



**From:** Goering, Tim J [mailto:tjgoeri@sandia.gov]  
**Sent:** Monday, July 17, 2006 10:09 AM  
**To:** Moats, William, NMENV  
**Cc:** Mayerson, David, NMENV  
**Subject:** FW: MWL Well Installation Details

Will and David:

Attached is additional information on the use of drilling fluids at the MWL. This information was compiled by Joe Fritts after an extensive review of the MWL well files, which were provided to you earlier. His attached table includes information on the depths at which drilling fluids were injected. No information on quantities of fluids used was available.

Regards.

Tim Goering

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**From:** Fritts, Joseph E  
**Sent:** Thursday, July 13, 2006 10:35 AM  
**To:** Goering, Tim J  
**Subject:** MWL Well Installation Details

Attached is a table that summarizes the method of installation used for the wells at the MWL. This information was gathered from a review of the well files. BW1, MW2, and MW3 were drilled with mud rotary with only the addition of the most inert additives available. MW1, MW5, and MW6 were drilled using Air Rotary Casing Hammer and only water was added to facilitate cuttings removal. The sonic drilling method was utilized when drilling the borehole for MW4.

Let me know if further clarification is needed.

Joe

Copy of MWL-GWM\_Ammonia\_Sulfide/MWL-MW4\_Ammonia

| Well ID | Sample Date | Lab       | ARCOC  | Sample Number (ERDMS) | Sample ID (ARCOC) | ER Sample ID | Analyte          | Result | Unit-of-Measure | MDL   | PQL  | Lab Qualifier | DV Qualifier | Test Method | Sample Type |
|---------|-------------|-----------|--------|-----------------------|-------------------|--------------|------------------|--------|-----------------|-------|------|---------------|--------------|-------------|-------------|
| MWL-MW4 | 18-Apr-96   | GEL       | 5048   | SNL0203817            | 027792-005        | MWL-MW4      | Ammonia          | <.017  | mg/L            | 0.017 |      | U             | 0            | EPA 350.1   | D           |
| MWL-MW4 | 18-Apr-96   | GEL       | 5048   | SNL0203804            | 027791-005        | MWL-MW4      | Ammonia          | <.017  | mg/L            | 0.017 |      | U             | 0            | EPA 350.1   | F           |
| MWL-MW4 | 20-Oct-95   | GEL       | 4407   | 026466-05             |                   | MWL-MW4      | Ammonia          | <.017  | mg/L            | 0.017 | 0.05 | U             |              | EPA-MCAWW-  | DU          |
| MWL-MW4 | 20-Oct-95   | GEL       | 4407   | 026465-05             |                   | MWL-MW4      | Ammonia          | <.017  | mg/L            | 0.017 | 0.05 | U             |              | EPA-MCAWW-  | SA          |
| MWL-MW4 | 31-May-94   | QUANTERRA | 144    | SNL0201343            | SNLA013903-4      | MWL-MW4      | Ammonia nitrogen | 1.3    | mg/L            | 0.1   |      |               | 0            | 350.1       | F           |
| MWL-MW4 | 28-Oct-94   | QUANTERRA | 319    | SNL0201500            | 019302-4          | MWL-MW4      | Ammonia nitrogen | <.1    | mg/L            | 0.1   |      | U             | 0            | 350.1       | F           |
| MWL-MW4 | 11-Nov-93   | QUANTERRA | 6996   | SNL0201149            | SNLA014009-2      | MWL-MW4C     | Ammonia nitrogen | <.1    | mg/L            | 0.1   |      | U             | 0            | 350.1       | F           |
| MWL-MW4 | 14-Mar-94   | QUANTERRA | 508662 | SNL0201195            | SNLA014792-2      | MWL-MW4L     | Ammonia nitrogen | <.1    | mg/L            | 0.1   |      | U             | 0            | 350.1       | F           |

