

ROCKY FLATS SITE REGULATORY CONTACT RECORD

Purpose: Non-Rocky Flats Legacy Management Agreement (RFLMA) Surface Water Monitoring Project for North and South Walnut Creeks

Contact Record Approval Date: 3/15/10

Site Contacts/Affiliations: Scott Surovchak/U.S. Department of Energy (DOE); Linda Kaiser/Stoller; Rick DiSalvo/Stoller; John Boylan/Stoller; George Squibb/Stoller

Regulatory Contact/Affiliation: Carl Spreng/Colorado Department of Public Health and Environment (CDPHE)

Discussion: On January 18, 2010, DOE and CDPHE staff consulted regarding planned non-RFLMA surface water monitoring at various locations and the rationale for performing this monitoring. It was agreed that this monitoring does not require approval under RFLMA and that a Contact Record would be prepared to outline the monitoring project. The parties verbally concurred that the monitoring could proceed.

The non-RFLMA monitoring is intended to provide temporal and spatial water quality data that pertain to several postclosure aspects of Rocky Flats site operations and surveillance, which are outlined below.

- Closure of Rocky Flats resulted in the removal of buildings, roads, and parking lots and the elimination of imported water, which greatly reduced the runoff and eliminated sewage treatment plant effluent contributions to surface water. Groundwater, which contains varying levels of natural uranium, now makes up a higher proportion of surface water base flow compared to preclosure conditions. Periodic comparison of preclosure and postclosure natural uranium levels in surface water adds to the understanding of hydrologic conditions.
- The postclosure vegetation management and revegetation work is resulting in well-established vegetation in the Rocky Flats drainage areas. This is intended to mitigate erosion from runoff during precipitation events. Data will help characterize the water quality impacts from precipitation events.
- Breaching of Dams A-1 and A-2 (located in North Walnut Creek) and Dams B-1, B-2, B-3 and B-4 (located in South Walnut Creek) was completed in 2009. This action was the preferred alternative in the DOE October 2004 *Pond and Land Reconfiguration Environmental Assessment, Comment Response and Finding of No Significant Impact (DOE/EA-1492)*. The purpose of the action was to eliminate the cost of dam inspections and maintenance and enhance the ecological conditions by returning to a more natural flow-through condition approximating pre-Rocky Flats Plant operations. Water quality levels upstream and downstream of some of the breached dams can help quantify the effects of restored flow-through conditions.
- DOE is currently pilot-testing treatment media and component configurations, known as the Phase II/III upgrades to the Solar Ponds Plume Treatment System (SPPTS) in the North Walnut Creek drainage to gather information for design of a subsequent full-scale SPPTS Phase IV upgrade.

The following discussion provides background and objectives information for the non-RFLMA monitoring project.

Ambient water quality levels of uranium—RFLMA Attachment 2, *Legacy Management Requirements*, Table 1, Surface Water Standards, are based on the tables in Colorado Water Quality Control Commission (WQCC) Regulation No. 31: Basic Standards and Methodologies for Surface Water (5 CCR 1002-31) and on the site-specific standards in the WQCC Regulation No. 38 (5 CCR 1002-38).

The initial RFLMA uranium standard for Walnut Creek was 10 picocuries per liter (pCi/L), which is equivalent to approximately 14.6 micrograms per liter ($\mu\text{g/L}$) of uranium. This standard was based on an ambient uranium level that was determined during plant operations, which is no longer representative of site conditions. Post closure surface water runoff has decreased, and the relative contribution of uranium from groundwater containing predominantly natural uranium has therefore increased. DOE petitioned the WQCC in August 2007 to revise the uranium standard to the WQCC table value standard, which is the maximum contaminant level (MCL) of 30 $\mu\text{g/L}$.

DOE's impetus for the rulemaking in 2007 was that uranium levels at RFLMA Point of Evaluation GS10 in South Walnut Creek exceeded the RFLMA standard due to the increased groundwater contribution to surface water, and the predominantly natural uranium in groundwater. Concentrations of natural uranium in groundwater from wells near GS10 have been as high as 10 to 15 times the MCL, so with groundwater now comprising a higher proportion of surface water flows, applying an unusually low uranium standard may be inappropriate.

