



MWH

BUILDING A BETTER WORLD

October 27, 2009

Mr. Andrew Bain
Remedial Project Manager, Superfund Program
U.S. Environmental Protection Agency, Region 9
75 Hawthorne St. (SFD-8-2) 9th Floor
San Francisco, CA 94105

**Subject: Method Specification for Compaction of Backfill Material in the Unnamed Arroyo
Northeast Church Rock Mine Site, New Mexico**

Dear Mr. Bain:

MWH is submitting this letter to the U.S. Environmental Protection Agency (USEPA) on behalf of the United Nuclear Corporation (UNC). This letter is intended to document the results of the compaction method specification test for backfilling the arroyo that was proposed to EPA in the Final Construction Plan dated September 11, 2009. This letter provides a description of the construction of the test pads, results of the compaction testing, and the method that will be used for compaction of the soil backfill in the unnamed arroyo. These methods apply only to the placement of soil backfill and do not apply to bedding and riprap materials.

A sample of soils from the borrow area was submitted to Earthworks Engineering Group, LLC for determination of maximum density using standard effort (ASTM method D 698). Results of the test are included in Attachment 1 and show that the maximum density is 110.6 pounds per cubic foot at 14.1 percent moisture.

Two compaction test pads were constructed on September 30, 2009 using material from the designated borrow area shown in the Construction Plan (MWH, 2009). The test pads were constructed adjacent to the unnamed arroyo in Zone 4 north of the existing culvert. Contaminated materials had been excavated from the test area and the area had scanned below the correlated action level prior to compaction testing. One test pad was compacted using a John Deere 1050 bulldozer. The second test pad was compacted with a John Deere 850 bulldozer.

The test pads were constructed to dimensions four times the length and two times the width of each piece of equipment. Borrow material was stockpiled adjacent to the test pad area and was moved to the test pad using a wheeled loader. The loader placed the material in the test pad area but did not roll over staged (non-compacted) material on the test pad. Once sufficient material was placed in the test pad area for an 18 inch lift, the test pad was sprayed with two passes from the water truck and was leveled with the dozer performing the compaction. Two additional passes with the water truck were made after the pad was leveled. Then the bulldozer made two passes with the tracks over the test pad. Each pass consisted of traveling forward and backward over the entire pad. Following the second pass, density measurements were



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made at four random locations across the pad using a nuclear density gauge. Following density measurements a second lift was construction on top of the first. Results of the compaction tests are included in Attachment 2 and show that the average density for each lift exceeded 90 percent relative density.

Based on these results, the compaction method specification for the John Deere 1050 bulldozer will be:

- Lift thickness not greater than 18 inches
- Four passes with the water truck, or as necessary for a moisture content approximately between 8 and 14 percent
- Four passes of the tracks (two forward and two backward) over all areas of the backfill

The compaction method specification for the John Deere 850 bulldozer will be:

- Lift thickness not greater than 12 inches
- Four passes with the water truck, or as necessary for a moisture content approximately between 8 and 14 percent
- Four passes of the tracks (two forward and two backward) over all areas of the backfill

MACTEC plans on beginning backfilling of the southern portion of the arroyo on or about October 28, 2009.

Sincerely,

MWH Americas, Inc.

Jed Thompson
Supervising Civil Engineer

cc: Frieda White, NN EPA (4 copies)
Lance Hauer, General Electric



ATTACHMENT 1

PROCTOR TEST RESULTS

Project: NECR IRA Construction
EEG Project No.: A09-268
Sample: received as of 9/21/09
Method: ASTM D-698, A, Dry, Manual

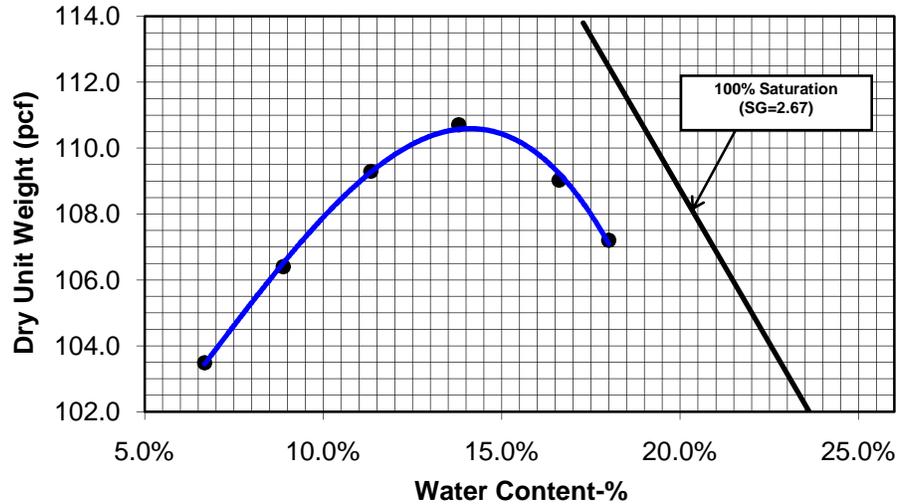
Unified Classification: CL
Description: Lean Clay

