PREPARED FOR
DAWN MINING COMPANY, LLC
AND NEWMONT USA LIMITED

Midnite Mine Superfund Site Remedial Design Work Plan

Revision 1

MAY 28, 2012

MWH®

BUILDING A BETTER WORLD

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LIST OF ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
ABA	acid base accounting
AES	Advanced Environmental Sciences
AKART	All Known and Reasonable Technologies
ANSI	American National Standards Institute
ARAR	Applicable or Relevant and Appropriate Requirement
ARD	acid rock drainage
AR	access restriction
ASME	American Society of Mechanical Engineers
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMP	Best Management Practice
BPA	Backfilled Pit Area
CCM	Criteria Committee Meeting
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cfs	cubic feet per second
COC	contaminant of concern
COD	chemical oxygen demand
CQAP	Construction Quality Assurance Plan
CRSP	Colorado Rockfall Simulation Program
CSI	Construction Specification Institute
CWA	Clean Water Act
Cy	cubic yards
Dawn	Dawn Mining Company
DMC	Dawn Mining Company
DOI	United States Department of the Interior
DOJ	United States Department of Justice
DQO	data quality objective
EAR	East Access Road
EDLA	Equivalent Daily Load Application
EIS	Environmental Impact Statement
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
ESAL	Equivalent Single Axle Load
ESI	Expanded Site Investigation
FS	Feasibility Study
FSP	Field Sampling Plan
gpm	gallons per minute
GSR	Green and Sustainable Remediation
HASP	Health and Safety Plan
HELP	Hydrologic Evaluation of Landfill Performance
HRS	Hazard Ranking System
IC	institutional control
ICIAP	Institutional Control Implementation and Assurance Plan
IX	ion exchange
MA	Mine Area or Mined Area
MAA	Mine Affected Area
MGC	Miller Geotechnical Consulting
µg/L	micrograms per liter
µR/hr	microroentgen per hour
mg/kg	milligrams per kilogram
mg/L	milligrams per liter

MWH	MWH Americas, Inc.
NEPA	National Environmental Policy Act
NESC	National Electric Safety Code
Newmont	Newmont Mining Company or Newmont USA Limited
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	operations and maintenance
OM&M	operations, maintenance and monitoring
OSHA	Occupational Safety and Health Administration
OSWER	EPA Office of Solid Waste and Emergency Response
pCi/g	picoCuries per gram
pCi/L	picoCuries per liter
pCi/m^2-s	picoCuries per square meter per second
P.E.	Professional Engineer
PCP	Pollution Control Pond
P.G.	Professional Geologist
P&ID	piping and instrumentation diagram
PM	Project Manager
PMP	Performance Monitoring Plan
QA	quality assurance
QAPP	Quality Assurance Project plan
QC	quality control
RD	Remedial Design
RI	Remedial Investigation
ROD	Record of Decision
RA	Remedial Action
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
Site	Midnite Mine Superfund Site
SOP	Standard Operating Procedure
SOW	Scope of Work or Statement of Work
SMP	Site-Wide Monitoring Plan
SPCC	Spill Prevention, Control, and Countermeasures
SWMP	Stormwater Management Plan
SWRP	South Waste Rock Pile
Tribe	Spokane Tribe of Indians
TERO	Tribal Employment Rights Ordinance
TCLP	Toxicity Characteristic Leaching Procedure
TSS	total suspended solids
TTDR	Treatability Testing Data Report
TTER	Treatability Testing Evaluation Report
UAO	Unilateral Administrative Order
USGS	United States Geological Survey
UTL	upper tolerance limit
WAR	West Access Road
WDOH	Washington Department of Health
WQS	water quality standard
WRT	Water Remediation Technologies
WTP	water treatment plant

1.0 INTRODUCTION

1.1 PURPOSE AND OBJECTIVES

This Remedial Design (RD) Work Plan has been prepared on behalf of Dawn Mining Company and Newmont USA and presents the organization, objectives, and activities associated with designing the remedy for the Midnite Mine Superfund Site (Site). The Site is located in Stevens County on the Spokane Indian Reservation in eastern Washington State, approximately 45 air miles northwest of Spokane (see Figures 1-1 and 1-2). The Site includes an inactive open-pit uranium mine and areas and media impacted by mine-related contamination (see Figure 1-3). Contaminants at the Site include radionuclides and heavy metals mobilized as a result of mining activities and environmental processes, such as acid mine drainage, radioactive decay, and particulate transport in air, surface water, and groundwater.