Following a January 2009 hearing, the WQCC revised the uranium standard to the Colorado health-based uranium metal standard of 16.8 $\mu\text{g/L}$, which is equivalent to approximately 11.3 pCi/L of uranium. The WQCC decided that human health-based criteria were more appropriate than the table value standard, a new ambient-based standard, or maintaining the current standards at that time, but would consider future revisions based on additional data if requested.

Since the late 1990s, samples from a number of surface water and groundwater locations have been collected for analysis at Los Alamos National Laboratory (LANL) to determine the relative presence of natural and anthropogenic uranium species; recently, these samples have provided data for the WQCC hearing. Non-RFLMA samples will again be collected for LANL analysis to update this information.

SPPTS upgrade and ambient nitrate and uranium—The SPPTS Phase II/III work was necessitated in part because of the successful implementation of the SPPTS Phase I upgrade to collect additional nitrate- and uranium-contaminated groundwater, which increased the contaminant loading and water flow rates to the SPPTS. Those flows could not be adequately treated by the original SPPTS. The approved SPPTS Phase I, II, and III upgrades are documented in Contact Records 2008-08 and 2009-01.

Following completion of the Phase I upgrades that increased nitrate loading and water flow rates to the SPPTS, the RFLMA nitrate standard, which was a temporary modification that adopted an agricultural-based standard of 100 mg/L, expired on December 31, 2009. The current nitrate standard is now based on the water supply standard of 10 mg/L. DOE will be evaluating the Phase II and III results to determine the practicability of a subsequent Phase IV system to cost effectively minimize in-stream levels. Monitoring will provide data for ambient water quality levels resulting from bioreduction of nitrate and the contribution of natural uranium in groundwater baseflow.

Spatial variation during precipitation runoff events—In-stream radionuclide and total suspended solids (TSS) concentrations during the rising and falling water levels due to precipitation events (synoptic sampling) will provide data for evaluating the effects of soil erosion on water quality.

The non-RFLMA monitoring project involves four sampling activities, described below. The sampling locations and analytes are shown in Figure 1.

- Grab samples will be collected at eight locations in North Walnut Creek and analyzed for nitrate+nitrate as N concentrations. The samples will initially be collected biweekly; sampling frequency may be adjusted as data become available. Analytical results will be evaluated both spatially and temporally to further define nitrate concentration and variation in North Walnut Creek.
- Grab samples will be collected at 12 locations in both North and South Walnut Creeks and analyzed for total uranium concentrations. The samples will initially be collected at a biweekly frequency; sampling frequency may be adjusted as data become available. Analytical results will be evaluated both spatially and temporally to further define uranium concentration and variation in North and South Walnut Creeks.
- Grab samples will be collected at 12 locations in both North and South Walnut Creeks and analyzed at LANL for isotopic uranium signatures using high-resolution instruments. The samples will be collected as a single sampling event in March 2010; additional LANL sampling may be conducted at later dates. Analytical results will be evaluated spatially to further define the ratios of anthropogenic to natural uranium in North and South Walnut Creeks.
- Automated storm-event composite samples will be collected at six locations in both North and South Walnut Creeks for plutonium, americium, and TSS. Automated water sampling equipment will be temporarily installed next to the stream or stoplog structure (at the ponds). The equipment will be attached to a half-pallet (approximately 2 feet by 4 feet, or approximately 8 square feet) that is staked to the ground. A small vinyl tube will be run to the stream or the pond stoplog structure and attached to either a piece of rebar in the stream or the face of the stoplog structure at the ponds. The samplers will be programmed to trigger on rising water levels and then automatically collect samples during the rising limb of a runoff event (the rising limb of a runoff event is the period with the highest suspended solids concentration). The intent is to synoptically collect a sample at each location from the same runoff event during the same portion of the hydrograph. This sampling is intended to occur for six runoff events; additional events may be sampled based on the data evaluation. Analytical results will primarily be evaluated spatially to look for variation along the stream reaches.

At present, it is estimated that the sampling project will be conducted over a 3 to 4 month period. However, some of the sampling may be conducted for a shorter or longer period. DOE will keep CDPHE informed through consultation regarding any additional sampling locations or changes to the sampling project.

Closeout of Contact Record: This contact record will be closed after completion of the non-RFLMA sampling project described herein. After this Contact Record is closed out, additional non-RFLMA sampling activities may be performed, and CDPHE will be kept apprised of the additional sampling through the consultative process.

