Appendix I

2009 Program Directives

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Program Directive

Monticello Disposal/Processing Site

Activity or Task Semi-annual water quality monitoring **Directive No.** MNT-2009-01

Initiated By: T. Bartlett/Site Lead

Directive Subject: Modification to analyte list and sample hold time.

Directive and Associated Task Changes:

1. Continue sampling for TDS only at monitoring wells T01-01, T01-12, 88-85, 92-08, MW00-06.
2. Continue sampling for TDS only at surface locations Seep 2, SW00-02, SW01-02, SW01-01, Sorenson.
3. The hold time for TDS aliquots is extended to 14 days.
4. Analysis of uranium isotopes in all surface water samples is discontinued.
5. Analysis of gross alpha activity and gross beta activity in all ground water and surface water samples is discontinued.

Organization(s) Affected: Environmental Monitoring/Field Services; Environmental Support Services

Affected Documents: *Monticello Mill Tailings Site Operable Unit III Post-Record of Decision Monitoring Plan*, August 2004 (MMTS monitoring plan, DOE-LM/GJ684-2004) and *Ground Water and Surface Water Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (DOE-LM/GJ1112-2006).

Justification for the Directive:

Modifications implemented by this directive were initiated at the direction of UDEQ in concurrence with EPA Region 8 at the May 10, 2005, Monticello FFA meeting. This directive updates Directive MNT-2007-01 to extend the modifications through FY 2009.
NOTE: the above modifications affect Table 4-1 of the MMTS monitoring plan.
NOTE: purge criteria and sample filtration criteria specified in the MMTS monitoring plan are not affected by this directive.

Review and Concurrence:

Steve Donivan 9-23-2008
Steve Donivan, Laboratory Services Coordinator (Date)

Linda Tegelman 09 25 08
Linda Tegelman, QA Specialist (Date)

Issuing Manager Approval:

Carl Jacobson 9/25/08
Carl Jacobson, Sub Task Order Manager (Date)

Effective Date: October 1, 2008 **Expiration Date:** September 30, 2009

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T. Bartlett, Site Lead
Linda Sheader for Information Repository (2 copies)
Sam Campbell, Lead, Environmental Monitoring/Field Services

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Program Directive

U.S. Department of Energy Office of Legacy Management
Monticello Disposal/Processing Site

Activity or Task Ground water compliance field work **Directive No.** MNT-2009-02

Initiated By: T. Bartlett/Site Lead

Directive Subject: Field and laboratory methods will be implemented to investigate the extent of localized hot spots of ground water and surface seep contamination.

Directive and Associated Task Changes:

S.M. Stoller will self-perform installation of soil borings using a Geoprobe rig or manual devices for the purpose of collecting water samples for laboratory analysis of uranium. The attached sampling and analysis plan provides the detailed scope of work, field and laboratory, and rationale and data use objectives.

Organization(s) Affected: Ecology/Hydrology; Environmental Monitoring/Field Services; Environmental Sciences Laboratory; Environmental Support Services

Affected Documents: *Monticello Mill Tailings Site Operable Unit III Post-Record of Decision Monitoring Plan*, August 2004 (MMTS monitoring plan, DOE-LM/GJ684-2004).

Justification for the Directive:

The work specified in this directive is being implemented as a response action for the contingency remedy for OU III and in accordance with the Explanation of Significance Difference for the OU III, March 2009.

Review and Concurrence:

4/1-2009

Vickie Price, QA Specialist (Date)

Issuing Manager Approval:

4/1/09

Carl Jacobson, Sub Task Order Manager (Date)

Effective Date: October 1, 2008 **Expiration Date:** September 30, 2009

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T. Bartlett, Site Lead
Sam Campbell, Lead, Environmental Monitoring/Field Services
Linda Sheader for Information Reposiitory (2 copies)

Sampling and Analysis Plan
Ground Water Hot Spot and Seep 6 Studies
Operable Unit III
Monticello Mill Tailings Site, Monticello, Utah
April 2009

I. Introduction

Work conducted under this plan is directed by Program Directive MNT-2009-02. This sampling and analysis plan provides the technical basis and direction for obtaining water samples from temporary soil borings and existing wells for the purpose of a one-time snapshot characterization of localized hot spots of ground water and surface water contamination. The work will focus on the region of the alluvial aquifer south of Montezuma Creek between the PRB and the millsite; and, the area surrounding Seep 6 (see attached figure). This work is being implemented as a contingency remedy response action in accordance with the Explanation of Significant Difference, signed March 2009.

