Midnite Mine Superfund Site

10090 Percent Design

Appendix Q – Remedial Action Site-Wide Monitoring Plan

~~Note: This SMP has been prepared to a 90-percent level. Minor edits to this plan are anticipated as the Midnite Mine Remedial Design is finalized.~~

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LIST OF ACRONYMS

ARD	acid rock drainage
AQMP	Air Quality Monitoring Plan
bgs	below ground surface
BLM	Bureau of Land Management
BMP	Best Management Practice
BODR	Basis of Design Report
BPA	Backfilled Pit Area
BPDP	Backfilled Pit Dewatering Plan
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	Contaminant of Concern
DMC	Dawn Mining Company LLC
DQO	Data Quality Objective
EPA	Environmental Protection Agency
FSP	Field Sampling Plan
gpm	gallons per minute
HASP	Health and Safety Plan
IC	institutional control
ICIAP	Institutional Control Implementation and Assurance Plan
JSA	Job Safety Analysis
MA	Mined Area
Mgal	million gallons
Newmont	Newmont USA Limited
NPDES	National Pollutant Discharge Elimination System
PCP	Pollution Control Pond
PIA	potentially impacted area
PMP	Performance Monitoring Plan
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RA	Remedial Action
RAWPRAO	Remedial Action Work PlanObjective
RD	Remedial Design
RI	Remedial Investigation

ROD	Record of Decision
Site	Midnite Mine Superfund Site
SMP	Site-wide Monitoring Plan
SOP	Standard Operating Procedure
SWMP	Stormwater Management Plan
SWRP	South Waste Rock Pile
Tribe	Spokane Tribe of Indians
WTP	Water Treatment Plant

Q1.0 INTRODUCTION

This Site-wide Monitoring Plan (SMP) describes the overall goals and procedures for monitoring environmental media (i.e., surface water, groundwater, sediment, and air) during and after the remedial action (RA) at the Midnite Mine Superfund Site (Site) located outside of Wellpinit, Washington. A summary of the Selected Remedy for the Site is presented below in Section Q1-1. This SMP is an appendix to the *Midnite Mine Superfund Site Basis of Design Report* (BODR), which presents the background and supporting information relevant to the Site and the planned RAs. The BODR contains the engineering drawings, plans, and specifications for the RA. Upon approval of the Final BODR, this SMP will become a component of the Remedial Action Work Plan (RAWP), which presents the construction activities for implementing the Selected Remedy at the Site.

This SMP was prepared in accordance with the following documents:

- *Statement of Work for the Remedial Design and Remedial Action for the Midnite Mine Superfund Site* (EPA, 2011).
- *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (EPA, 1988)
- *Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites (OSWER Directive Number 9200.4-17P).*
- *Monitored Natural Attenuation of Inorganic Contaminants in Ground Water - Technical Basis for Assessment, Volumes 1-3 (EPA/600/R-07/139; EPA/600/R-07/140; and EPA/600/R-10/093).*

The purpose of this SMP is to describe monitoring of environmental media during remedy implementation to determine if contaminants from the mined area (MA) are being released to down gradient or downwind areas. Following implementation of the Selected Remedy, this SMP will be revised to include monitoring of groundwater, surface water, soil, sediment, and radon (flux and airborne), as necessary to evaluate the effectiveness of the remedy in meeting the Performance Standards, Remedial Action Objectives, and cleanup levels. Baseline data collected historically will be compared with SMP data collected during the active remediation to evaluate changing conditions throughout the remedial process.

This SMP does not include monitoring or sampling information for the Water Treatment Plant (WTP) influent and effluent. That information is included in the existing NPDES permit and will be part of the modified permit when it is finalized. This SMP includes the following supporting documents:

- Field Sampling Plan (FSP) – The FSP describes the field-specific equipment and procedures for site-wide monitoring of surface water, sediment, and groundwater. The FSP includes the sampling/monitoring locations, rationale, and frequencies. The FSP will be updated as necessary during the RA such that sampling locations and frequencies can be added or deleted to meet the data quality objectives (DQOs) as the RA progresses. Additional details regarding the FSP are presented below in Section Q5.1.
- Quality Assurance Project Plan (QAPP) – The QAPP provides the policy, organization, functional activities, and quality assurance/quality control (QA/QC) protocols to be followed during implementation of the SMP to assure that the resulting data are of sufficient quality to support the data end uses. The QAPP presents the detailed DQOs for the various data collection activities and includes the Standard Operating Procedures (SOPs). Additional details regarding the QAPP are presented below in Section Q5.2.

When RA construction activities begin, this SMP will replace the *Performance Monitoring Plan for the Phase I RD/RA: Interim Water Management for the Midnite Mine* (PMP; AES, 2011). The bulk of the monitoring protocols and many of the sampling locations previously established and approved in the PMP remain unchanged in this SMP. However, this SMP includes necessary revisions to accommodate monitoring during and following the RA to meet the objectives described in Section Q1.2. Additional details regarding the monitoring approach are presented below in Section Q3.0.

Air Monitoring. Details of the environmental air monitoring plan are being ~~have yet to be~~ developed, ~~. Analyses indicate that the construction activities will not constitute a "major source"~~ and an Air Quality Monitoring Plan (AQMP)~~therefore, a comprehensive air monitoring program is not required by regulations. Discussions with EPA and the Tribe are underway to define air monitoring objectives for use during the RA. Once the air monitoring plan~~ has been submitted for Tribe and EPA review. When finalized~~determined~~, the AQMP~~details of the plan~~ will be included as an attachment to~~incorporated into~~ this SMP~~ or a separate Plan~~.

Q1.1 SELECTED REMEDY SUMMARY

The Selected Remedy for the Midnite Mine Superfund Site includes the following (EPA, 2006):

1) Containment of Mine Waste in Pits:
   - Excavation of above-grade mine waste. Waste to be excavated includes waste rock, ore and proto-ore, stored mine cores, road gravel, contaminated soil, and pit and drainage sediments. It does not include waste rock in the Backfilled Pit Area.
   - Consolidation of the excavated mine waste in Pit 3 and Pit 4 to create waste containment areas with a sump, drainage layer, and liner to channel groundwater entering the pits around the waste and into the sump at the bottom.
   - Contouring the waste in Pits 3 and 4 and waste in the Backfilled Pit Area and construction of a stable vegetated cover designed to minimize surface water infiltration and meet radon and radiation cleanup levels for each waste containment area.
2) Water Collection and Treatment:
   - As an interim action pending waste containment, continued collection and ex situ treatment of contaminated seeps and pit water, with on-site discharge of treated water in compliance with interim discharge limits.
   - Following waste containment, removal of water that enters Pit 3, Pit 4, and the Backfilled Pit Area using pumping wells; collection of any remaining seeps that exceed surface water cleanup levels.
   - Design and construction of a replacement water treatment plant and a conveyance for discharge of treated water to the Spokane River Arm of Lake Roosevelt.
   - Long-term discharge of treated water to the Spokane River Arm under an NPDES permit.
3) Residuals Management:
   - Disposal of water treatment sludge at the Dawn Millsite until alternate disposal is required by mill closure.
   - Following mill closure, disposal of sludge at a licensed off-site facility, unless the sludge characteristics are modified to allow alternative disposal.
4) Surface Water and Sediment Management:

- Contouring, revegetation, and surface water management in the drainage basin to divert clean water away from waste containment areas while minimizing erosion.
- Construction of sediment controls in the mine drainages to prevent sediment transport downstream to Blue Creek.
- Monitoring of Blue Creek and delta areas to assess natural recovery and the need for active remediation.