This RD Work Plan is one of many work elements being conducted pursuant to the remedial actions set forth in the *Midnite Mine Superfund Site Record of Decision* (ROD; United States Environmental Protection Agency [EPA], 2006) and a RD/Remedial Action (RA) Consent Decree (CD) lodged by the United States District Court on 17 January 2012. This RD Work Plan describes specific activities that are necessary to prepare the designs for the Selected Remedy identified in the ROD and the CD (including the Scope of Work (SOW) attached as Appendix B to the CD). The Selected Remedy includes consolidation and containment of mine wastes in pits; water collection and treatment; disposal of residual water-treatment sludge; and monitored natural attenuation of groundwater. A more detailed description of the Selected Remedy for the Midnite Mine is presented in Section 2.5.

The objectives of the Midnite Mine RD are to prepare engineering plans and technical specifications that: 1) meet the RA objectives (RAOs) and performance standards defined in the CD and ROD, and 2) are suitable for procuring construction contractors to implement the Selected Remedy. In accordance with the CD, the RD Work Plan provides the general approach to construction, operation, maintenance, and monitoring of remedial actions as necessary to fully implement the Selected Remedy. This RD Work Plan contains:

- Descriptions of plans that will be necessary to construct the Selected Remedy and schedules for implementation of all RD and pre-design tasks identified in the Scope of Work.
- The overall project delivery strategy for performing design investigations and remedial design.

- The responsibility and authority of all organizations and key personnel involved with implementation of the remedial design, including a description of qualifications of key personnel directing the remedial design.
- A detailed schedule for remedial design activities.
- Example design sheets and specifications to be used in the design.
- The proposed design quality assurance approach.
- The regulatory requirements to which the RD will comply.

Although this RD Work Plan describes the process and strategy for preparing the design for the Midnite Mine remedy, it does not contain design details such as best management practices, design calculations, assumptions, technical specifications, etc. These details will be developed during the actual design process by the design team with input from project stakeholders, and will be included in the design submittals. Moreover, this RD Work Plan presents the RD approach and process as it is anticipated at the pre-design stage. Components of the RD approach and process are likely to change or evolve as the design progresses due to the complex and multi-faceted nature of the Site and the Selected Remedy. Any unanticipated changes to the RD approach or processes described in this RD Work Plan will be communicated and resolved among the appropriate project stakeholders. Additional details regarding the project delivery strategy for the Midnite Mine RD are presented below.

1.2 PROJECT DELIVERY STRATEGY FOR THE MIDNITE MINE REMEDIAL DESIGN

The overall strategy is to deliver the RD efficiently, cost effectively, and in a manner that satisfies the concepts and requirements described in the CD. The project delivery strategy includes the following components:

1.2.1 Project Delivery Method

The Midnite Mine RD/RA will be a traditional design-bid-build project delivery. The design team (described below in Section 1.3) will prepare the design and bid documents in accordance with this RD Work Plan. These design/bid documents then will be used to obtain bids from qualified remediation contractors, and the selected remediation contractor(s) will perform the RA construction activities. During the RA, the design team or other qualified engineering or construction-manager entity will act as Dawn/Newmont's agent to review the progress of the work and confirm the RA is performed in accordance with the approved design.