II. Data Use Objective

The objective of this study is to determine the extent of ground water contamination by uranium in the two specified areas. Uranium concentrations in the alluvial aquifer at some locations between the PRB and millsite are unexpectedly rising. At Seep 6, uranium concentrations are anomalously high with no apparent trending. These conditions may prolong water quality restoration in the respective areas for a much greater time than was originally expected. The information obtained in this study will assist DOE in evaluating natural attenuation at the site, identifying a potential target area for ground water extraction and treatment, and estimating the period of ground water and surface water restoration.

III. Scope of Work

Alluvial Aquifer

Soil borings will be mechanically advanced using a direct-push rig into the alluvial aquifer at numerous locations between the PRB and millsite from which a sample of ground water will be collected. Borings will be located grid-wise for the entire area. Up to twenty-four borings/samples are anticipated (see attached figure). All work will be performed by the DOE LM contractor.

Subsurface materials in the area of interest consist of unconsolidated silt and fine sand that overlie poorly sorted sand and gravel and occasional cobbles. Each boring will be advanced to bedrock, typically within 30 ft of ground surface. Depth to bedrock and depth to static water will be measured and recorded to determine the saturated thickness of the alluvial aquifer. Once this is confirmed, the drill rods will be extracted to the approximate center of the saturated zone and a water sample will be collected through the rods. The water sample will be collected using a peristaltic pump or mechanical lift device. All tubing and pumps will be decontaminated between sample locations.

Following sample collection, all boreholes will be abandoned by backfilling to 3 to 4 feet above the water table with commercial bentonite. The remainder of the hole will be filled with native soil or commercial sand.

In addition to the borehole water samples, a water sample will be collected from existing wells T00-03, T00-05, T00-06, T00-07, MW00-03 and PW-23. Depth to water, total well depth, and stick up will also be measured and recorded. These wells are not routinely sampled, but for this study the water quality information will assist in delineating the ground water contamination hot spot.

General water quality parameters (pH, electrical conductivity, temperature, alkalinity) will be measured in the field if sufficient water is available. One aliquot from each location will be placed in a polyethylene bottle and placed on ice until laboratory analysis. The sample aliquots will be transferred to the DOE LM Environmental Sciences Laboratory (ESL) in Grand Junction, Colorado, for analysis of uranium by kinetic phosphorescence and major ions by ion chromatography. The water samples will be filtered in the laboratory prior to analysis. All analytical procedures will conform to standard operating practices documented in Environmental Sciences Laboratory Procedures manual, Stoller Manual STO 210.

Seep 6

Seep 6 emanates high concentrations (approximately 2,000 μg/L) of dissolved uranium. The seep is located in the area of former mill facilities and is hydraulically above the alluvial aquifer. The origin and extent of contamination at this location is not known. This field study will attempt to identify areal extent of aqueous contamination in this area and the source of water to Seep 6.

Field study will use manual coring devices for a one-time characterization of water quality and occurrence in the area. The coring device will be advanced until refusal or to the limit of the manual method. Bedrock in this area is within several feet of ground surface. Coreholes will be advanced laterally outward and upward of Seep 6 until the extent of saturation can be approximated. A water sample will be collected at each location and analyzed at the ESL for uranium and possibly radon-222 (as an indicator of mill tailings).

In addition to coring and water sample collection, reconnaissance of the area of Seep 6 will identify the possible source(s) of water, for example municipal water lines and stock tanks.

IV. Health and Safety

A "Plan of the Day/Plan of the Week" form (LMS 2130e) will be required each day field work is conducted to authorize the daily scope of work. The form must be signed by the Site Lead/Project Manager.

Field work with the Geoprobe will be conducted according to the requirements in the signed Job Safety Analysis and a signed Project Activity Evaluation that were prepared specifically for the work scope included in this sampling and analysis plan.