5) Monitored Natural Attenuation of Groundwater:
   - Recovery of groundwater through natural flushing following source control.
   - Sampling of groundwater to verify recovery.
6) Institutional Controls and Access Restrictions:
   - Permanent institutional controls in waste containment areas and at the water treatment plant to prevent groundwater use and protect the integrity of the remedy.
   - Physical access restrictions such as an interim fence and a permanent boulder barrier around containment areas to prevent damage to soil covers and to reduce risk.
   - Interim institutional controls to prevent extraction or use of groundwater until cleanup levels are met.
   - Interim measures, such as signs, advisories, and community outreach, to minimize public uses of surface water, sediment, and affected food plants outside the waste containment area until cleanup levels are met.
7) Long-Term Site Management:
   - Long-term monitoring to assess the effectiveness of the remedy, including physical inspections, revegetation surveys, groundwater and surface water monitoring, radiation, and radon monitoring.
   - Operation and maintenance of the water treatment system, including process monitoring, routine maintenance, and periodic replacement.
   - Operation and maintenance of soil covers, wells and water conveyances, surface water controls, and all other elements of the remedy that require maintenance.
   - Remedy reviews every five years to assure that the remedy is protective of human health and the environment.
8) Contingent Actions:

- Sediment cleanup in Blue Creek and Blue Creek delta if necessary.
- Implementation of other enhancements to reduce ARD.

Q1.2 SITE WIDE MONITORING OBJECTIVES

The overall objectives of the site-wide monitoring are to:

- Determine if contaminants are released from the MA to down gradient or downwind areas during implementation of the Selected Remedy.
- Determine if cleanup levels are being achieved within a reasonable timeframe following implementation of the Selected Remedy.
- Provide sufficient data to support EPA determinations regarding ongoing remedy protection of human health and the environment through the 5-year review process.

This SMP (and its supporting documents) includes the proposed locations, rational, sampling and analytical methods, sample frequency, and reporting for environmental-media monitoring to achieve these objectives. The detailed DQO process applied in development of this SMP is described in Section Q2-3.0 of the QAPP. The 7-step DQO process defines the monitoring objectives, information needed, decisions and decision criteria, performance and acceptance criteria, and analytical approach that results in development of a detailed monitoring plan.

Q1.3 SCHEDULE

Site-wide monitoring will begin upon initiation of the RA and will continue until an end date determined by EPA. Data generated from the site-wide monitoring will be used to support EPA determinations regarding ongoing remedy protection of human health and the environment through the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 5-year review process.

Q1.4 PROCESS FOR UPDATING THIS SMP

The RA construction activities are anticipated to occur during three main phases that occur over a 10-year duration. Therefore, this SMP (and the supporting FSP and QAPP) is a dynamic document that will be updated periodically to reflect changes to the site-wide monitoring network (and associated DQOs, procedures and protocols, as necessary) that occur as the phased RA progresses. Recommendations for updates will be made in the quarterly data reports (or in more frequent monthly reports, if necessary) in coordination with the EPA and the Tribe, and will be based on changing site conditions, results of data evaluations, or new data needs that may arise throughout the RA. Any changes to this SMP will require review and approval by EPA.

Q2.0 KNOWN AND ANTICIPATED SITE CONDITIONS

The following hydrogeologic discussion is summarized from information contained in the *Phase I Hydrologic Modeling for Midnite Mine RI/FS* (URS, 2002) and the Midnite Mine Remedial Investigation (RI) Report (EPA, 2005), with supplemental information from pre-remedial design investigations described in Section 3.0 of the BODR. This summary information provides the basis for understanding potential contaminant fate and transport, and for designing the site-wide monitoring network. The discussion below focuses on surface water and groundwater flow because these are the primary mechanisms for contaminant transport, and for contributing to sediment contamination and sediment distribution. Air as a media of concern is discussed separately in Section Q2.4 below.

Q2.1 PRE-REMEDIAL ACTION SITE HYDROGEOLOGY

In the Site area, the hydrogeologic system includes both natural features and features that have been altered as a result of the historic mining and interim remedial action activities. As shown on Figure Q-1, the Midnite Mine is located primarily within a watershed that is drained by three intermittent streams: the Western Drainage, Central Drainage, and Eastern Drainage (these drainages are described in more detail below). Within the MA, the upper reaches of the original Western Drainage and Central Drainage were excavated or filled with waste rock during the mining operations. South of the MA, the Western Drainage and Central Drainage flow into the Eastern Drainage, which in turn flows into Blue Creek. Blue Creek is a perennial stream that flows to the Spokane River Arm of Lake Roosevelt. Four other surface water drainages receive surface water runoff and/or groundwater migration from the MA (the Northeastern, Northern, Far West, and Southwestern drainages).

In addition to the placement of waste rock in the upper reaches of the Western and Central drainages, several site features and facilities constructed for mine water management have modified the natural surface-water drainage pattern. Two open pits (Pits 3 and 4) collect and impound surface water runoff from a large portion of the MA. These open pits create local groundwater sinks. Water management facilities include (1) the Pollution Control Pond (PCP); (2) seep water collection systems; (3) pipes and culverts that convey water from the seep collection points to Pit 3, from Pit 3 and Pit 4 to the WTP, and to the catchment areas; and (4) ditches that divert surface water flow around portions of the MA to other existing natural drainage channels.