1.2.2 Technical Manager Meetings/Design Review Meetings

Throughout the Midnite Mine RD process, periodic meetings will be held with regulatory and design-team project managers and technical staff to review progress and important or significant technical issues,

discuss design parameters and assumptions, and discuss potential design changes. The goals of these meetings are to keep the lines of communication open and to get stakeholder input and consensus early in the RD process (as opposed to relying solely on the traditional review/response-to-comments approach to communicate and address potential issues). It is anticipated that these meetings will be held approximately monthly during the RD (or as required) and will occur either in person or via teleconference depending on the current status of the design effort. Additional details regarding the Technical Manager Meetings are included in Section 6.2.

In addition to the Technical Manager Meetings discussed above, Design Review Meetings will be held within two weeks of receiving regulator comments on the 30-percent and 60-percent design submittals. The purpose of the Design Review Meetings is to allow the design team the opportunity to seek clarification on regulator comments and to work with the regulators to resolve difficult comments prior to initiating subsequent designs.

1.2.3 Design Sequencing

The RD (described in Section 5.0) will be sequenced to mirror the anticipated chronological order (or phases) of the RA construction. For example, the designs for earthwork activities that are scheduled to occur early during the RA will be progressed to 100 percent, whereas the designs for earthwork activities scheduled to occur later in the overall RA might initially only be brought to the 30- or 60-percent design stage. (Note that the design for each phase of earthwork will progress to the 100-percent design stage before each phase of field activities begin). The purpose for staggering the design is to allow information and lessons learned while performing the initial earthwork construction activities to be integrated into the subsequent earthwork designs as they are finalized. The concept is that it is more efficient and cost effective to make changes to a 30- or 60-percent design than it is to change a 90- or 100-percent design. Also, portions of the water treatment design are not anticipated to progress beyond the preliminary 30-percent design phase until the National Pollutant Discharge Elimination System (NPDES) permit is reissued and the discharge standards are finalized. Once the NPDES permit is reissued, the WTP design will progress through the 100-percent stage before construction of the new WTP begins. The efficiencies gained by staggering the design efforts as described above are expected to streamline the overall schedule for implementing the Selected Remedy. The design approach, anticipated construction schedule, and related sequencing issues are discussed in detail in Section 7.0.

1.2.4 Value Engineering

Construction contractors and outside technical experts will be consulted during the design process to help identify procedures, processes, and construction techniques that could improve quality, or streamline implementation or future operation and maintenance of the Selected Remedy. For example, construction

contractors will be solicited at key points during the design process where it is determined that outside expertise would enhance the design and the performance of the remedy. The objective is to identify value engineering ideas early such that they can be incorporated into the RD.

1.2.5 Compliance during Remedial Design with Regulatory Requirements

This RD Work Plan has been prepared, and the actual RD activities will be performed, in accordance with the *Superfund Remedial Design and Remedial Action Guidance* (EPA, 1986). The intent is to design the Selected Remedy such that it is protective of human health and the environment, complies with the ROD, and fulfills the CD SOW. The compliance requirements specific to various planning documents (e.g., EPA guidance relevant to preparing Quality Assurance Project Plans), and the process for compliance with substantive environmental requirements for the Site RAs are included in Section 5.0.

1.2.6 Applying EPA Principles for Greener Cleanups

The RD process will include an evaluation of applicable Green and Sustainable Remediation (GSR) technologies and best management practices (BMPs). The goal of the GSR evaluation is to identify technologies and/or BMPs that may reduce the environmental footprint of the RA and the associated long-term operation and maintenance. The results of this evaluation will be included in the 30-percent design submittal. Actual GSR technologies/BMPs that are carried forward in the successive design will be determined with input from the project stakeholders based on a cost-benefit analysis and on the determination that the proposed GSR strategies can occur in a manner that is consistent with governing statutes and regulations. The use of GSR technologies cannot compromise the cleanup objectives, community interests, reasonableness of cleanup timeframes, or protectiveness of the cleanup actions.