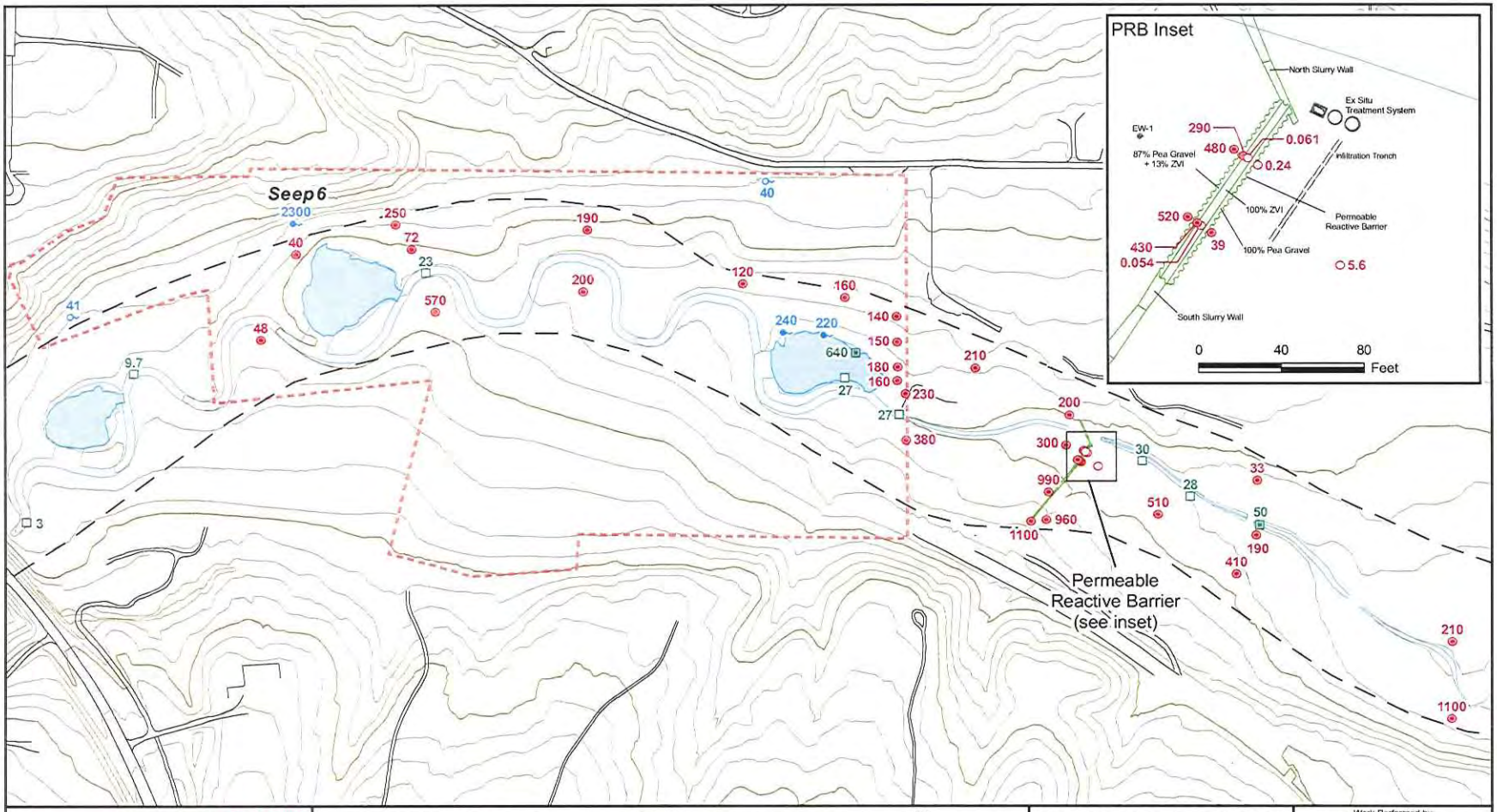
A daily safety meeting will be conducted and documented prior to the start of work.

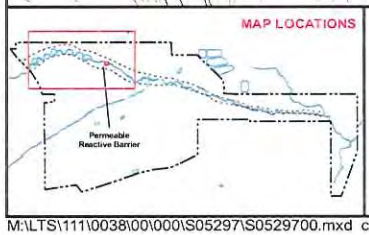
V. Waste Management

See attachment 1.

VI. Documentation and Reporting

Field activities will be recorded by the geologist in a field logbook. Upon completion of the field work, the geologist will prepare a trip report for the Site Lead to document data collection information and site conditions. Laboratory analysis information will be recorded by the analyst in accordance with Manual STO 210. Pertinent sample information (field and laboratory) and analytical results will be incorporated into the DOE LM database. Results of the investigations will be presented and evaluated in the annual ground water report for OU III (annual ground water reports are typically distributed in September).





