 gal.) = 2.44 lbs. |
| December  | (2.17 x 10 <sup>-5</sup> lbs./gal.)(114,000 gal.) = 2.47 lbs. |



EXHIBIT 2.10

1993  
Calculations  
re  
Lead (Pb)

Assay = 0.3 mg/L.

$$\frac{(.30 \text{ mg/L})(3.785 \text{ L/gal.})}{(1000 \text{ mg/g})(453.6 \text{ g/lb.})} = 2.50 \times 10^{-6} \text{ lbs./gal.}$$

|           |  |
|-----------|--|
| January   | (2.50 x 10 <sup>-6</sup> lbs./gal.)(158,800 gal.) = .40 lbs. |
| February  | (2.50 x 10 <sup>-6</sup> lbs./gal.)(143,500 gal.) = .36 lbs. |
| March     | (2.50 x 10 <sup>-6</sup> lbs./gal.)(138,300 gal.) = .35 lbs. |
| April     | (2.50 x 10 <sup>-6</sup> lbs./gal.)(133,800 gal.) = .34 lbs. |
| May       | (2.50 x 10 <sup>-6</sup> lbs./gal.)(132,159 gal.) = .33 lbs. |
| June      | (2.50 x 10 <sup>-6</sup> lbs./gal.)(110,630 gal.) = .28 lbs. |
| July      | (2.50 x 10 <sup>-6</sup> lbs./gal.)(104,220 gal.) = .26 lbs. |
| August    | (2.50 x 10 <sup>-6</sup> lbs./gal.)(121,965 gal.) = .30 lbs. |
| September | (2.50 x 10 <sup>-6</sup> lbs./gal.)(117,734 gal.) = .29 lbs. |
| October   | (2.50 x 10 <sup>-6</sup> lbs./gal.)(114,718 gal.) = .29 lbs. |
| November  | (2.50 x 10 <sup>-6</sup> lbs./gal.)(112,446 gal.) = .28 lbs. |
| December  | (2.50 x 10 <sup>-6</sup> lbs./gal.)(114,000 gal.) = .29 lbs. |

EXHIBIT 2.11

1993  
Calculations  
re  
Chromium (Cr)

Assay = < .01 = used .01 mg/L

$$\frac{(.01 \text{ mg/L})(3,786 \text{ L/gal.})}{(1000 \text{ mg/g})(453.6 \text{ g/lb.})} = 8.3 \times 10^{-8} \text{ lbs./gal.}$$

|           |  |
|-----------|--|
| January   | (8.3 x 10 <sup>-8</sup> lbs./gal.)(158,800 gal.) = .013 lbs. |
| February  | (8.3 x 10 <sup>-8</sup> lbs./gal.)(143,500 gal.) = .012 lbs. |
| March     | (8.3 x 10 <sup>-8</sup> lbs./gal.)(138,300 gal.) = .012 lbs. |
| April     | (8.3 x 10 <sup>-8</sup> lbs./gal.)(133,800 gal.) = .011 lbs. |
| May       | (8.3 x 10 <sup>-8</sup> lbs./gal.)(132,159 gal.) = .011 lbs. |
| June      | (8.3 x 10 <sup>-8</sup> lbs./gal.)(110,630 gal.) = .009 lbs. |
| July      | (8.3 x 10 <sup>-8</sup> lbs./gal.)(104,220 gal.) = .009 lbs. |
| August    | (8.3 x 10 <sup>-8</sup> lbs./gal.)(121,965 gal.) = .010 lbs. |
| September | (8.3 x 10 <sup>-8</sup> lbs./gal.)(117,734 gal.) = .010 lbs. |
| October   | (8.3 x 10 <sup>-8</sup> lbs./gal.)(114,718 gal.) = .010 lbs. |
| November  | (8.3 x 10 <sup>-8</sup> lbs./gal.)(112,446 gal.) = .009 lbs. |
| December  | (8.3 x 10 <sup>-8</sup> lbs./gal.)(114,000 gal.) = .010 lbs. |

EXHIBIT 2.12

1993  
Calculations  
re  
Nitrate (NO3)

Assay = 146 mg/L

$$\frac{(146 \text{ mg/L})(3,785 \text{ L/gal.})}{(1000 \text{ mg/g})(453.6 \text{ g/lb.})} = .0012 \text{ lbs./gal.}$$

|           |  |
|-----------|--|
| January   | (.0012 lbs./gal.)(158,800 gal.) = 191 lbs. |
| February  | (.0012 lbs./gal.)(143,500 gal.) = 172 lbs. |
| March     | (.0012 lbs./gal.)(138,300 gal.) = 166 lbs. |
| April     | (.0012 lbs./gal.)(133,800 gal.) = 161 lbs. |
| May       | (.0012 lbs./gal.)(132,159 gal.) = 159 lbs. |
| June      | (.0012 lbs./gal.)(110,630 gal.) = 133 lbs. |
| July      | (.0012 lbs./gal.)(104,220 gal.) = 125 lbs. |
| August    | (.0012 lbs./gal.)(121,965 gal.) = 146 lbs. |
| September | (.0012 lbs./gal.)(117,734 gal.) = 141 lbs. |
| October   | (.0012 lbs./gal.)(114,718 gal.) = 138 lbs. |
| November  | (.0012 lbs./gal.)(112,446 gal.) = 135 lbs. |
| December  | (.0012 lbs./gal.)(114,000 gal.) = 137 lbs. |