The GSR technology evaluation will reference the following information sources:

- EPA Principles for Greener Cleanups (http://www.epa.gov/oswer/greenercleanups/principles.html#attachment).
- EPA Superfund Green Remediation Strategy (http://www.epa.gov/oswer/greenercleanups/strategy.html).
- EPA Region 10 Superfund, RCRA, LUST, and Brownfields Clean and Green Policy.
- EPA Technology Primer – Green Remediation: Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites (EPA 542-R-08-002).
- EPA Hazardous Waste Clean-Up Information (CLU-IN) Web Site (http://www.clu-in.org/greenremediation/).

Additional detailed discussion of the GSR evaluation process is in Section 5.9.

1.3 PROJECT ROLES AND RESPONSIBILITIES

The overall organizational structure and key personnel for the Midnite Mine Superfund Site RD is illustrated in Figure 1-4. The responsibility and authority of each organization is presented below. Additional discussion regarding the project roles and responsibilities related to the overall project quality assurance/quality control (QA/QC) is included in Section 6.0.

1.3.1 Environmental Protection Agency

The EPA is the lead agency governing the remediation of the Midnite Mine Superfund Site. The EPA issued the ROD and CD, and is responsible for approving all plans and reports related to implementing the Selected Remedy. The EPA Remedial Project Manager is Ms. Ellen Hale. The EPA has contracted CH2M Hill as their oversight contractor. The CH2M Hill point of contact is Ms. Kira Sykes.

1.3.2 Dawn Mining Company/Newmont USA Limited

As the responsible party, Dawn Mining Company/Newmont USA Limited is implementing the Selected Remedy in accordance with the CD. Dawn/Newmont has overall responsibility for procuring consultants and contractors to perform the work, budgeting and securing the necessary funds, and assuring that the requirements of the CD are met. The Dawn/Newmont Project Coordinator is Mr. Nick Cotts and the Alternate Project Coordinator is Mr. Bill Lyle. The Dawn Mining Company Site Manager is Mr. Robert Nelson.

1.3.3 Spokane Tribe of Indians

The Site is located on lands owned by the federal government and held in trust for the Spokane Tribe of Indians (Tribe) and individual tribal members. The Tribe has given its concurrence with the EPA ROD. Mr. Randy Connolly is the Tribe Superfund Coordinator. The Tribe has access to contract technical support from AESE, Inc. The AESE, Inc. point of contact is Dr. F. E. Kirschner.

1.3.4 Worthington Miller Environmental

Worthington Miller Environmental (WME) is the Supervising Contractor procured by Dawn/Newmont to implement the Selected Remedy. As the Supervising Contractor, WME will direct and supervise all aspects of the RD/RA in accordance with the CD. The WME Project Manager for Dawn/Newmont is Mr. Lou Miller, P.E.

1.3.5 MWH Americas, Inc.

MWH Americas, Inc. (MWH) will serve as the RD Engineer, and will report to the Supervising Contractor. MWH is a global technical consulting, engineering, and construction firm, with a reach-back capacity to more than 7,000 employees. MWH provides expertise in all aspects of Comprehensive Environmental

Response, Compensation, and Liability Act (CERCLA) projects, including remedial investigations, human health and ecological risk assessments, feasibility studies, RD/RA, treatability testing, permitting, construction, and operation and maintenance of completed designs. The various technical issues that will be involved with the Midnite RD/RA work require access to personnel with experience in specific technical areas. MWH provides these capabilities, and can draw on specific personnel for additional resource support and input as necessary.

The core MWH Midnite Mine project team will consist of a select group of professionals based in Salt Lake City, Utah, Ft. Collins, Colorado, and Boise, Idaho that specialize in CERCLA compliance, remedial earthwork design, and wastewater treatment, respectively. Many of the MWH team have worked together on other projects, and several have worked on the Midnite Mine Site and nearby Dawn Millsite projects for as long as 15 years. The specific individuals involved and their respective roles are as follows:

Project Manager. Mr. Vance Drain is the MWH Project Manager (PM) and main point of contact for the Supervising Contractor. Mr. Drain will be responsible for day-to-day communication with the Dawn/Newmont Project Manager as well as with the Dawn/Newmont Project Coordinators and MWH staff assigned to perform the various project tasks. He will be responsible for the contractual commitments and for ensuring that the necessary resources are dedicated to the project. As MWH Project Manager, he will define and clarify the scope of work and objectives for each major activity, and then will assure the technical, budget, and schedule requirements are met. He, along with the MWH Engineering Manager, will be responsible for coordinating with the necessary agencies and authorities to identify any permit requirements associated with implementation of the remedy.