All water in the MA and potentially impacted area (PIA) originates as precipitation. In undisturbed areas surrounding the MA, the majority of precipitation water is removed from the flow system by evapotranspiration or becomes surface water runoff. Within the MA, a major portion of the precipitation infiltrates and moves rapidly through the permeable waste rock and ore/protore stockpiles. The remainder of the precipitation falling on the MA runs off to the open pits, to existing surface water drainages, or to the PCP. Most of infiltrating precipitation within the MA moves as interflow within the unconsolidated materials at depths above the water table potentiometric surface (interflow is the lateral movement of water in the unsaturated zone that first returns to the surface or enters a stream prior to becoming groundwater). The interflow generally converges on the buried channels of the Western and Central drainages, and discharges to seeps and springs where the buried channels daylight at the toe of the South Waste Rock Pile (SWRP). A relatively small portion of the infiltrated water recharges the saturated-zone groundwater flow system, at depths below the potentiometric surface.

Groundwater generally flows from north to south beneath the site. Groundwater levels range from about 130 feet below the ground surface (bgs) on the Northwest Ridge to a few feet bgs along the drainages south of the MA. In the saturated zone below the potentiometric surface, groundwater generally flows from the higher elevations of the site toward the lower elevations, and converges toward the buried drainages and the hydraulic sinks created by the open pits. However, within the MA, groundwater flow directions also are strongly influenced by the topography of the post-mining land surface underlying the waste rock materials. In most of the MA, waste rock piles lie above the potentiometric surface, except in areas that have been excavated for mining and later backfilled (e.g., Pit 2, Pit 2 West, and Boyd Pit).

Q2.1.1 Surface Water

Q2.1.1.1 Surface Water Drainages

There are eight surface water drainages in the PIA that may receive surface water runoff (and associated sediments) or groundwater discharge from the MA. These surface water drainages are depicted on Figure Q-1 and are discussed below.

The **Western Drainage** currently emerges at the toe of the South Waste Rock Pile (SWRP) and then flows approximately 2,700 feet southeast, where it joins the Eastern Drainage. Prior to mining and waste rock placement, the Western Drainage existed within and drained the western portion of the MA (see Figure Q-1). Surface water contributions to the Western Drainage are primarily from seeps from the SWRP (the Western Drainage and Western Drainage Junior seeps) and springs located along the reach between the seep collection system access road and the confluence with the Eastern Drainage. The Western Drainage receives stormwater from a ditch extending along the western and southwestern edge of the SWRP, direct runoff from the central portion of the SWRP, and shallow groundwater flow from the MA. Except during thunderstorms and spring runoff, surface water flow within the Western Drainage is largely fed by groundwater and typically begins about halfway between the seep collection system and the confluence with the Eastern Drainage. Sediments are present throughout the length of the Western Drainage channel and consist of light brown silt with some clay, sand, and cobbles. These sediments are scheduled to be removed as part of the RA.

The **Central Drainage** extends from just south of the PCP dam and continues in a southerly direction for about 1,800 feet to where it joins the Eastern Drainage. Prior to mining and waste rock placement, the Central Drainage existed within and drained the central portion of the MA (see Figure Q-1). The upper portion of the Central Drainage has two forks, the East Fork and the West Fork. Contributions are primarily from seeps from the SWRP (which are captured and treated at the WTP), springs located along the southern reach of the drainage, direct runoff from the surrounding land surface, and shallow groundwater flow. The drainage is typically dry from below the seep collection system to just above the confluence with the Eastern Drainage. Sediments are present throughout the length of the drainage channels and typically consist of light brown silts with cobbles. These sediments are scheduled to be removed as part of the RA.

The **Eastern Drainage** is located immediately east of the southeastern portion of the MA. The Eastern Drainage includes three tributary drainages that collect surface water from the MA: the East Dump Fork, East Seep Fork, and Lower Fork. The main channel of the Eastern Drainage extends from the National Pollutant Discharge Elimination System (NPDES) outfall pond, which is near the WTP east of the MA, downstream to the confluence with Blue Creek, which is approximately 6,700 feet to the south. Surface water is discharged to the Eastern Drainage from the (1) Northeastern Drainage, (2) NPDES outfall pond, (3) Central Drainage, (4) Western Drainage, and (5) various seeps located throughout the drainage. The Eastern Drainage receives direct runoff from waste rock deposited along the southeast MA boundary, and in its southern reach may receive groundwater discharge along its course. The Eastern Drainage typically has surface water flow for most of the year, partially from the WTP discharge from the

NPDES outfall pond. Sediments consist of dark brown silt, sand, and small cobbles; these sediments are scheduled for removal as part of the RA.

The **Northeastern Drainage** (the extension of the Eastern Drainage above the NPDES outfall pond) is located immediately east of the northern portion of the MA. The upper portion of the drainage has three forks: the East Fork, Middle Fork, and West Fork. Surface water entering the drainage is conveyed southward to the NPDES outfall pond. The drainage is often dry above the outfall pond except for several small seep areas. Surface and groundwater contributions to the drainage include:

- East Fork - Collects surface water from a small area east of the MA.
- Middle Fork - Collects MA surface water from areas east of Pit 4, including runoff from waste rock deposited at the top of the drainage.
- West Fork - Collects MA runoff from a bedrock ridge on the east side of Pit 3 and from an area of fill between Pits 3 and 4.

The **Northern Drainage** drains much of the area to the east of the MA and consists of three branches. In its upper reach, a short segment drains the small portion of the MA north of Pit 4. The Northern Drainage is typically dry for most of its length except during thunderstorms or spring snowmelt.

The **Far West Drainage** is located immediately west of the southern portion of the MA. The Far West Drainage drains areas west of the MA and a small area of the MA that falls outside the primary drainage basin where the MA is located. The eastern branch of the Far West Drainage also is known as Whitetail Creek – a poorly defined drainage feature – that traverses the Rhoads property to the southwest of the MA. Surface water runoff and groundwater enters the Far West Drainage from the extreme western portion of the MA between the North and the South Topsoil areas. The Far West Drainage receives direct runoff from the western portion of the Vehicle Shop and Mine Offices Area. The Far West Drainage is typically dry. Unlike the other PIA drainages, the Far West Drainage extends directly to Lake Roosevelt and does not enter Blue Creek.

The **Southwestern Drainage** is located southwest of the southern portion of the MA. Surface water runoff enters the Southwestern Drainage from the southwestern portion of the MA between the South Topsoil area and the Western Drainage. Potential MA surface water contributions to the drainage include:

- Runoff from a small area of the MA outside the drainage basin, where topsoil is located
- Runoff from the West Haul Road

The Southwestern Drainage extends to the south directly to Blue Creek and is typically dry.

Blue Creek is a perennial stream that is fed by springs, groundwater seepage into the streambed, numerous intermittent surface drainages, and flow from Turtle Lake. Blue Creek also receives surface water drainage from the Midnite Mine area via the Eastern Drainage, the main stem of the Northern Drainage below the East Haul Road, and the Southwestern Drainage. It flows in a southwesterly direction to the Spokane River Arm of Lake Roosevelt, approximately 3.5 miles from the Eastern Drainage.