Uranium Alluvial Ground Water Sample
< 30 ug/L
> 30 ug/L

Uranium Montezuma Creek Surface Water Sample
< 44 ug/L
> 44 ug/L

Uranium Seep Surface Water Sample
< 44 ug/L
> 44 ug/L

Approximate Extent of Alluvial Aquifer
Former Millsite
Road
Stream
Pond
Topographic Contour (50' Interval)
Topographic Contour (10' Interval)

N

0 300 600
Scale in Feet

U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION, COLORADO

Work Performed by
S.M. Stoller Corporation
Under DOE Contract No. DE-AC01-07LM00060

Program Directive MNT-2009-02
Uranium in Ground Water and Surface Water, October 2008

DATE PREPARED: April 1, 2009

FILENAME: S0529700

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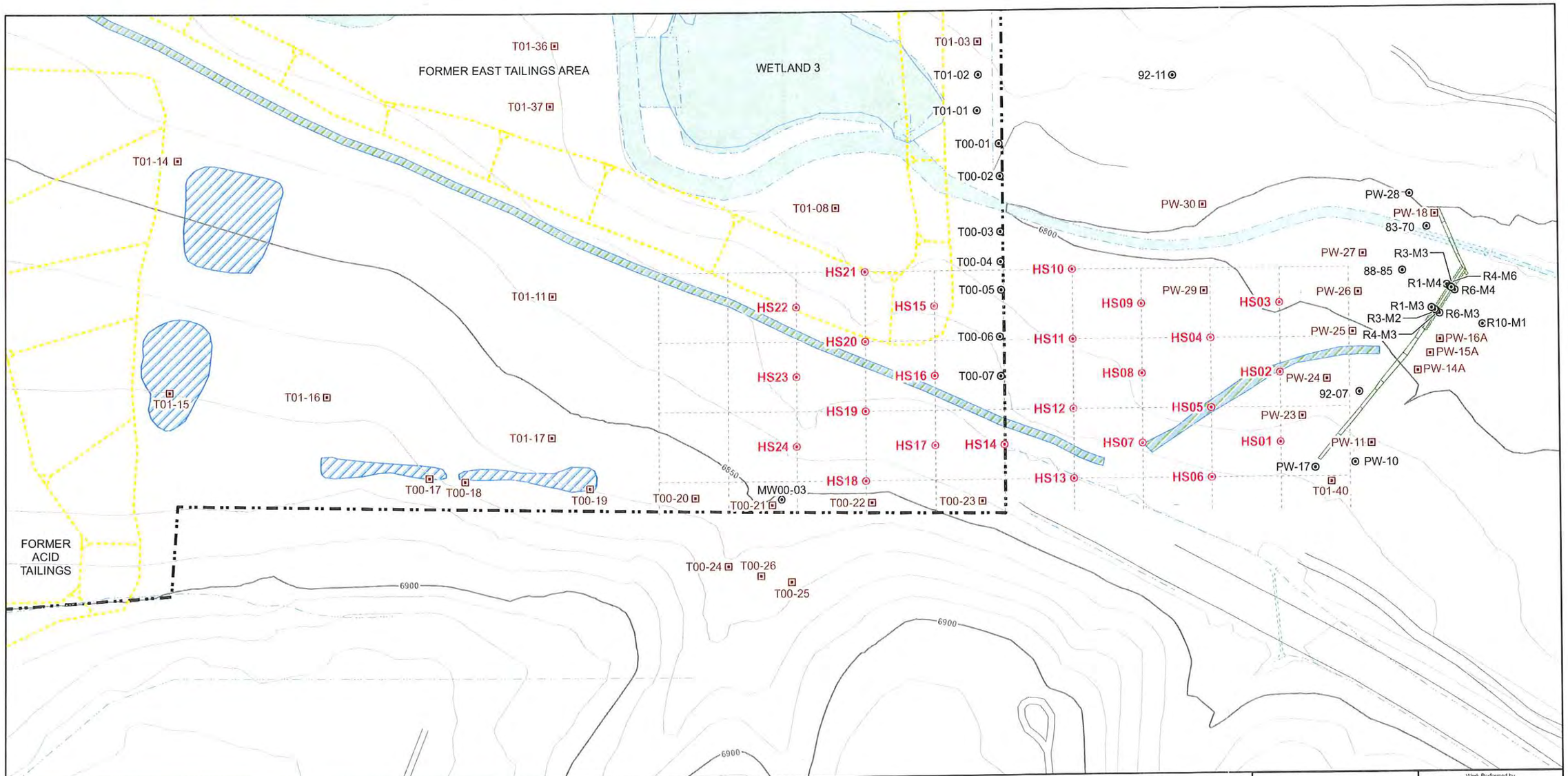