Mr. Drain is a professional geologist with a bachelor's degree in geology and a master's degree in earth sciences. Mr. Drain has over 26 years of CERCLA experience and has managed several complex, interdisciplinary remediation projects for CERCLA and RCRA sites throughout the western United States, including EPA Region 10. Mr. Drain's resume is included in Appendix A.

Engineering Manager. Mr. Clint Strachan will serve as the MWH Engineering Manager and the primary design interface to the MWH Project Manager. He will be responsible for coordinating the necessary resources to accomplish the design of the various elements and to complete the RD phase on schedule. He will ensure that the various plans and design submittals meet the requirements of the CD and the SOW in Appendix B of the CD.

Mr. Strachan is a registered professional (civil) engineer (registered PE in Washington) with a technical specialty in geotechnical engineering. Mr. Strachan has over 30 years of experience with the

development, design, permitting, construction, operation, and reclamation of mine facilities. Project experience has included tailings impoundments, heap leach facilities, water storage dams, sedimentation dams, and storage ponds. Mr. Strachan's Work experience includes site selection, site evaluation and investigation, analysis and design, waste material characterization, project permitting, construction QA/QC, and expert witness work. Mr. Strachan has a bachelor's degree in agricultural engineering and a master's degree in civil engineering. Mr. Strachan's resume is included in Appendix A.

Water Treatment Lead Engineer. Mr. Dan Dupon will serve as the lead engineer for the water treatment component of the Selected Remedy. Mr. Dupon is experienced with the treatment of mining-impacted waters, their inherent chemical complexity, and the broadening field of advanced treatment technologies. Mr. Dupon offers a unique ability to define solutions for a vast array of water-quality challenges. During his 15 years of experience in the industry, he has been dedicated to developing and implementing treatment investigations that range from conceptual process development and bench-scale tests to full-scale design and operation. The range of technologies that Mr. Dupon has direct experience with is extensive, including membrane separation, lime softening, enhanced coagulation, ion exchange, and biological reduction. His primary focus has been the evaluation and recommendation of treatment processes for mine wastewaters, as part of reclamation planning and water management. In addition, many of these projects have involved assessing the technical feasibility of passive and innovative technologies, with the objective of developing costs to support the selection of appropriate long-term, remediation alternatives. Mr. Dupon's resume is included in Appendix A.

Project Reviewers. Mr. Michael Gronseth and Mr. Ed Cryer will serve as the earthwork and water treatment Project Reviewers, respectively. Mr. Gronseth and Mr. Cryer will oversee all quality QA/QC related to the RD of the Midnite Mine Superfund Site. Mr. Gronseth has over 25 years of experience with environmental remediation and has served as the QA/QC manager for the MWH's Federal Operations for the past 8 years. In this capacity, Mr. Gronseth has been involved with the development of Corporate QA/QC policies and is responsible for the implementation of contract and corporate QA/QC programs. Mr. Cryer has over 40 years of experience in water quality and environmental studies, municipal, water resources, aquaculture and industrial water and wastewater planning, and engineering projects. His experience includes the preparation of planning studies, contract documents, and designs for municipal and industrial water and wastewater systems and industrial, water resources and mining processing and pollution control facilities. Mr. Gronseth's and Mr. Cryer's resumes are included in Appendix A.

