

December 6, 2012

U.S. Department of Energy
Office of Legacy Management
ATTN: Art Kleinrath
Site Manager
2597 Legacy Way
Grand Junction, CO 81503

SUBJECT: Contract No. DE-AM01-07LM00060, S.M. Stoller Corporation (Stoller)
Long-Term Hydrologic Monitoring Program Sampling and Analysis Results
for 2012 at Rulison, Colorado

REFERENCE: Task Order LM00-502-07-619, Rulison, Colorado, Site

Dear Mr. Kleinrath:

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 8, 2012. The samples were shipped to GEL Laboratories in Charleston, South Carolina, for analysis. All requested analyses were successfully completed. Samples were analyzed for gamma-emitting radionuclides by high-resolution gamma spectrometry; tritium was analyzed using two methods. The conventional tritium method has a detection limit on the order of 400 pCi/L, and a select set of samples was analyzed for tritium using the enriched method, which has a detection limit on the order of 3 pCi/L.

Site Location and Background

The Rulison site is located in Garfield County in western Colorado (see enclosed Figure 1). The Rulison test was designed and conducted to evaluate the use of a nuclear detonation to fracture the tight, gas-bearing 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 enclosed Figure 2) are a combination of wells and surface water locations. Sampling locations range from within a few hundred feet of surface ground zero (SGZ) to over 4 miles from SGZ. The U.S. Environmental Protection Agency (EPA) performed the LTHMP sampling from the program's inception in 1972 through 2007. The results of the historical monitoring at Rulison have consistently shown that nuclear-test-related contamination has not impacted groundwater or surface water at the sampling locations. In 2008, DOE reviewed all previous LTHMP data and evaluated future sampling locations. Based on the approximate 35 years of groundwater and surface water collection results, the depth to the

Rulison shot-point, and limited options for transport, DOE concluded that the monitoring of distant groundwater and surface water locations was not an effective approach for detecting detonation-related contaminant migration. The evaluation concluded that an updated monitoring program focused on detecting immediate contaminant migration from the detonation zone was warranted. The updated monitoring program emphasizes the sampling of natural gas production wells in the vicinity of the Rulison site. Producing gas wells near the Rulison site are considered the most likely pathway for transporting detonation-derived contaminants. The results of the natural gas monitoring program can be found online at www.lm.doe.gov/Rulison/Documents.aspx under the heading “Natural Gas Well Monitoring Results.” Not only will gas production wells near the site be sampled, but sampling will continue at groundwater and surface water locations near SGZ, as those locations are used to verify that no contaminants are migrating from the surface clean up areas or detonation zone.

Sample Analytical Results

Table 1 shows the water sample analysis results for 2012. The results demonstrate that no detonation-related contaminants are impacting any of the sampling locations. Four sampling locations were not sampled because the property owners denied access to the sampling locations. These locations are noted in Table 1 as “not sampled.” Conventional tritium analysis for all of the sampling locations resulted in no detectable activity. Enriched tritium sample analysis resulted in low levels of tritium being detected, as shown in Table 1. Figures 3 and 4 show historical enriched tritium sample analysis results, the EPA drinking water standard, and a line representing the natural decay rate for tritium. The current results are consistent with background levels for tritium and historical trends. For comparison, the EPA drinking water standard for tritium is 20,000 pCi/L. In Figure 3, one can see that the historical enriched tritium analysis results parallel the natural rate of tritium decay, an indication that additional tritium from detonation-related contamination is not being detected.

Table 1. Rulison LTHMP Water Sample Analysis Results

Sample Location	Collection Date	Tritium ^a (pCi/L)	Gamma Spectrometry ^b (pCi/L)
Cary Weldon (private well)	Not Sampled	-	-
Wesley Kent (private well)	Not Sampled	-	-
CER Test (private well)	05/08/2012	ND	ND
Daniel Gardner (private well)	05/08/2012	21.1 ^c	ND
Kevin Whelan (private well)	05/08/2012	20.2 ^c	ND
Morrissania Ranch (private well)	05/08/2012	ND	ND
Patrick McCarty (private well)	05/08/2012	ND	ND
Tim Jacobs (private well)	05/08/2012	22.7 ^c	ND
City Springs (spring)	05/08/2012	ND	ND
Sprg 300 Yrd N of GZ (spring)	Not Sampled	-	-
Sprg 500 ft E of GZ (spring)	Not Sampled	-	-
Battlement Creek (creek)	05/08/2012	ND	ND
Potter Ranch (spring)	05/08/2012	ND	ND

^a Conventional tritium analyses had a detection limit on the order of 400 pCi/L.