Q2.1.1.2 Open Pits and Other Impoundments

This section describes the open pits and impoundments that are in place at the start of the RA. This section will be updated as the RA progresses and pits are backfilled, impoundments are taken off line, and new impoundments are constructed.

Surface water and associated sediments accumulate in four areas in the MA: (1) Pit 3, (2) Pit 4, (3) the PCP, and (4) the Blood Pool (see Figure Q-1). Water levels in each of these areas fluctuate seasonally. Following cessation of uranium mining in 1981, water levels increased in the open pits from groundwater inflow and precipitation/run-on (and from water pumped from the PCP to Pit 3 since 1983) until the pit dewatering and water treatment activities began in 1992. Currently, all water that accumulates in these impoundments is captured, treated on Site, and discharged to the Eastern Drainage. Water that discharges from seeps in southern part of the MA is currently collected and pumped back to Pit 3, then treated at the on-site WTP. At the WTP, the Pit 3 water is blended with water pumped from Pit 4 and treated during April to October of each year. The PCP serves as a catchment basin for (1) seep water that originates from the SWRP above the PCP, (2) stormwater from a large portion of the MA, and (3) seep water that is captured and pumped from the Western and Central Drainage seepage collection systems. The Blood Pool is an unlined depression located in the east-central portion of the Midnite Mine site. It intermittently collects seep water and a limited quantity of surface water runoff from the area near the WTP.

As described in URS (2002) and MGC (2011), Pit 3 is a hydraulic sink and forms a sub-basin that includes the up gradient Pit 4. Recharge, interflow, and bedrock groundwater flow within the capture zone of this hydraulic sink report to Pit 3. The Pit 4 lake has been characterized as a flow-through lake, with outflow occurring on the southern or down gradient portion of the pit, and flow from Pit 4 appears to recharge Pit 3 through seeps in the Pit 3 walls and pit bottom.

Q2.1.2 Sediment

Sediments are present in the surface water drainages and impoundments described above. The Selected Remedy will include removing the mine-affected sediments from Pit 3, Pit 4, the PCP, and the Western, Central, and Eastern drainages. As discussed in Sections Q3.0 and Q4.0, this SMP includes monitoring sediments during and following the RA.

Q2.1.3 Groundwater

Groundwater flows within two principal geologic material types at the Midnite Mine: 1) regolith and 2) fractured bedrock. Groundwater flow in these material types is depicted conceptually on Figure Q-2 and is discussed below:

The **regolith** is an unconsolidated hydrogeologic unit consisting primarily of alluvium, but also includes colluvium, weathered bedrock, and moderate amounts of glacial outwash sediment. In the MA, the regolith also includes waste rock. The thickness of the unconsolidated material varies significantly across the site. The alluvium is relatively thin, and in the MA occurs within portions of the buried drainages. Some of the alluvial material was removed from portions of the Western Drainage and Eastern Drainage prior to waste rock placement (Peters, 1999). In upland areas of the watershed, alluvium is present as a thin veneer or is absent because of the steeper topographic relief. Alluvium is also present in the drainages south of the MA, effectively pinching-out south of the confluence of the Western Drainage and Eastern Drainage based on well logs (SMI, 1995). The alluvium thickens to 10 to 15 feet at the lower end of the Eastern Drainage. Surface materials in the PIA away from the MA consist of residual soils, alluvium, colluvium, sediments, and riparian sediments. The thicknesses of these materials range from zero on exposed bedrock surfaces to several tens of feet in the drainage bottoms.

The **waste rock** in the MA includes the major waste rock piles, and the ore and protore stockpiles. These materials were deposited on top of weathered and fractured igneous and metamorphic rocks that are generally less permeable than the overlying unconsolidated materials. Material particle sizes in the waste rock and ore/protore stockpiles range from silt and clay to large boulders. Site grading and compaction of the land surface in some areas of the MA, such as on the haul roads and haul truck staging areas, reduced the ground surface permeability which facilitates increased stormwater runoff and causes surface water to become channelized in some areas. Conversely, much of the waste rock and stockpiled ore and protore material is of coarse texture, which results in high infiltration rates.

Based on water levels measured in piezometers installed in the waste rock piles, the SWRP and Hillside Waste Rock Pile are generally unsaturated. Waste rock from the mining operations was deposited across several existing drainages in the MA (the northern extensions of the Western, Central, and Eastern drainages). The saturated thickness of the waste rock is generally less than 2 feet in these buried drainages within the MA. In areas that were excavated below the local water table, such as the backfilled pits, saturated thicknesses of the waste rock range from approximately 15 to 30 feet. All of the ore/protore stockpiles in the MA are above the water table and therefore are generally unsaturated. A primary component of the RA is to remove and consolidate the waste rock in Pits 3 and 4.

The **bedrock** hydrogeologic unit consists of unweathered metasedimentary rocks of the Precambrian Togo Formation, quartz monzonite, and various igneous dikes. Adjacent to the contact between the Togo Formation and the quartz monzonite, some of the bedrock has been hydrothermally altered.

Groundwater flow within the bedrock occurs primarily through secondary porosity features (fractures, joints, faults, and lithologic contacts). The fractures have a relatively high density and vary widely in orientation. Within the quartz monzonite and igneous dikes, fracturing is pervasive throughout the rock matrix. Fractures within the metasediments are commonly present along relict bedding planes, cleavage planes, foliation, and other zones of weakness in the rocks. The fractures are typically heterogeneous in spacing, orientation, size, and degree of interconnection. Fracture apertures are typically less than ¼ -inch. Generally, fractures are most prevalent near the land surface and are assumed to decrease in number and size with depth because of increasing confining pressure.

In the upper zones, the shallowest aquifer perches on the top of the bedrock, or the bedrock may be sufficiently exfoliated such that there is a hydraulic connection with the overlying saturated alluvium/colluvium or waste rock. These predominantly horizontal fractures in the exfoliated zones (which extend to depths of approximately 50 feet) store and transmit the majority of water representing the shallow aquifer (Kirschner, 2014). However, at depth, groundwater flow within the un-weathered bedrock is through discrete fractures, joints, and faults. While conditions vary from boring to boring, several generalizations can be made concerning the lithologic and hydrogeologic conditions in the bedrock down gradient of the

MAMined Area. For example, lithologic logs for bedrock wells drilled in the Western and Central drainages generally indicate a relatively thick unsaturated zone within the bedrock, with groundwater encountered in fractures at deeper depths. Water levels measured in these wells are close to the ground surface, indicating a relatively significant upward gradient (e.g., confining head pressures on the order of 80 to 100 feet at the fracture zones screened in wells MWWD-01 and MWCD-01, which are located just south of the Mined Area in the Western and Central drainages, respectively).