1.4 ORGANIZATION OF WORK PLAN

The remainder of this RD Work Plan is comprised of the following sections:

- Section 2.0 describes the site background, site characteristics, nature and extent of contamination, a summary of the remedial actions completed to date, and a summary of the ROD and Selected Remedy.
- Section 3.0 presents a summary of the pre-design activities (both completed and ongoing).
- Section 4.0 summarizes the RD considerations relevant to the overall RAOs and the performance standards defined in the Consent Decree.
- Section 5.0 describes the contents of the RD deliverables.
- Section 6.0 describes the quality QA/QC process that will be followed during the RD.
- Section 7.0 presents the overall approach and schedule for the RD/RA efforts for the Midnite Mine Superfund Site.

2.0 PROJECT DESCRIPTION

This section provides an overview of the Site and a summary of information assembled during the Midnite Mine Superfund Site Remedial Investigation/ Feasibility Study (RI/FS). The section includes descriptions of the conceptual site model, physical setting, and RI sampling results, including background levels of contamination. More detailed information is contained in the *Midnite Mine Remedial Investigation Report* (EPA, 2005a) and *Midnite Mine Superfund Site Record of Decision* (ROD; EPA, 2006), which are in the Administrative Record for the Site.

2.1 SITE HISTORY AND ENFORCEMENT ACTIVITIES

In 1954, Tribe members and prospectors Jim and John LeBret found uranium in an area of the Spokane Reservation. The LeBret brothers and several other tribe members formed Midnite Mines, Inc. and secured mining leases at the Site. The Dawn Mining Company (Dawn) was subsequently formed, with Newmont Mining Company as the 51 percent shareholder and Midnite Mines, Inc. owning 49 percent. Newmont USA Limited is the corporate successor of Newmont Mining Company. This document refers to Newmont Mining Company and its successors collectively, as Newmont or Newmont USA Limited.

Midnite Mine was initially operated from 1954 until 1965, providing uranium under contracts with the United States Atomic Energy Commission. Following four years of inactivity, mining resumed in 1969, providing uranium under contracts with the energy industry. Mining activities were suspended in 1981, when the price of uranium dropped steeply, and were never resumed. Mine operations were regulated by a series of United States Department of the Interior agencies, including U.S. Geological Survey, U.S. Bureau of Mines, and U.S. Bureau of Land Management (BLM) Minerals Management Service. The Bureau of Indian Affairs (BIA) represented the Tribe and individual tribal allotment owners in matters related to leases and royalties.

Approximately 5.3 million tons of ore and proto-ore and 33 million tons of waste rock were removed from nine pits between 1955 and 1981. About 2.4 million tons of ore and proto-ore were stockpiled on site. Waste rock was used to backfill a series of previously mined pits, construct roads, and grade the Site, or was placed in one of several waste rock piles. Pit 3 and Pit 4, the two pits mined last, were not backfilled and remain open.

Ore from Midnite Mine was processed at the Dawn Mill established adjacent to the reservation in the town of Ford, Washington. Approximately 2.9 million tons of ore were hauled off Site and processed at the mill, producing approximately 11 million pounds of "yellowcake" (milled uranium oxide [U_3O_8]). The Dawn Mill is being closed under Washington Department of Health (WDOH) oversight, pursuant to the Uranium Mill Tailings Radiation Control Act.

In the late 1970s, contaminated seeps were observed at the toe of the largest waste rock piles at Midnite Mine. Pursuant to a BLM order, Dawn constructed an impoundment (the Pollution Control Pond, or PCP) in 1979 to capture the seeps for evaporation. Following the suspension of mining in 1981, Dawn began pumping water from the PCP to the now inactive Pit 3 in response to growing quantities of water in the PCP and newly identified seeps at the base of the largest waste rock pile.

In 1980, Dawn performed partial reclamation of the side slopes of the South Waste Rock Pile with approximately eight inches of stockpiled topsoil, which was seeded with a mixture of grasses and planted with trees. Dawn performed certain stabilization and security measures at the Site required by BLM, including construction of and periodic improvements to the seep collection system; construction of a sedimentation basin at the toe of a steeply sloped waste rock pile located to the east of Pit 4; and installation of surface water controls such as a diversion trench, pipes, and channels. Data collection also was required and included monitoring of surface water quality and flow and groundwater quality in Site wells. In the mid-1980s, BIA installed a barbed wire fence along the mine lease perimeter and in the drainage area to prevent cattle from entering contaminated areas.