^b Gamma spectrometry detection limits are nuclide-specific and sample-specific.

^c Enriched tritium analysis result; detection limit on the order of 3.00 pCi/L.

ND = not detected

Conclusions

Contaminant concentrations in water samples collected at Rulison are consistent with historical sample analysis results. The results continue to verify that detonation-related contaminants have not impacted groundwater or surface water at the sampling locations.

Please contact me with any questions at (970) 248-6477.

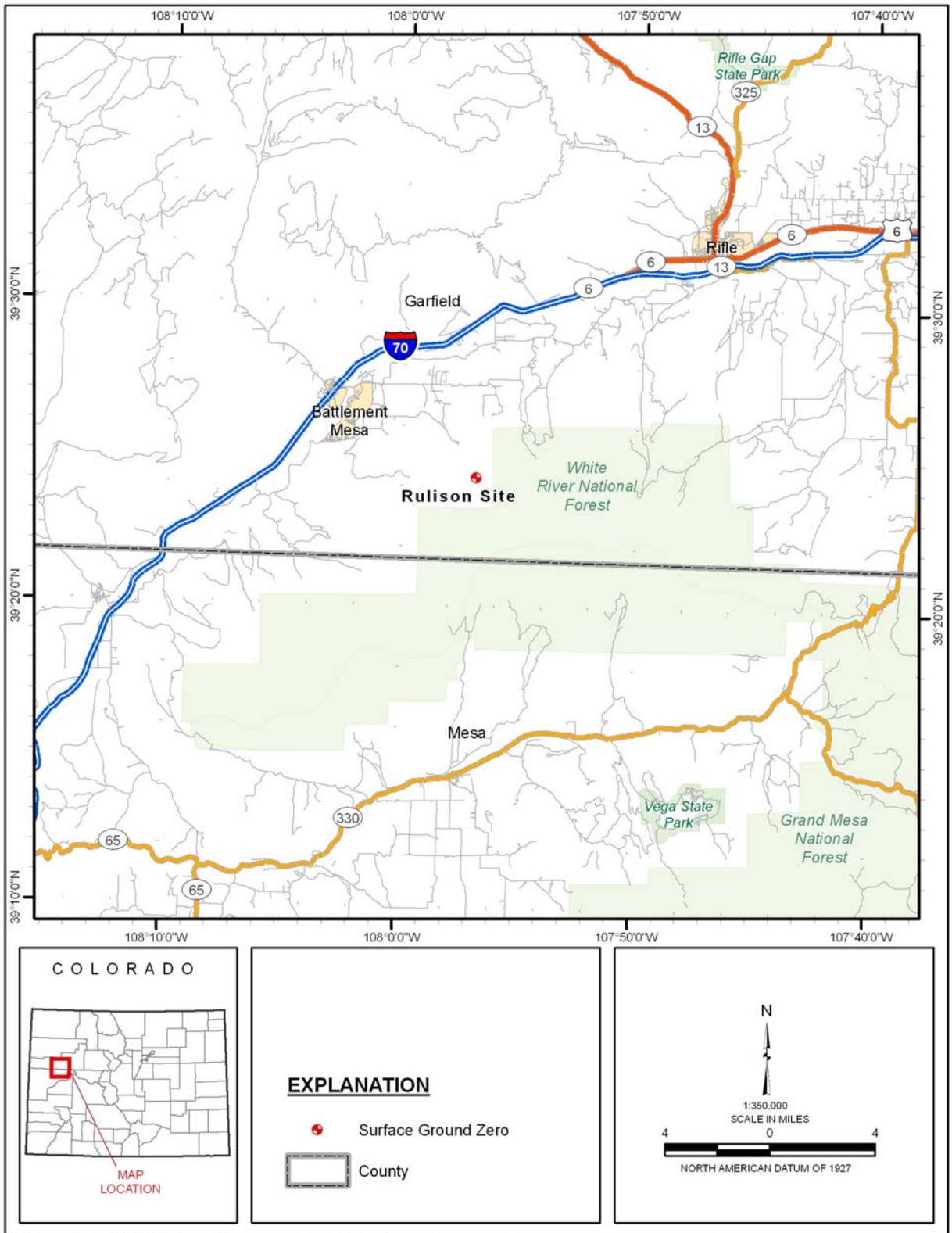
Sincerely,

Richard D. Hutton
Project Manager

Enclosures

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

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Figure 1. Rulison, Colorado, Site Location Map

