

ANALYTICAL REPORT

ROCKWELL INTERNATIONAL  
NORTH AMERICAN SPACE OPERATIONS  
P.O. BOX 464  
GOLDEN, COLORADO 80401

GENERAL LABORATORY  
BUILDING 881

DISTRIBUTION:

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File

LAB NUMBER: E87-3780  
DATE: 11-06-87  
ACCOUNT NO: 986070-00

APPROVED:

*J. D. Grooms*  
J. D. Grooms

SAMPLE DESCRIPTION

Well # 9-87 for Remedial Investigation-903 PAD. Sample Date: 6-18-87

ANALYSIS RESULTS

Analytical results are listed in the attached Tables.

Analysis Qualifiers

The required detection limit (RDL) is listed for each parameter. When a sample parameter is reported below the RDL it appears in the table as a less than symbol (<). When the stated uncertainty is greater than the actual value, the analysis represents a non-minimum detectable activity value meaning the value is essentially zero. The stated uncertainties were established through the propagation of errors associated with the analysis, and are stated at the two sigma confidence interval.

The parameters of Pu-239, Am-241, U-234, 235, 238, Gross Alpha and Gross Beta do not have RDL values. The data reported for Sr-90 is actually the sum of Sr-89 and Sr-90. The half life for Sr-89 is 50.5 days, therefore, the probability of Sr-89 being present is unlikely but should still be considered since separate analysis were not performed.

Symbols

\* indicates that the sample has a pH below the required pH to analyze for carbonate. Therefore, alkalinity as carbonate is not analyzed for and is not reported.

@ indicates that the sample was not analyzed for this parameter as per the analysis request.

© indicates that the parameter result for the sample is nto availabe.

\*\* indicates that the sample was lost before of during analysis and the parameters are not reportable. **ADMIN RECORD**

"REVIEWED FOR CLASSIFICATION  
By R. B. Hoffman  
Date 7/11/90

REVIEWED FOR CLASSIFICATION/UCM  
By *George H. Lick*  
Date @ 7/3/90

TABLE 1

Analysis by Water Lab and Special Chemical Analysis

| <u>Analy//Samp.ID</u>                                  | <u>RDL</u> | <u>9-87</u> |
|--|------------|-------------|
| Cl <sup>-</sup> (mg/L)                                 | 1.0        | 4.91        |
| NO <sub>3</sub> <sup>-</sup> as N (mg/L)               | 0.20       | 3.3         |
| SO <sub>4</sub> <sup>=</sup> (mg/L)                    | 1.0        | 39          |
| Total Dissolved Solids (mg/L)                          | 1          | 270         |
| Alkalinity as:<br>HCO <sub>3</sub> <sup>-</sup> (mg/L) | 1.0        | 175         |
| CN <sup>-</sup> (ug/ml)                                | 1.0        | <           |
| Oil & Grease (mg/L)                                    | 5.0        | 53.3        |
| Cr <sup>+6</sup> (mg/L)                                | 1.0        | <           |

Analysis by Radiochemistry

|                     |                       |                               |
|---------------------|-----------------------|-------------------------------|
| Gross Alpha (pCi/L) | N/A                   | 14 ± 7                        |
| Gross Beta (pCi/L)  | N/A                   | 59 ± 12                       |
| U-234 (pCi/L)       | N/A                   | 1.8 ± 0.8                     |
| U-235 (pCi/L)       | N/A                   | 0.0 ± 0.3                     |
| U-238 (pCi/L)       | N/A                   | (1.9 ± 0.7)X 10 <sup>-1</sup> |
| Sr-90 (pCi/L)       | 1.0                   | <                             |
| Pu-239 (pCi/L)      | N/A                   | (0.0 ± 6.9)X 10 <sup>-1</sup> |
| Am-241 (pCi/L)      | N/A                   | 0.0 ± 1.3                     |
| Tritium (pCi/L)     | 1.1 X 10 <sup>2</sup> | 3.6 X 10 <sup>2</sup>         |
| Cs-137 (pCi/L)      | 1.0                   | <                             |

TABLE 2

Volatiles by Gas Chromatography

| <u>Analy//Samp.ID-</u>          | <u>RDL</u> | <u>9-87</u> |
|---------------------------------|------------|-------------|
| Chloroform (ppb)                | 4          | <           |
| Carbon Tetrachloride (ppb)      | 4          | <           |
| 1,1-Dichloroethene (ppb)        | 4          | <           |
| 1,2-Dichloroethane (ppb)        | 4          | <           |
| 1,1,1-Trichloroethane (ppb)     | 4          | <           |
| 1,1,2-Trichloroethane (ppb)     | 4          | <           |
| Trichlorethene (ppb)            | 4          | <           |
| Tetrachloroethene (ppb)         | 4          | <           |
| Trans- 1,2-Dichloroethene (ppb) | 4          | <           |

Dissolved Metal by Atomic Absorption (all units are ug/ml)

|                |        |       |
|----------------|--------|-------|
| Antimony (Sb)  | 0.06   | <     |
| Arsenic (As)   | 0.01   | <     |
| Cadmium (Cd)   | 0.005  | <     |
| Lead (Pb)      | 0.005  | 0.011 |
| Mercury (Hg)   | 0.0002 | <     |
| Potassium (K)  | 5.0    | <     |
| Selenium (Se)  | 0.005  | <     |
| Thallium (Tl)  | 0.01   | <     |
| Zinc (Zn)      | 0.02   | <     |
| Cesium (Cs)    | 0.2    | <     |
| Beryllium (Be) | 0.005  | <     |

TABLE 3

Dissolved Metal by ICP (all units are ug/ml)

| <u>Analy//Samp.ID</u> | <u>RDL</u> | <u>9-87</u> |
|-----------------------|------------|-------------|
| Silver (Ag)           | 0.01       | <           |
| Aluminum (Al)         | 0.2        | <           |
| Barium (Ba)           | 0.2        | <           |
| Calcium (Ca)          | 5.0        | 72.0        |
| Cobalt (Co)           | 0.05       | <           |
| Chromium (Cr)         | 0.01       | 0.01        |
| Copper (Cu)           | 0.025      | <           |
| Iron (Fe)             | 0.1        | <           |
| Magnesium (Mg)        | 5.0        | 7.2         |
| Manganese (Mn)        | 0.015      | 0.18        |
| Molybdenum (Mo)       | 0.04       | <           |
| Sodium (Na)           | 5.0        | 13.6        |
| Nickel (Ni)           | 0.04       | <           |
| Strontium (Sr)        | 0.2        | 0.31        |
| Vandium (V)           | 0.05       | <           |
| Zinc (Zn)             | 0.02       | 0.02        |