Other large-scale geologic features at the mine site also appear to significantly influence groundwater flow in the bedrock. For example, the intensely fractured and altered contact zone between the metasedimentary rocks and quartz monzonite appears to channel water from Pit 4 to Pit 3. Seeps are associated with this contact zone on the north highwall of Pit 3. Dikes in the bedrock may act to channel or restrict the flow of groundwater. Where dikes consist of un-fractured or weathered clay-rich material, these features restrict groundwater flow. Conversely, where dikes have intensely fractured contact zones, they are highly conductive. Water-bearing aplite dikes were encountered in several boreholes drilled during the RI for monitoring well installation.

Q2.1.4 Summary of the Conceptual Groundwater Flow Model

Using the available data for the Midnite Mine, a pre-remedy conceptual model of the groundwater flow system has been prepared to describe the movement of water throughout the site. Figure Q-3 illustrates the major features of the pre-remedy groundwater flow system.

Precipitation that falls on the site is subject to evaporation, evapotranspiration, runoff, or percolation. Recharge to the groundwater flow system is from percolation of precipitation. In areas surrounding the MA where bedrock is exposed at the ground surface or underlies thin soils with natural vegetation, the amount of water entering the groundwater flow system is about 10 percent of precipitation or less. In the MA, groundwater recharge rates are much higher, possibly as much as 80 percent of precipitation because of the coarse texture, high porosity, and large hydraulic conductivity of the waste rock and the relatively sparse vegetation cover.

Within the MA, a large portion of the infiltrating precipitation moves within unconsolidated materials as interflow at depths above the water table. These coarse-grained materials have hydraulic characteristics that allow rapid movement of water. After major precipitation events and during spring snowmelt events, interflow moves quickly downward and tends to accumulate along the top of the bedrock. Much of this interflow moves down the slope of the bedrock surfaces and converges into buried drainages and bedrock depressions excavated by mining. Most of the interflow emerges as seeps at the toe of the SWRP and East Dump. Because most of this infiltration water moves as interflow quickly out of the unconsolidated materials to surface discharge points, only a relatively small portion of water infiltrating within the MA recharges the underlying fractured bedrock. Nevertheless, the bedrock does receive recharge in the higher elevation portions of the MA.

The available hydrogeologic data show that the groundwater flow system in the Midnite Mine vicinity exhibits the key features of a topographically driven flow system. In such flow systems, groundwater circulates through the subsurface along pathways from upland areas of recharge to lowland areas of discharge, typically stream valleys and drainages. A large amount of topographic relief increases the influence of surface topography on flow directions and accentuates groundwater flow. In the MA, the undulating topography and major groundwater sinks created by mining (e.g., Pit 3 and Pit 4) reflect superposition of local and intermediate flow systems. In addition to the lateral flow from higher to lower elevations across the site area, there are strong downward components of flow in recharge areas and strong upward flow components in discharge areas (see Figure Q-3). Site-specific groundwater-level data show that locations having upward and downward hydraulic gradients are consistent with the areal trends typically seen in a topographically driven groundwater flow system. Downward gradients are present in the recharge areas in the higher elevation areas along the Northwest Ridge and other parts of the northern MA. Upward gradients are found in the lower elevations of the Site.

Groundwater flow within the weathered and unweathered bedrock at the site and the surrounding area is through a continuum of interconnected fractures. Fractures are pervasive throughout the bedrock and are observed in most areas to have relatively close spacing, small apertures, and wide variation in orientations. Hydraulic conductivity in the more intensely fractured portions of the weathered bedrock is generally higher than that in the deeper unweathered bedrock. At depth, groundwater flow within the unweathered bedrock is through discrete fractures, joints and faults. An increased density of fracturing has been observed in the northern highwalls of the open pits along the contact zone between the Togo Formation and the quartz monzonite, which likely causes a zone of higher hydraulic conductivity that trends north-south between the pits. Additional zones of higher hydraulic conductivity may exist in the bedrock that is generally aligned with the surface water drainage channels, both natural and buried, because such channels develop through geologic time due to preferential erosion of structural weaknesses in the rock.

Recharge to the backfilled pits occurs by infiltration of precipitation, interflow along the bedrock surface, and groundwater inflow from the surrounding bedrock. Groundwater flow within this area is consistent with the conceptual model for the site as a whole, in that the flow directions are controlled primarily by topography. Groundwater moves into the backfilled pits in areal patterns similar to those of surface water running into the open pits. Groundwater flows southward from the backfilled pits through the surrounding bedrock and over the lowest elevations of the buried bedrock rims of the pits, across the bedrock surface.

Currently, the seep flows and surface water runoff from the SWRP is captured by collection systems and pumped to the PCP. However, before the implementation of this pumpback system, seep flow and surface water runoff entered the drainages south of the MA.
A substantial portion of this flow percolated downward into the alluvial deposits and recharged the shallow groundwater system. After installation of the seep collection systems and for current conditions, the alluvium receives recharge from direct infiltration of surface water from snowmelt and runoff generated by occasional, intense rainfall. In areas having upward gradients, the alluvium also receives upward flow from the bedrock groundwater that converges laterally toward the drainages.

For the flow system as a whole, under long-term steady-state conditions, the recharge rate should approximate the amount of combined discharge from the system. Groundwater leaves the watershed in which the MA is located via:

- Evaporation from the ground surface, seeps, and open water bodies in Pit 3, Pit 4, and the PCP
- Transpiration by local vegetation in the drainages south of the MA
- Groundwater discharge to surface water drainage channels down gradient of the MA, which eventually lead to Blue Creek.
- Groundwater discharge to deeper unweathered bedrock.

Essentially no surface water flows from the MA southward beyond the seep collection systems located along the southern MA boundary. Although groundwater discharges into the drainages south of the MA, the rate of this seepage does not sustain stream flow in the majority of the drainages during rainless periods. There are currently pump back wells in the drainages that are intercepting much of this alluvial groundwater and returning that water to Pit 3 for treatment. Nonetheless, groundwater discharge causes a small but steady base flow in the drainages southernmost reaches of the Central and Western Drainages. In the Eastern Drainage, there is an upward gradient and the groundwater table rises to groundwater surface, which indicates groundwater seepage. These groundwater discharge areas probably reflect the terminus of flow lines in the groundwater flow system that originates in the northern high-elevation areas of the MA.

