Task Order LM00-502
Control Number 09-0301

December 15, 2008

U.S. Department of Energy
Office of Legacy Management
ATTN: Jack Craig
Site Manager
3600 Collins Ferry Road
Morgantown, WV 26505

SUBJECT: Rulison Long-Term Hydrologic Monitoring Program Sampling and Analysis Results for 2008

Dear Mr. Craig:

The U.S. Department of Energy (DOE) Office of Legacy Management conducted annual sampling at the Rulison, Colorado site, for the Long-Term Hydrologic Monitoring Program (LTHMP) on May 12, and 13, 2008. Samples were analyzed by the U.S. Environmental Protection Agency (EPA) Radiation & Indoor Environments National Laboratory in Las Vegas, Nevada. Samples were analyzed for gamma-emitting radionuclides by high-resolution gamma spectroscopy and tritium using the conventional and enriched methods.

**Site Location and Background**

The Rulison site is located in Garfield County in western Colorado (see attached Figure 1). The Rulison test was designed and conducted to evaluate the use of a nuclear detonation to fracture the tight gas-bearing sandstone formations in the Piceance Basin for enhanced natural gas production. A 43 kiloton device was detonated on September 10, 1969, at a depth of 8,426 feet below ground surface within the Williams Fork Formation of the Mesaverde Group.

Sampling locations (see attached Figure 2) are a combination of wells and surface water locations. Sample locations range from within a few hundred feet of surface ground zero (SGZ) to over 4 miles from SGZ. EPA performed the LTHMP sampling from program inception in 1972 through 2007. The results of the historical monitoring at Rulison have consistently shown that groundwater and surface water at the sample locations have not been impacted by nuclear-test-related contamination. DOE recently completed an evaluation of the LTHMP and concluded that monitoring of distant groundwater and surface water locations was not an effective method to detect detonation-related contamination. The evaluation determined that a new monitoring program, focused on detection of contaminant migration from the detonation zone was warranted at this time. The new monitoring program will emphasize sampling of natural gas production wells as the most likely pathway for transporting detonation derived contaminants. In addition to sampling gas production wells in the vicinity of the site, sampling will continue at groundwater and surface water locations near SGZ, as those locations are used to verify success of surface remediation activities.

## Sample Analytical Results

Sample analysis results are shown in Table 1. The results demonstrate that none of the sampling locations are being impacted by detonation-related contaminants. Three sampling locations yielded a reportable value of tritium activity using the enriched tritium analysis method. The values ranged from 18.3 to 35.8 picocuries per liter (pCi/L). Conventional tritium analysis for these same three locations resulted in no detectable activity. These results are consistent with background levels for tritium. For comparison, the EPA drinking water standard for tritium is 20,000 pCi/L. All other tritium sample results were below detection limits. All high-resolution gamma spectroscopy results for gamma-emitting radionuclides were below detection limits.

*Table 1. Rulison LTHMP Water Sample Analysis Results*

| Sample Location | Collection Date | Tritium (pCi/L) | Gamma Spectroscopy (pCi/L) |
|---|---|---|---|
| Cary Weldon (private well) | 05/13/2008 | ND | ND |
| Wesley Kent (private well) | 05/13/2008 | ND | ND |
| CER Test (private well) | 05/12/2008 | ND | ND |
| Daniel Gardner (private well) | 05/12/2008 | ND | ND |
| Kevin Whelan (private well) | 05/12/2008 | ND | ND |
| Morrissania Ranch (private well) | 05/12/2008 | 23.7 [a,b] | ND |
| Patrick McCarty (private well) | 05/12/2008 | 35.8 [a,b] | ND |
| Tim Jacobs (private well) | 05/12/2008 | ND | ND |
| City Springs (spring) | 05/13/2008 | ND | ND |
| Spr 300 Yrd N of GZ (spring) | 05/12/2008 | ND | ND |
| Sprg 500 ft E of GZ (spring) | 05/13/2008 | 18.3 [a,b] | ND |
| Battlement Creek (creek) | 05/12/2008 | ND | ND |
| Potter Ranch (spring) | 05/12/2008 | ND | ND |

[a]Analyzed using both conventional and enriched tritium methods.
[b]Result from enriched tritium analysis method.
ND = Not detected.