LEGEND

- PROPOSED BOREHOLE
- EXISTING WELL
- PREVIOUS BOREHOLE
- 100 FOOT GRID
- FORMER MILLSITE
- ROAD
- PERMEABLE REACTIVE BARRIER
- DRAINAGE DITCH
- CULVERT
- FORMER TAILINGS AREA
- 50-FT CONTOUR
- 10-FT CONTOUR
- WETLAND AREA AND MONTEZUMA CREEK
- OLD BRINE PONDS FROM ACID PLANT
- OLD MONTEZUMA CREEK

N

SCALE IN FEET

150 100 50 0 150

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION, COLORADO	Work Performed by S.M. Stoller Corporation Under DOE Contract No. DE-AM01-07LM00060
Program Directive MNT-2009-02 Hot Spot Base Map, Proposed Boreholes, and Previous Boreholes	
DATE PREPARED April 1, 2009	FILENAME S0530200

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Attachment 1. Waste Management Summary for MMTS OU III Geoprobe Work, per Program Directive MNT-2009-02

Material	Disposal Location	Comments
Excess soil from geoprobe hole or leftover soil sample	• If radiologic scanning indicates potential radiologic contamination: Monticello Temporary Storage Facility (TSF) • If radiologic scanning does not indicate potential radiologic contamination: Original geoprobe hole or surrounding ground surface	Potential radiologic contamination is indicated by radiologic scanning results above background levels. Sample locations are not within or near areas of known radiologic contamination.
Solid waste from decontaminating geoprobe or sampling equipment	• If radiologic scanning indicates potential radiologic contamination: Monticello Temporary Storage Facility (TSF) • If radiologic scanning does not indicate potential radiologic contamination: Solid waste receptacles at Monticello office	Potential radiologic contamination is indicated by radiologic scanning results above background levels. Sample locations are not within or near areas of known radiologic contamination.
Excess ground water from geoprobe hole or leftover water sample; associated liquid waste from decontaminating geoprobe or sampling equipment	• On the ground surface in the vicinity of the sample location	This disposal path complies with the requirements for managing excess ground water and associated decontamination liquids specified in the *MMTS OU III Post-ROD Monitoring Plan* (August 2004)

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Program Directive

Monticello Disposal/Processing Site

Activity or Task Water quality monitoring **Directive No.** MNT-2009-03

Initiated By: T. Bartlett/Site Lead

Directive Subject: Monitor influent and effluent of water treatment system.

Directive and Associated Task Changes:

1. Conduct monthly monitoring of the influent and effluent water to/from the ex situ ground water treatment system in accordance with the attached sampling and analysis plan.
2. Enter and manage the monitoring data in the DOE LM program database.

Organization(s) Affected: Environmental Monitoring/Field Services; Environmental Support Services

Affected Documents: *Monticello Mill Tailings Site Operable Unit III Post-Record of Decision Monitoring Plan*, August 2004 (MMTS monitoring plan, DOE-LM/GJ684-2004) and *Ground Water and Surface Water Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (DOE-LM/GJ1112-2006).

Justification for the Directive:

Operation of the ex situ ground water treatment system and the associated monitoring of that system as specified in this directive is being implemented as a response action for the OU III remedy. This and other associated response actions will be documented in the Monticello Site Management Plan (in progress).

Review and Concurrence:

Steve Donivan 9-25-2008 Linda Tegelman 09 25 08

Steve Donivan, Laboratory Services Coordinator (Date) Linda Tegelman, QA Specialist (Date)

Issuing Manager Approval:

Carl Jacobson 9/25/08

Carl Jacobson, Sub Task Order Manager (Date)

Effective Date: October 1, 2008 **Expiration Date:** September 30, 2009

Distribution: Document Production – Master Copy (signed original for PDF)
T. Bartlett, Site Lead
Linda Sheader for Information Reposiitory (2 copies)
Sam Campbell, Lead, Environmental Monitoring/Field Services

Sampling and Analysis Plan
Ex Situ Ground Water Treatment System
Monticello Mill Tailings Site, Monticello, Utah
September 24, 2008

Introduction

Work conducted under this plan is directed by Program Directive MNT-2009-03. Samples of the influent and effluent water to/from the ex situ ground water treatment system will be collected on a monthly basis to assess ground water treatment performance and to confirm compliance with discharge allowances to Montezuma Creek. Sample results obtained under this plan will be documented in annual ground water reports (submitted in September) and summarized in FFA quarterly reports.