Q2.2 ANTICIPATED IMPACTS TO CONTAMINANT FATE AND TRANSPORT DURING REMEDY CONSTRUCITON

Implementation of the Selected Remedy will involve earthmoving activities that have the potential to release mine-related constituents of concern (COCs) to down gradient or downwind areas in the following ways:

- Generation of dust, which could mobilize COCs in ambient air and deposit COCs where the dust settles.
- Migration of COCs that are suspended or dissolved in stormwater that flows off of construction areas.
- Migration of COCs that are suspended or dissolved in groundwater that is exposed as a result of excavating and flows off of the construction areas as surface water.
- Migration of COCs that are suspended or dissolved in surface water that contacts native bedrock that is exposed as a result of excavating and flows off of the construction areas.

An overall premise to the remedial design is to prevent mine-affected environmental media (e.g., sediment, surface water, air) from migrating away from the construction areas by construction procedures and best management practices (BMPs). Examples of these construction procedures and BMPs include:

- Dust suppression will be an integral component of all RA construction activities.
- All surface water, stormwater, and snowmelt runoff within the RA construction areas will be captured and routed to the operating WTP.

- Stormwater management BMPs will be implemented and monitored in accordance with the Stormwater Management Plan (SWMP), which like this SMP becomes a component of the RAWP upon approval of the Final BODR. (Additional information regarding how this SMP interacts with the SWMP is discussed below in Section Q4.5.)

In the event that the RA construction procedures or BMPs fail or are inadequate, construction related COCs will migrate down gradient or downwind. Any stormwater/surface water that flows off of the RA construction areas will flow into the Western, Central, or Eastern drainages described in Section Q2.1.1. The monitoring network presented in the FSP is designed to monitor locations where mine-affected media is expected to occur in the event the BMPs fail or are inadequate.

Q2.3 ANTICIPATED IMPACTS THAT COMPLETEDTHAT REMEDY WILL HAVE ON CONTAMINANT FATE AND TRANSPORT

This section describes the anticipated impacts that the remedy will have on contaminant fate and transport model based on the Remedial Design of the Selected Remedy. Figure Q-4 illustrates the major features of the post-remedy groundwater flow system.

As the remedy is implemented, the sources of contamination will be removed, consolidated in the pits, and hydraulically isolated (including sediments in the Western, Central, and Eastern drainages). The post-remedy surface topography (and subsurface bedrock topography) will continue to direct surface runoff and groundwater flow toward the natural drainages in the MA. In areas where mine wastes and contaminated sediments are removed, the precipitation and snowmelt will runoff or infiltrate, converge on the Western, Central, and Eastern, and Far West drainages, and ultimately discharge to Blue Creek (or directly to Lake Roosevelt in the case of the Far West Drainage).. However, this post-remedy flow will be un-impacted by mine wastes and contaminated sediments as they will no longer be present (or will be hydraulically isolated). Similarly, precipitation and snowmelt on the capped consolidated wastes will runoff or infiltrate and migrate laterally as interflow, and ultimately discharge to Blue Creek without contacting mine wastes. Water that accumulates in the consolidated wastes will be extracted, treated on-Site at the new WTP, and ultimately discharged via pipeline to Lake Roosevelt.

As acknowledged in the *Record of Decision* (ROD; EPA, 2006) COCs in surface water and groundwater are expected to exceed background and cleanup levels during, and for a period of time following the RA as natural flushing of water that previously contacted mine wastes occurs.

The time required for surface water and groundwater cleanup levels to be achieved is unknown and can be better estimated after post-remedy monitoring is conducted for several years. Sediment cleanup levels should be achieved upon completion of the RA as the intent is to remove all mine-affected sediments. It is possible that mine-affected surface water that remains following the RA might transfer contaminants to the sediments in the remediated drainages. However, the impact that the remnant mine-affected surface water has on sediments following the RA is expected to be minimal (e.g., low concentrations of COCs) and relatively brief as natural attenuation processes occur in both the surface water and potentially impacted sediments. Also, the contribution of direct erosion of mine wastes to sediment contamination will be removed upon completion of the remedy as the wastes no longer will be exposed to erosional forces.

Q2.43 ANTICIPATED IMPACTS THAT COMPLETED REMEDY WILL HAVE ON HYDROGEOLOGIC CONDITIONS

The hydrogeologic conditions at the Site will gradually change from the current conditions (summarized above) to post-remedy conditions as the phased RA construction activities are completed. Currently (pre-remedy), the natural water balance in the MA watershed (i.e., long-term steady state conditions where the recharge rate approximates the amount of combined discharge from the flow system) is maintained because mine-affected water that is captured, treated and discharged to the Eastern Drainage within the MA watershed, and ultimately contributes to the combined discharge from the MA watershed to Blue Creek. The primary difference between current pre-remedy hydraulic conditions and post-remedy conditions is that the mine-affected water that is extracted from the consolidated wastes, underdrain systems, and the alluvial groundwater controls will be treated and discharged via pipeline to Lake Roosevelt outside of the MA watershed. As a result, the amount of combined water discharging from the MA watershed to Blue Creek following implementation of the remedy will be reduced by the volume of treated water that is discharged directly to Lake Roosevelt.

The amount of post-remedy water that will be treated and discharged to Lake Roosevelt is expected to be significantly less than the amount of water that currently is treated and discharged on-Site to the Eastern Drainage. This is because the bulk of post-remedy precipitation and snowmelt will be shed as surface water runoff that will not have contacted mine wastes, whereas much of the pre-remedy precipitation and snowmelt contacts mine wastes and requires treatment. The anticipated volumes of post-remedy water requiring treatment will gradually decrease over time as the backfilled pits are dewatered and long-term steady state conditions are re-established. As described in the Water Balance section of BODR Appendix E, the long-term steady state volume of post-remedy water that will be treated and discharged to Lake Roosevelt is estimated to be 50 gpm or 26 million gallons per year (Mgal/yr). The sources of post remedy water that will need treatment are groundwater seepage into pits 3 and 4, the Backfilled Pit Area (BPA), and the three dewatering trenches installed to capture alluvial groundwater in the Far East, Central and Western drainages (see Appendix E of the BODR). This combined volume of post-remedy water requiring treatment (26 Mgal/yr) is approximately 12 percent of the overall volume of water estimated to discharge from the MA watershed (209 Mgal/yr) based on data collected during 1999 and 2000 as part of the RI (URS, 2002). These numbers should be considered estimates because they do not account for evapotranspiration.

The resulting impacts that the completed remedy will have on hydraulic conditions at the Site could include lower potentiometric surfaces near Pit 3, Pit 4, and within the BPA, and more variable stream flows in the creeks that emanate from the MA. These impacts will be better understood and documented following several years of post-remedy monitoring. The major post-remedy changes to the flow system downstream from the Mine Area will be:

1) Eliminating flow from the operation of the existing WTP to Blue Creek, which discharges approximately 60 Mgal/yr of treated water to the Eastern Drainage during the operational season (typically four days per week during April through November).