EXHIBIT 2.13

1993  
Calculations  
re  
Sulfate (SO4)

Assay = 28,300 mg/L

$$\frac{(28,300 \text{ mg/L})(3,785 \text{ L/gal.})}{(1000 \text{ mg/g})(453.6 \text{ g/lb.})} = .2361 \text{ lbs./gal.}$$

|           |   |
|-----------|---|
| January   | (.2361 lbs./gal.)(158,800 gal.) = 37,500 lbs. |
| February  | (.2361 lbs./gal.)(143,500 gal.) = 33,887 lbs. |
| March     | (.2361 lbs./gal.)(138,300 gal.) = 32,659 lbs. |
| April     | (.2361 lbs./gal.)(133,800 gal.) = 31,596 lbs. |
| May       | (.2361 lbs./gal.)(132,159 gal.) = 31,209 lbs. |
| June      | (.2361 lbs./gal.)(110,630 gal.) = 26,125 lbs. |
| July      | (.2361 lbs./gal.)(104,220 gal.) = 24,611 lbs. |
| August    | (.2361 lbs./gal.)(121,965 gal.) = 28,802 lbs. |
| September | (.2361 lbs./gal.)(117,734 gal.) = 27,802 lbs. |
| October   | (.2361 lbs./gal.)(114,718 gal.) = 27,090 lbs. |
| November  | (.2361 lbs./gal.)(112,446 gal.) = 26,554 lbs. |
| December  | (.2361 lbs./gal.)(114,000 gal.) = 26,921 lbs. |

EXHIBIT 2.14

1993  
Calculations  
re  
Chloride (Cl)

Assay = 1100 mg/L

$$\frac{(1100 \text{ mg/L})(3.785 \text{ L/gal.})}{(1000 \text{ mg/g})(453.6 \text{ g/lb.})} = .0092 \text{ lbs./gal.}$$

|           |  |
|-----------|--|
| January   | (.0092 lbs./gal.)(158,800 gal.) = 1,458 lbs. |
| February  | (.0092 lbs./gal.)(143,500 gal.) = 1,317 lbs. |
| March     | (.0092 lbs./gal.)(138,300 gal.) = 1,269 lbs. |
| April     | (.0092 lbs./gal.)(133,800 gal.) = 1,228 lbs. |
| May       | (.0092 lbs./gal.)(132,159 gal.) = 1,213 lbs. |
| June      | (.0092 lbs./gal.)(110,630 gal.) = 1,015 lbs. |
| July      | (.0092 lbs./gal.)(104,200 gal.) = 956 lbs.   |
| August    | (.0092 lbs./gal.)(121,965 gal.) = 1,119 lbs. |
| September | (.0092 lbs./gal.)(117,734 gal.) = 1.081 lbs. |
| October   | (.0092 lbs./gal.)(114,718 gal.) = 1.053 lbs. |
| November  | (.0092 lbs./gal.)(112,446 gal.) = 1,032 lbs. |
| December  | (.0092 lbs./gal.)(114,000 gal.) = 1,046 lbs. |

EXHIBIT 2.15

1993  
Calculations  
re  
Sodium (Na)

Assay = 6960 mg/L

$$\frac{(6960 \text{ mg/L})(3.785 \text{ L/gal.})}{(1000 \text{ mg/g})(453.6 \text{ g/lb.})} = .058 \text{ lbs./gal.}$$

|           |   |
|-----------|---|
| January   | (.058 lbs./gal.)(158,800 gal.) = 9,210 lbs. |
| February  | (.058 lbs./gal.)(143,500 gal.) = 8,323 lbs. |
| March     | (.058 lbs./gal.)(138,300 gal.) = 8,021 lbs. |
| April     | (.058 lbs./gal.)(133,800 gal.) = 7,760 lbs. |
| May       | (.058 lbs./gal.)(132,159 gal.) = 7,665 lbs. |
| June      | (.058 lbs./gal.)(110,630 gal.) = 6,417 lbs. |
| July      | (.058 lbs./gal.)(104,220 gal.) = 6,045 lbs. |
| August    | (.058 lbs./gal.)(121,965 gal.) = 7,074 lbs. |
| September | (.058 lbs./gal.)(117,734 gal.) = 6,829 lbs. |
| October   | (.058 lbs./gal.)(114,718 gal.) = 6,654 lbs. |
| November  | (.058 lbs./gal.)(112,446 gal.) = 6,522 lbs. |
| December  | (.058 lbs./gal.)(114,000 gal.) = 6,612 lbs. |