As Received Moisture Content: 4.7%

| Sieve: | 1 | 3/4 | 3/8 | No. 4 | No. 8 | No. 16 | No. 30 | No. 50 | No. 100 | No. 200 |
|------------------|--------|--------|-------|-------|-------|--------|--------|--------|---------|---------|
| Percent Passing: | 100.0% | 100.0% | 99.2% | 97.8% | 95.8% | 94.3% | 93.4% | 92.4% | 89.4% | 64.9% |

Liquid Limit: 31%
Plasticity Index: 14%

Compaction Curve:



Oversize Correction Data:

Fine Fraction: -
 Fine Fraction Moisture Content: -
 Dry Unit Weight of Fine Fraction: -
 Coarse Fraction: -
 Bulk Specific Gravity: -
 Coarse Aggregate Moisture Content: -

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|---|
| Max Dry Unit Weight (pcf): 110.6 |
| Opt. Water Content (%): 14.1% |

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| Estimated R-Value |
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ATTACHMENT 2



Earthworks Engineering Group, LLC
 Geotechnical Engineering - Materials Testing - Distress Investigations

Project: NECR IRA Gallop Test pads
Date: 09/30/09
Client: MWH
EEG Project No: A09-268

Compaction Test Results

DG

| No. | <u>Location Key</u> | | | <u>Elevation Key</u> | | | | |
|-----|--|---------------------------------------|-------------|-------------------------------------|--|-----------------|-------|----------|
| | BF - Backfill BP - Building Pad | FTG - Footing Ret - Retaining Wall | TR - Trench | FSG - Fin. Subgrade BTM - Bottom | AB - Agg. Base FAB - Finish Agg. Base | SP - Springline | | |
| | Location | | | Elev | Proctor | Dry | % H2O | Rel Dens |
| | Test Pad 850 | | | | | | | |
| | 1st lift #1 18" thick | | | | 110.6 | 100.0 | 9.7 | 90.4% |
| | 1st lift #2 18" thick | | | | 110.6 | 102.4 | 10.5 | 92.6% |
| | 1st lift #3 18" thick | | | | 110.6 | 105.7 | 11.2 | 95.6% |
| | 1st lift #4 18" thick | | | | 110.6 | 105.6 | 8.3 | 95.5% |
| | avg | | | | | | | 93.5% |
| | Test Pad 850 | | | | | | | |
| | 2nd Lift #5 36" total tickness | | | | 110.6 | 103.9 | 9.3 | 93.9% |
| | 2nd Lift #6 36" total tickness | | | | 110.6 | 104.0 | 9.9 | 94.0% |
| | 2nd Lift #7 36" total tickness | | | | 110.6 | 101.6 | 7.8 | 91.9% |
| | 2nd Lift #8 36" total tickness (dug down 7") | | | | 110.6 | 89.1 | 7.0 | 80.6% |
| | avg | | | | | | | 90.1% |
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| | BF - Backfill BP - Building Pad | FTG - Footing Ret - Retaining Wall | TR - Trench | FSG - Fin. Subgrade BTM - Bottom | AB - Agg. Base FAB - Finish Agg. Base | SP - Springline | | |
| | Location | | | Elev | Proctor | Dry | % H2O | Rel Dens |
| | Test Pad 1050 | | | | | | | |
| | 1st lift #1 15" thick | | | | 110.6 | 100.4 | 9.2 | 90.8% |
| | 1st lift #2 15" thick | | | | 110.6 | 103.5 | 8.4 | 93.6% |
| | 1st lift #3 15" thick | | | | 110.6 | 105.3 | 10.4 | 95.2% |
| | 1st lift #4 15" thick | | | | 110.6 | 91.8 | 8.5 | 83.0% |
| | avg | | | | | | | 90.6% |
| | Test Pad 1050 | | | | | | | |
| | 2nd Lift #5 24" total tickness | | | | 110.6 | 105.7 | 7.4 | 95.6% |
| | 2nd Lift #6 24" total tickness | | | | 110.6 | 103.2 | 8.2 | 93.3% |
| | 2nd Lift #7 24" total tickness | | | | 110.6 | 101.5 | 8.1 | 91.8% |
| | 2nd Lift #8 24" total tickness | | | | 110.6 | 103.5 | 9.1 | 93.6% |
| | avg | | | | | | | 93.6% |
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