2) An increase in surface water runoff as clean water is shed from the remediated areas.

As a result, it is likely that the post-remedy flows will be more variable as the snow melts in the spring and the precipitation wanes in the summer months, which will result in a more intermittent flow in in the Eastern Drainage, as opposed to the relatively constant discharge from the existing WTP that occurs between April and October of each year. In addition, alluvial the groundwater controls (consisting of paired extraction trenches and low-permeability barrier walls) will intercept shallow alluvial groundwater in the upper sections of the Western, Central, and Far Eastern drainages and temporarily reduce flow in the down gradient alluvial system. The groundwater extraction trenches are intended to intercept impacted alluvial groundwater from the Mine Area and will be abandoned once monitoring results indicate alluvial groundwater in the up gradient areas meet cleanup standards.

Q2.54 AIR

Q2.54.1 Gamma Radiation and Radon

Results of the RI indicate that Site gamma radiation and radon gas levels are elevated, as indicated by radon flux data, airborne radon measurements, and gamma survey information. Radiation surveys indicate overall elevated gamma radiation levels throughout the MA, with localized areas of significantly higher levels, primarily where ore and proto-ore is stockpiled. Radon levels are also elevated. Gamma-survey transects and samples along the haul roads and adjacent areas indicate elevated levels of radioactivity, caused by mine waste rock materials used in road construction and particulate transport from the road in dust and surface water runoff.

Q2.54.2 Anticipated Impacts that Remedy will have on Gamma Radiation and Radon

During the RA construction activities (i.e., when mine wastes actively are being excavated and consolidated in the pits), air monitoring will be performed in accordance with the AQMP. A draft AQMP is under review by EPA and the Tribe at the time of publication of the 100% design. When the AQMP is finalized it will be added likely be performed to this SMP as an attachment.evaluate if air COCs are migrating off-Site. The potential for airborne contaminants should be eliminated upon completion of the RA as the cap over the consolidated wastes (which are the source of airborne contaminants) is designed to prevent significant concentrations of airborne contaminants from reaching the cap surface.

Q2.65 EXISTING MONITORING DATA

Dawn Mining Company LLC/Newmont USA Limited (DMC/Newmont) has conducted monitoring at the Midnite Mine under several different programs. From 1979 to approximately 2001, DMC/Newmont conducted a surface water and groundwater monitoring program according to the requirements specified in the Bureau of Land Management (BLM) letter dated May 28, 1982 (U.S. Department of Interior, 1982). DMC/Newmont performed monitoring pursuant to its 1995 NPDES permit (WA-002572-1) for the water treatment plant and monitoring to obtain operational data.

Monitoring was performed according to the *Work Plan for the Midnite Mine* (SMI, 1998) from approximately October 1998 through June 1999 for surface water and groundwater and in 1998 for sediment. As part of the Work Plan, surface water and groundwater monitoring was performed under the Backfilled Pit Dewatering Plan (BPDP) from approximately June 1999 through April 2001.

Between 2001 and 2011, an amended program for continued surface water and groundwater monitoring under the BPDP was performed, which incorporates some of the monitoring from the BPDP as well as the monitoring for the 1995 NPDES permit. In 2011, groundwater, surface water, and sediment monitoring began in accordance with the *Performance Monitoring Plan for the Phase I RD/RA: Interim Water Management for the Midnite Mine* (PMP; AES, 2011).

Existing surface water and groundwater data obtained from 1998 to 2010 were statistically evaluated in the PMP. The results of the statistical data evaluation were used to define action levels of indicator parameters for comparison of future data. The statistical evaluations (which have been updated to include more recent data), list of indicator parameters, and action levels have been carried forward for use in this SMP and are summarized in Section Q2-3.0 of the QAPP.

Q3.0 SITE-WIDE MONITORING DESIGN OVERVIEW

Site-wide monitoring during the RA construction will be performed to evaluate potential releases of COCs that may occur as a result of the earthmoving activities or temporary storage of mine-affected surface water. Because surface water and groundwater flow are the primary mechanisms for contaminant transport (including sediment deposition), monitoring will be performed where flows converge in the Western, Central, and Eastern drainages down gradient of the RA activities. Additional monitoring will be performed up- and cross-gradient of the consolidated wastes to provide baseline data for evaluating the Selected Remedy performance.

Post-remedy monitoring will be performed to determine if cleanup levels are being achieved within a reasonable timeframe following implementation of the Selected Remedy, and to provide data to support the CERCLA -5-year review process.

Water level monitoring will be performed during and following the RA construction to evaluate the effectiveness of the dewatering components of the Selected Remedy. These include dewatering wells in the Waste Containment Area (i.e., Pit 3, Pit 4, and the Backfilled Pits Area), and the Alluvial Groundwater Controls constructed in the drainages down gradient of the MA. This water level monitoring will initiate when the dewatering systems are constructed and come on-line, and is anticipated to continue as part of the long-term post-remedy monitoring.

Q4.0 MONITORING PROGRAM

Site-wide monitoring will be performed at locations down gradient of the RA activities as depicted in figures included in the FSP. The surface water, groundwater, and sediment sampling locations for the site-wide monitoring program are representative locations for the Potentially Impacted Area (PIA) as delineated in the ROD (EPA, 2006). In addition, the locations are consistent with sampling locations that have been monitored by DMC/Newmont according to previous Bureau of Land Management (BLM) requirements, by the EPA as described in the Midnite Mine Remedial Investigation (RI) Report (EPA, 2005), and according the PMP that preceded this SMP.

Many of the SMP monitoring locations will remain consistent with previously established monitoring locations: 1) for data comparability, 2) because previously established sampling locations are representative of potential releases that could occur as a result of RA activities, and 3) because previously established sampling locations are suitable for monitoring the effectiveness of the Selected Remedy following implementation. Some existing monitoring locations within the footprint of the RA earthwork activities will be eliminated as the RA progresses. For example, toe seeps that discharge from mine waste piles will be eliminated when those mining wastes are excavated. Likewise, monitoring locations may be added prior to initiating the RA or as the phased RA construction progresses. For example,For example, new monitoring wells will be installed at the confluence of Oyachen and Blue creeks, and new groundwater monitoring wells will be installed to monitor the effectiveness of the alluvial groundwater collection systems (low-permeability barrier/interception trench) after they are constructed. Therefore, the FSP will be updated, both as the RD and the RA progresses, to add and/or remove representative sampling locations as appropriate.