Copy of Springs\_Ammonia\_Sulfide/Springs\_Ammonia\_Sulfide

| Spring ID          | Sample Date | Lab     | ARCOC  | Sample Number  | ER Sample ID                 | Analyte | Result | Unit-of-Measure | MDL   | PQL | Lab Qualifier | DV Qualifier | Test Method     | Sample Type |
|--------------------|-------------|---------|--------|----------------|------------------------------|---------|--------|-----------------|-------|-----|---------------|--------------|-----------------|-------------|
| BURN SITE SPRING   | 28-May-98   | ERCL    | 600331 | 9805-600331-03 | BURN SITE SPRING             | Sulfate | 74     | mg/L            | 0.3   | 1.2 |               | NONE         | Anions_CE       | SA          |
| BURN SITE SPRING   | 31-Aug-04   | GEL     | 607840 | 065849-013     | SWC-CYN-BURN SITE SPRING-001 | Sulfate | 79.7   | mg/L            | 1.93  | 4   | B             | NONE         | SW846 9056      | SA          |
| COYOTE SPRING      | 7-Mar-96    | ENCOTEC | 8888   | 027742-07      | COYOTE SPRING                | Sulfate | 120    | mg/L            | 0.5   | 50  |               |              | EPA-MCAWW-300.0 | SA          |
| COYOTE SPRING      | 1-Apr-97    | QSTL    | 6146   | 033017-006     | COYOTE SPRING                | Sulfate | 56.4   | mg/L            | 0.5   | 2.5 |               |              | EPA-MCAWW-300.0 | SA          |
| COYOTE SPRING      | 20-May-99   | GEL     | 601360 | 044314-005     | COYOTE SPRINGS               | Sulfate | 132    | mg/L            | 0.152 | 0.8 |               | NONE         | EPA 300.0       | SA          |
| COYOTE SPRING      | 18-May-00   | GEL     | 602487 | 048662-005     | COYOTE SPRINGS               | Sulfate | 122    | mg/L            | 0.079 | 5   |               | NONE         | SW846 9056      | SA          |
| COYOTE SPRING      | 11-May-01   | GEL     | 603985 | 049915-013     | COYOTE SPRINGS               | Sulfate | 114    | mg/L            | 0.062 | 5   |               | NONE         | EPA 300.0       | SA          |
| COYOTE SPRING      | 12-Jun-02   | GEL     | 605512 | 049466-013     | COYOTE SPRING                | Sulfate | 119    | mg/L            | 1.93  | 4   |               | NONE         | SW846 9056      | SA          |
| COYOTE SPRING      | 24-Jun-03   | GEL     | 606549 | 062535-013     | COYOTE SPRINGS               | Sulfate | 116    | mg/L            | 1.93  | 4   |               | NONE         | SW846 9056      | SA          |
| COYOTE SPRING      | 23-Jun-04   | GEL     | 607598 | 065242-013     | COYOTE SPRINGS               | Sulfate | 133    | mg/L            | 9.65  | 20  |               | NONE         | SW846 9056      | SA          |
| COYOTE SPRING      | 20-Feb-06   | GEL     | 609502 | 075732-016     | COYOTE SPRINGS               | Sulfate | 123    | mg/L            | 5.7   | 40  | B             | NONE         | SW846 9056      | SA          |
| HUBBELL SPRING     | 15-Mar-96   | ENCOTEC | 4864   | 027756-07      | HUBBELL SPRING               | Sulfate | 210    | mg/L            | 5     | 20  |               |              | EPA-MCAWW-300.0 | SA          |
| SOL SE METE SPRING | 8-Mar-96    | ENCOTEC | 4847   | 027745-07      | SOLSEMETE SPRING             | Sulfate | 36     | mg/L            | 0.5   | 5   |               |              | EPA-MCAWW-300.0 | SA          |

# MWL WELL INSTALLATION SUMMARY

1/17/2008

| WELL | INSTALLED | DRILL METH | FLUID            | QUANTITY LOST | DEPTHS FLUIDS INJECTED        | ADDITIVES    | DEPTHS ADDITIVES INJECTED | INITIAL WL |
|------|-----------|------------|------------------|---------------|-------------------------------|--------------|---------------------------|------------|
|      |           |            |                  |               |                               | quantity n/k |                           |            |
| BW1  | 1989      | mud rotary | sodium bentonite | 3000 GALS     | to total depth                | CMC          | > 100 fbgs                | 461fbgs    |
|      |           |            |                  |               |                               | SODA ASH     | see footnote              |            |
|      |           |            |                  |               |                               | LCM          | above screen              |            |
| MW1  | 1988      | ARCH       | minor water      | n/a           | n/a                           | NONE         | N/A                       | 458 fbgs   |
|      |           |            |                  |               |                               |              |                           |            |
| MW2  | 1989      | mud rotary | sodium bentonite | n/k           | to total depth                | CMC          | > 100 fbgs                | 454 fbgs   |
|      |           |            |                  |               |                               | SODA ASH     | see footnote              |            |
|      |           |            |                  |               |                               |              |                           |            |
| MW3  | 1989      | mud rotary | sodium bentonite | n/k           | to total depth                | CMC          | > 100 fbgs                | 460 fbgs   |
|      |           |            |                  |               |                               | SODA ASH     | initial footage           |            |
|      |           |            |                  |               |                               |              |                           |            |
| MW4  | 1994      | sonic      | water            | n/k           | during well installation      | n/a          | n/a                       | 487 fbgs   |
| MW5  | 2000      | ARCH       | water            | n/k           | periodically from 355 fbgs on | none         | n/a                       | 487fbgs    |
| MW6  | 2000      | ARCH       | water            | n/k           | periodically from 455 fbgs on | none         | n/a                       | 484 fbgs   |

Soda ash footnote. There is some ambiguity whether soda ash was used in either BW1 or MW2. If so, it was utilized in the initial footage at these locations.  
 Initial water levels are as reported following completion of the well development.