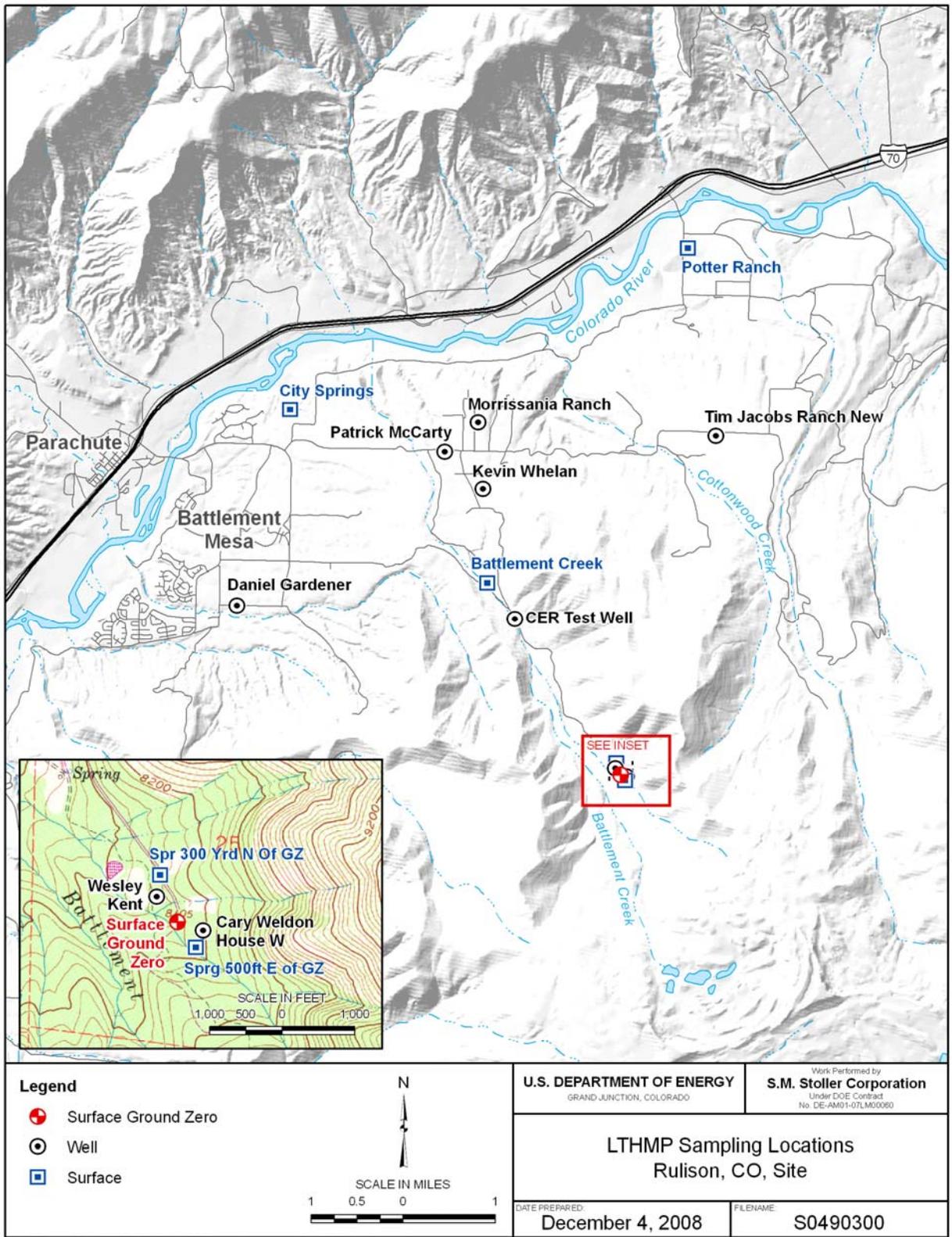


Figure 2. LTHMP Sampling Locations, Rulison, Colorado, Site

Rulison Site Enriched Tritium Concentration for Wells