The site-wide monitoring program includes:

- Surface water sampling in the drainages down gradient to the MA that could be impacted by the RA activities; Blue Creek; existing seeps; and active impoundments and pits (including new surface water impoundments constructed and operated during the RA).
- Sediment sampling in the drainages down gradient of the MA that could be impacted by the RA activities.

- Groundwater monitoring – sampling and water-level monitoring in wells installed in regolith and bedrock in down gradient. Additional groundwater monitoring will be performed up- and cross-gradient of the consolidated wastes to provide baseline data for evaluating the Selected Remedy performance.
- AirAmbient air quality monitoring will likely be performed in accordance. The details of the air monitoring program will be developed during ongoing discussions with the AQMP. At the time of publication of the 100% design, the AQMP was under review by EPA and the Tribe. When the AQMP is finalized, it will be added to this SMP as an attachment.
- Continuous-flow and field -parameter monitoring (pH, specific conductance, and temperature) at surface water sites in the Western, Central, and Mine drainages.
- Turbidity monitoring at surface water sites in the Western, Central, and Eastern drainages to comply with the requirements of the Stormwater Management Plan (BODR Appendix O).
- Flow and water-level monitoring of the active water management system.
- Visual inspections of the seep and surface water collection and pump-back stations.
- Precipitation and evaporation data collection.

The parameters to be analyzed under this SMP are listed in Tables Q2-4 and Q2-5 in the QAPP, and consist of the COCs for which cleanup levels were established in the ROD, with the addition of indicator parameters as described in Section Q2-3.0 of the QAPP. The sampling/monitoring activities are discussed in detail in the FSP.

Q4.1 FIELD SAMPLING PLAN

The FSP component of this SMP includes the guidance for all fieldwork by defining the sampling and data-gathering methods to meet the DQOs for monitoring surface water, sediment, and groundwater. This includes:

- Surface water, sediment, and groundwater monitoring networks
- Monitoring schedules, locations, and rationale
- Sample handling and analysis
- Sample collection and documentation

- QA/QC sampling requirements

The FSP will be updated as necessary throughout the RA to meet the overall DQOs. This will include adding or deleting sampling locations, revising sampling frequencies, and keeping the requirements for monitoring the water collection system current with active impoundments, pits, and pump-back components.

Q4.2 QUALITY ASSURANCE PROJECT PLAN

The QAPP component of this SMP includes the following information to support implementation of the surface water, sediment, and groundwater monitoring programs:

- Data Quality Objectives (DQOs)
- Data quality indicators (precision, accuracy, completeness, representativeness, and comparability)
- Project and laboratory roles and responsibilities
- General requirements for sampling procedures, sample handling, field and laboratory chain-of-custody.
- Task-specific Standard Operating Procedures (SOPs)
- Document and recordkeeping
- Analytical procedures
- Field and laboratory quality control procedures
- Data reduction, validation and reporting
- Performance and system audits
- Data assessment procedures
- Corrective actions

Q4.3 HEALTH AND SAFETY PLAN

The Midnite Mine Superfund Site Remedial Action Health and Safety Plan (HASP) included in Appendix L of the BODR includes the health and safety requirements for site-wide monitoring activities. The Job Safety Analyses (JSAs) specific to the site-wide monitoring activities are included in the FSP.

Q4.4 INSTITUTIONAL CONTROLS IMPLEMENTATION AND ASSURANCE PLAN

The *Midnite Mine Superfund Site Institutional Control Implementation and Assurance Plan* (ICIAP; MWH, 20142014a) presents the plan to implement, maintain, and monitor institutional controls (ICs) at the Site. The ICs are intended to protect the integrity of the remedy and to preclude uses of the Site that would result in unacceptable risks from exposure to contaminants in accordance with the ROD. The results of the site-wide monitoring will be used to evaluate the continuing need for the ICs, and to determine if the areas requiring groundwater and surface water ICs should be modified based on the areal extent of groundwater or surface water having constituents that exceed the cleanup levels established in the ROD. These evaluations will be included in the annual data transmittal report described below.

Q4.5 STORMWATER MANAGMENT PLAN

The *Midnite Mine Superfund Site Remedial Action Master Stormwater Management Plan* (SWMP; MWH, 20152014b) describes the over-arching framework for how stormwater and surface water will be managed to limit the release of sediment, pollutants, and deleterious debris to downstream areas during and following the RA. The stormwater management approach is to contain and treat all potentially mine-affected stormwater. The only stormwater that will be released to any drainage outside of the MA will be from remediated areas. Therefore, the SWMP (contained in BODR Appendix O) includes inspections and monitoring that is intended to prevent sediment loading from remediated areas to the receiving waters. SWMP monitoring includes pH and turbidity field screening, and is performed daily whenever visual inspections indicate that stormwater is flowing off the remediated areas. The SWMP inspections and monitoring will be performed separately from the inspections and monitoring requirements described in this SMP. The surface water monitoring described in this SMP will complement the SWMP monitoring by providing chemical and radiological data where stormwater fromin the remediated areas converges in the down gradient drainages where stormwater from the remediated areas converges.

Q5.0 REPORTING

Monitoring trip reports will be submitted within 30 days following completion of monitoring activities. The SMP monitoring trip summary reports shall describe monitoring activities conducted; descriptions of deviations and rationale for deviations from the QAPP, FSP, and SMP; conditions observed in the field that require maintenance or other action; and a tabulation of field-collected data (such as, discharge measurement, water level readings, field instrument readings).

Once analytical data are available, the monitoring data (laboratory analytical results and any field measurements and notes) will be compiled, validated, and evaluated according to the QAPP. The QAPP includes the decision logic to be followed in the event action levels are exceeded. A monitoring data report summarizing the quarterly sampling round will be submitted 30 days following receipt of final analytical data from the laboratory. The annual fourth quarter monitoring data report will summarize all of the data collected during the preceding year. One electronic and one hard copy of the report will be submitted to the EPA at the following addresses:

Karen KeeleyEllen Hale
EPA Region 10 (ECL – 122113)
1200 Sixth Avenue, Suite 900
Seattle, Washington 98101

One hard copy of the report will be submitted to the Spokane Tribe of Indians to one of the following addresses:

Regular Mail
Spokane Tribe of Indians
Natural Resources Department
Attn: Randy Connolly, Superfund Coordinator
PO Box 480
Wellpinit, Washington 99040

or

Express Mail
Spokane Tribe of Indians
Natural Resources Department
Attn: Randy Connolly, Superfund Coordinator
6290-B Ford-Wellpinit Road
Wellpinit, Washington 99040

Q6.0 REFERENCES

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FIGURES