## Conclusions

Tritium and gamma-emitting contaminant concentrations in water samples collected at Rulison are consistent with historical sample analysis results. The results continue to verify that groundwater and surface water supplies in the area have not been impacted by detonation-related contaminants. In the future, samples from distant locations will not be collected, as recommended by the recent LTHMP evaluation report. Monitoring will continue at groundwater and surface water locations near the site and at natural gas production wells near the site.

If you have any questions concerning this report, please contact me at (970) 248-6477.

Sincerely,

Richard D. Hutton
Task Order Manager

Attachments

cc: (electronic)
Jack Duray, Stoller
Rex Hodges, Stoller

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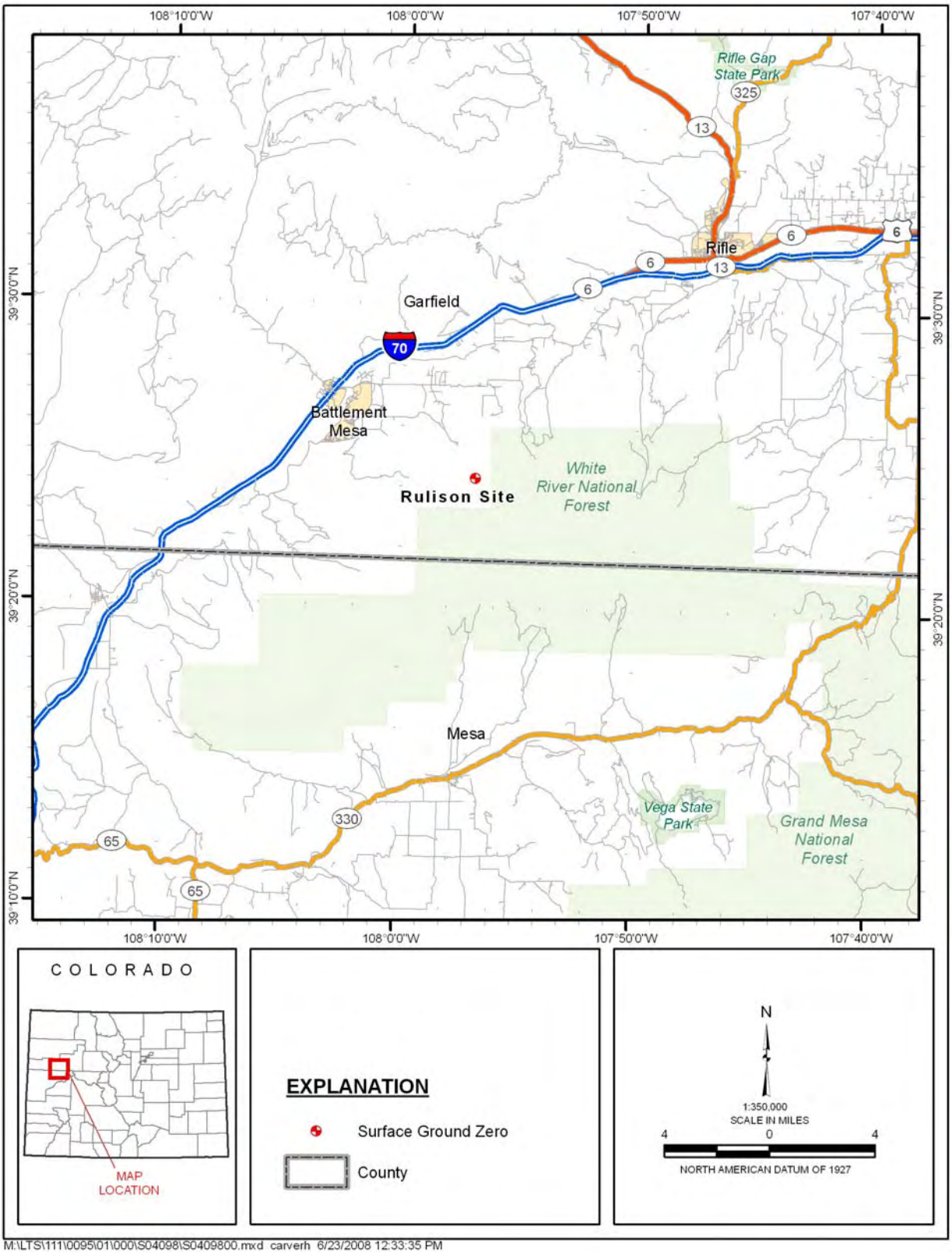