Resolution: Carl Spreng, CDPHE, approved the summary of the consultation regarding the non-RFLMA sampling project.

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Distribution:

Carl Spreng, CDPHE

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Rocky Flats Contact Record

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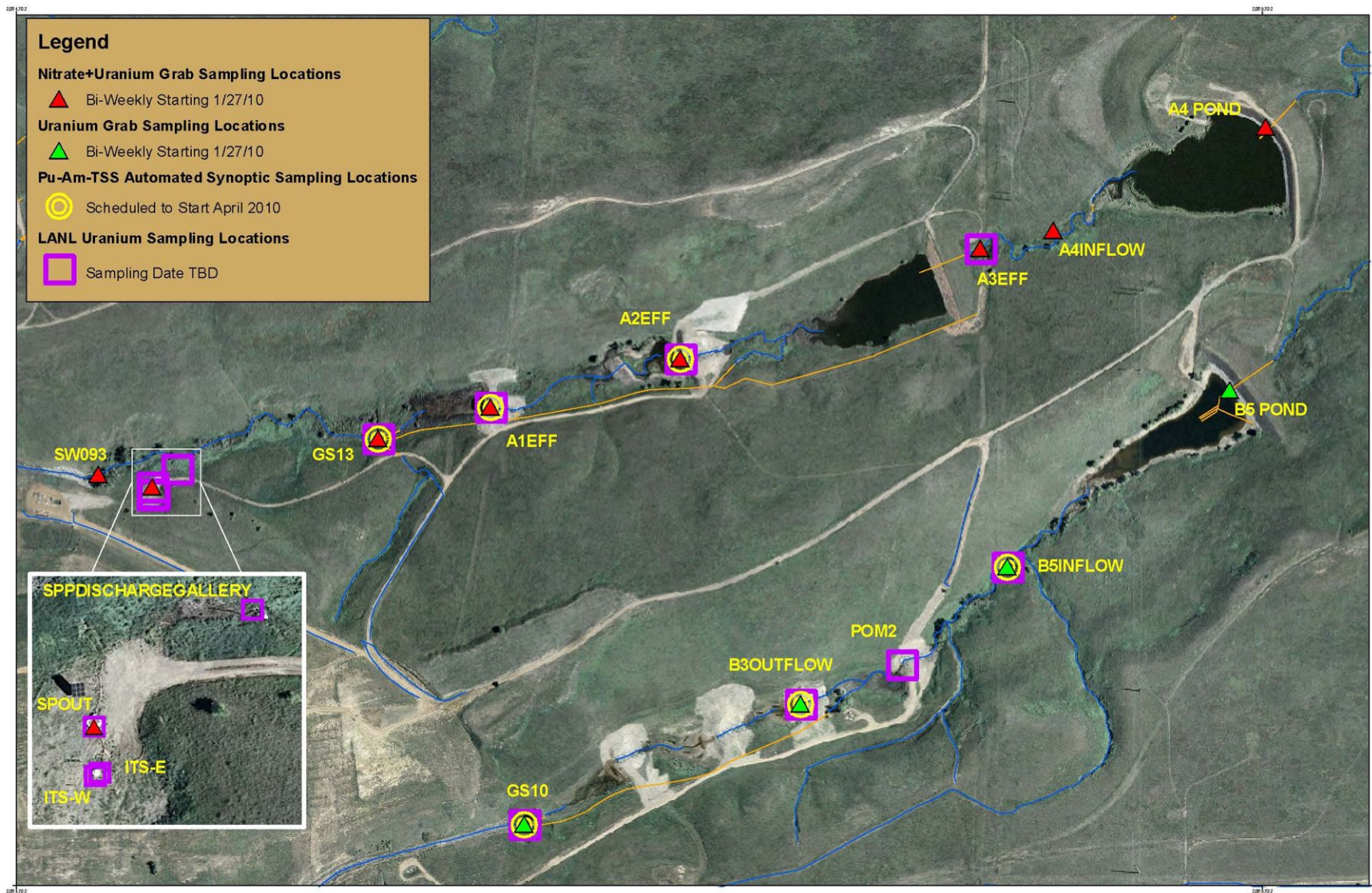


Figure 1. Sampling Locations and Analytes for the Non-RFLMA Monitoring Project