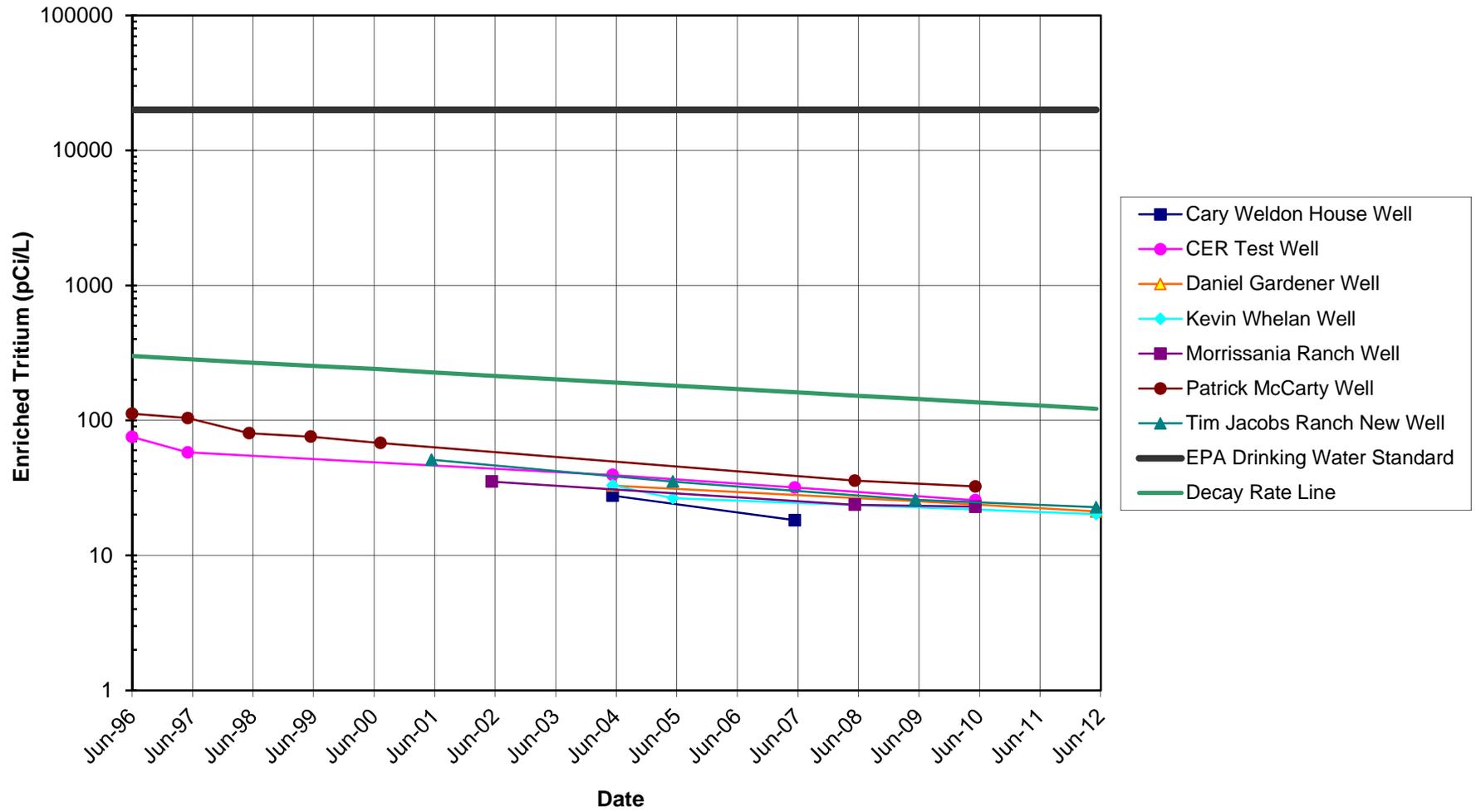


Figure 3. Enriched Tritium Concentrations—Wells, Rulison, Colorado, Site

Rulison Site Enriched Tritium Concentration