*Figure 1. Rulison Site Location Map*

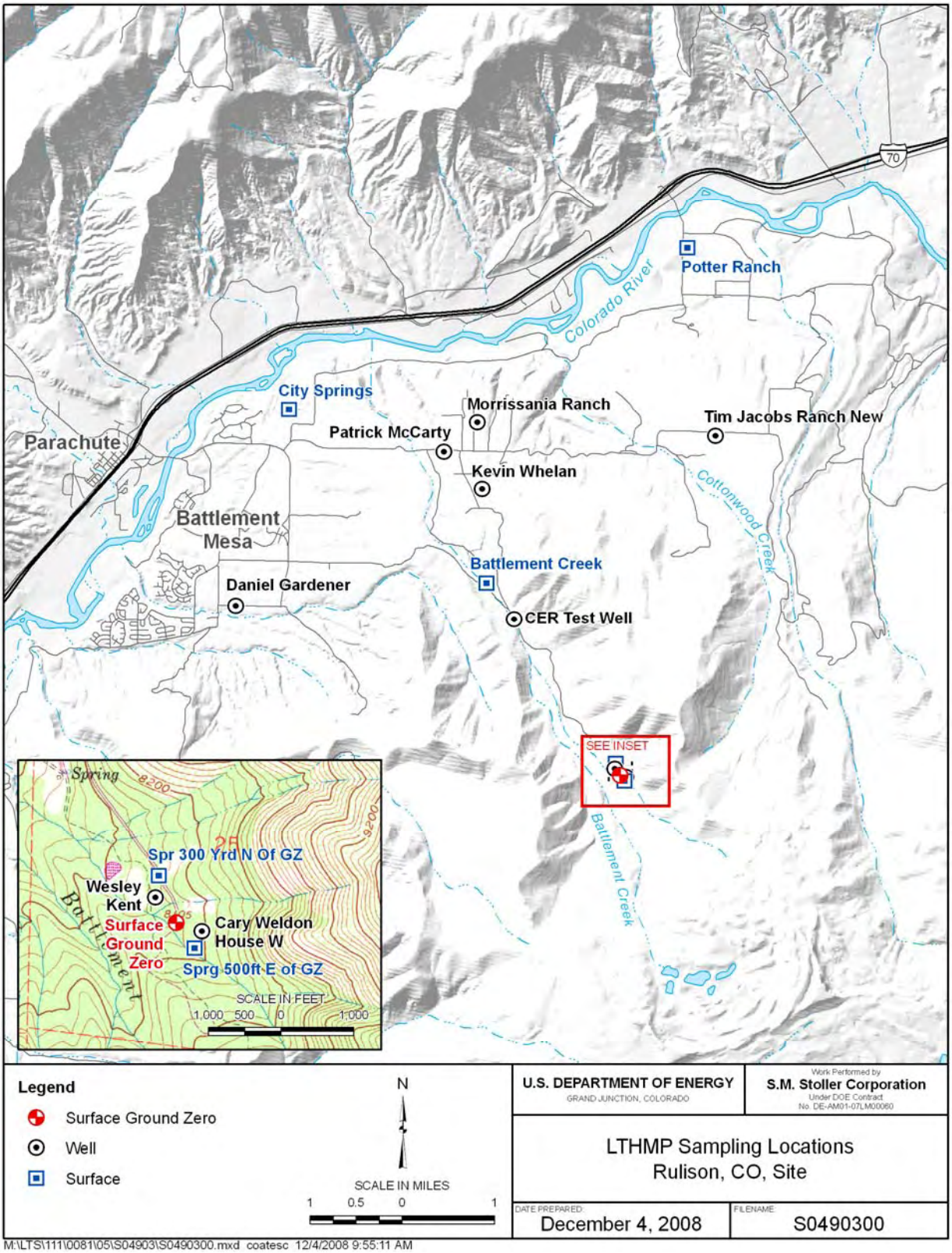


*Figure 2. LTHMP Sampling Locations, Rulison, CO, Site*