Sample Collection

One influent water sample will be collected from the valve on the inflow water line in the control vault. When the extraction well is pumping, the valve will be opened allowing the ground water to flow into a 500 mL polyethylene bottle. Field parameters (pH, temperature, electrical conductivity, dissolved oxygen, ORP, turbidity, and alkalinity) will be measured in the field before or after sample collection. The designated identification of the influent sample is TCINF.

Effluent sample locations for the individual treatment cells are designated as TCEFF1 (west treatment cell) and TCEFF2 (east treatment cell). One water sample will be collected and field parameters will be measured at each of these locations. Sample collection is at the outlet pipe of each cell. Water may be dipped, pumped, siphoned, or collected by another suitable method using decontaminated equipment and placed in a 500 mL polyethylene bottle. Sample collection will avoid including any film that may be present on the water surface.

One sample of the combined effluent, identified as TCOutfall, will be collected and field parameters measured from the point of discharge to Montezuma Creek. Water may be allowed to pour directly into the sample container, or may be collected by another suitable method using decontaminated equipment and placed in a 500 mL polyethylene bottle.

One sample will be collected from Montezuma Creek and field parameters measured at location 0301, which is approximately 100 feet downstream of the outfall. This sample may be dipped or pumped into a 500 mL polyethylene bottle.

Samples do not require filtration. Samples will be preserved in the field by adding sufficient nitric acid to reduce pH of the sample to less than 2.

Sample Management

Follow Stoller standard practices for sample management (field documentation, labeling, custody, shipping, etc.) as documented in Manual STO 6, Environmental Procedures Catalog.

Laboratory Analysis
All water samples will be submitted to Paragon Analytics, Ft. Collins, Colorado, a DOE LM contract laboratory, for analysis of uranium (by ICP MS) and total iron (by ICP Emission). Standard contract requirements for turn-around time and laboratory deliverables apply to these water samples.

Data Management
Laboratory results will be subject to Level 2 validation by Stoller. This level of validation ensures that the results received by the laboratory are useable and that the laboratory has met contract obligations. All field and laboratory data will be entered and managed in the DOE LM project database.

Health and Safety
Worker health and safety in the field will be ensured by adherence to the Job Safety Analysis for water sampling and monitoring that is included in *Ground Water and Surface Water Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (DOE-LM/GJ1112-2006).

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Program Directive

U.S. Department of Energy Office of Legacy Management
Monticello Disposal/Processing Site

Activity or Task Ground water compliance field work **Directive No.** MNT-2009-04

Initiated By: T. Bartlett/Site Lead

Directive Subjects: 1). Ground water and surface water monitoring at MMTS will be conducted in accordance with project-specific procedures/methods contained in *Monticello Mill Tailings Site Operable Unit III Post-Record of Decision Monitoring Plan*, August 2004 (DOE-LM/GJ684-2004). Certain project-specific procedures/methods differ in detail from procedures/methods contained in *U.S. Department of Energy Office of Legacy Management Sampling and Analysis Plan* (LMS/POL/S04351-1.0).

2). Surface water monitoring will be expanded in scope beginning with the April 2009 event.

Directive and Associated Task Changes:

1). Where procedures/methods differ between the affected documents, the Monticello plan will take precedence.
2). Surface water locations SW92-09 and SW94-01 will be reinstated into the semi-annual monitoring program beginning with the April 2009 event.

Organization(s) Affected: Environmental Monitoring/Field Services

Affected Documents: 1). *Monticello Mill Tailings Site Operable Unit III Post-Record of Decision Monitoring Plan*, August 2004 (MMTS monitoring plan, DOE-LM/GJ684-2004).

2). *U.S. Department of Energy Office of Legacy Management Sampling and Analysis Plan* (LMS/POL/S04351-1.0).

Justification for the Directive:

1). Expanding monitoring scope is a response action of the contingency remedy for OU III in accordance with the Explanation of Significance Difference for the OU III, March 2009.

Review and Concurrence:

Vickie Price 4/1/2009
Vickie Price, QA Specialist (Date)

Issuing Manager Approval:

4/1/09
Carl Jacobson, Sub Task Order Manager (Date)

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