for Springs/Surface Water

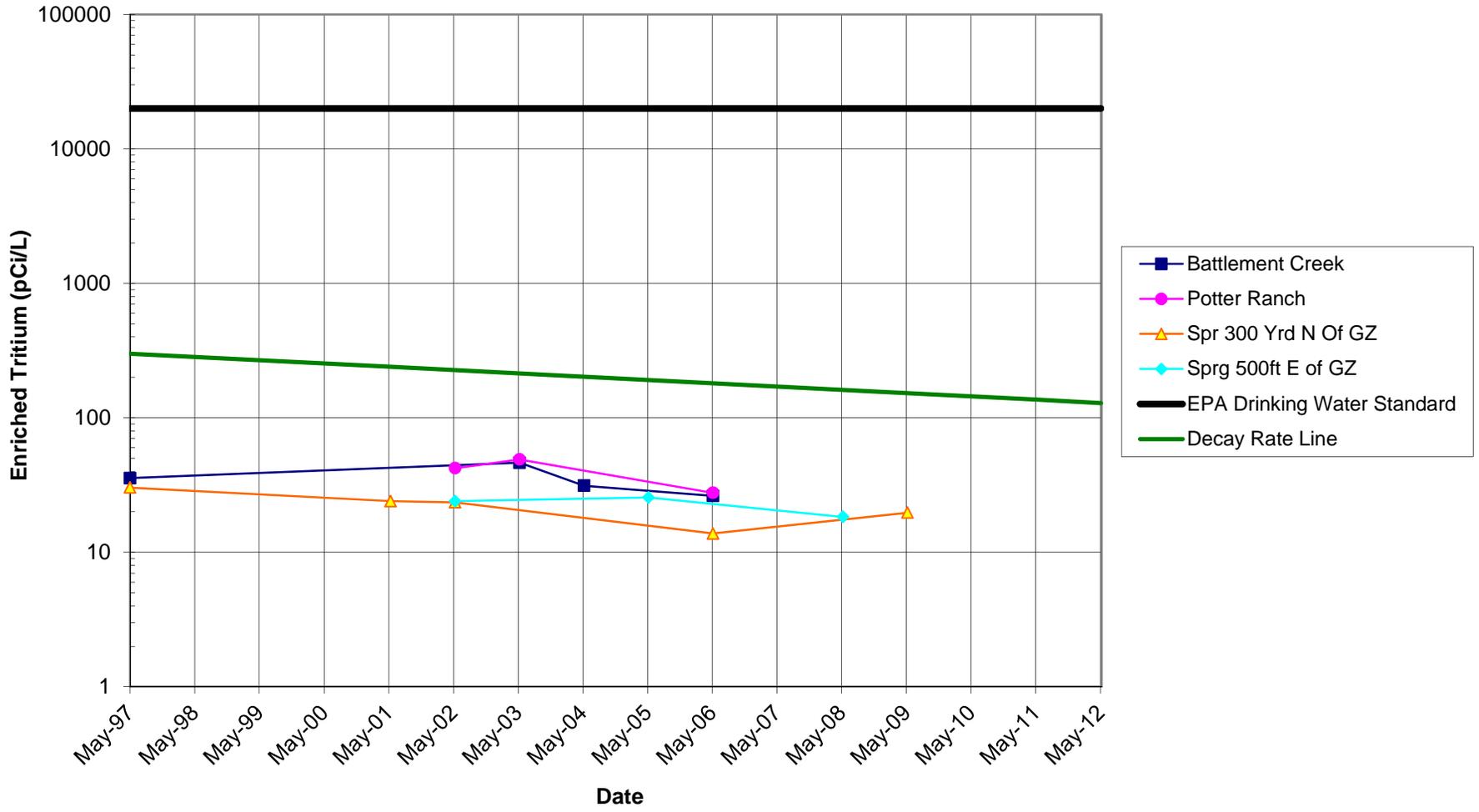


Figure 4. Enriched Tritium Concentrations—Surface Water, Rulison, Colorado, Site