In 1987, Dawn and EPA entered into a Compliance Order under the Clean Water Act (CWA) that required Dawn to eliminate discharges of pollutants to waters of the United States. In response, Dawn constructed a seep collection and pumpback system to collect water from the Western Drainage and Central Drainage and to pump that water to the PCP and Pit 3. The system incorporated seep collection that had been ongoing at the East Seep since 1978. Seeps appearing in the Central Drainage down gradient of the unlined PCP also were collected.

In 1988, Dawn constructed a water treatment plant (WTP) to treat the growing quantities of water in the open pits. A 1991 BLM order required Dawn to dewater the pits in compliance with a NPDES permit issued by EPA in 1986 (Permit No. WA-002572-1). In 1992, the WTP began treating water using barium chloride and hydrated lime to precipitate radium, heavy metals and uranium, and final clarification to

reduce suspended solids. Treated water is discharged to the East Drainage at the Site pursuant to the NPDES permit.

The water treatment process concentrated uranium and produced sludge with uranium concentrations of regulatory significance. Consequently, the Atomic Energy Act license requirements applied. WDOH, under the authority of the Nuclear Regulatory Commission Agreement State Program, issued the license (Radioactive Materials License WN-I0390-1) in 1992.

The BIA terminated the mining lease held by Dawn in 1991, but did not terminate the site management and reclamation obligations of the lease.

In 1991, Dawn submitted a mine reclamation plan. This plan was not accepted by BLM. BLM initiated scoping of the studies for an Environmental Impact Statement (EIS) in 1995 for mine reclamation under the National Environmental Policy Act (NEPA). In 1996, Dawn produced a revised Reclamation Plan. BLM considered the revised plan sufficient for inclusion as one of several reclamation options to be evaluated under NEPA following additional site studies.

In 1997, the Federal Government entered negotiations with Dawn and Newmont for study and cleanup of the Site in compliance with CERCLA and NEPA requirements. In 1998, negotiations involving the U. S. Department of the Interior (DOI), EPA, and the U.S. Department of Justice (DOJ) led to an interim agreement between DOJ, DOI, Dawn, and Newmont. The 1998 Interim Agreement called for data collection at the Site and temporary dewatering of the backfilled pits. Negotiations for an overall site settlement continued.

In 1998, EPA performed an Expanded Site Investigation (ESI) and scored the Site using the Hazard Ranking System (HRS) to determine the eligibility of the Site for inclusion on the National Priorities List (NPL).

Dawn and Newmont fulfilled the requirements of the 1998 Interim Agreement, including data collection and temporary dewatering of backfilled pits at the mine. The field work was conducted in 1999 and 2000, followed by reporting in 2000 and 2001.

In late 1998, EPA determined that negotiations for an overall site settlement were unsuccessful and, with Tribe support, proposed the Site for the NPL in February 1999. Negotiations with Dawn in 1999 to

conduct a RI/FS were unsuccessful, leading to an RI/FS conducted and funded by EPA. EPA performed the RI/FS from 1999 to 2006. The Final Rule for the inclusion of the Midnite Mine Site on the NPL was issued in May 2000. In 2005, the United States filed a claim against Newmont and Dawn Mining for response costs incurred at the Site.

The *Midnite Mine Superfund Site Record of Decision* (ROD) was signed by the Director of the Environmental Cleanup Office of the EPA, Region 10 on September 29, 2006. The ROD presents the final remedy for the Site as selected by the EPA, with concurrence by the Tribe. A summary of the ROD and Selected Remedy is presented below in Section 2.5.

On November 7, 2008, following a court ruling on the cost claim, EPA Region 10 issued to Dawn and Newmont a Unilateral Administrative Order (UAO) for Phase I Remedial Design and Remedial Action, EPA Docket No. CERCLA-10-2009-0026, with an attached Statement of Work (SOW) (EPA, 2008). In accordance with the UAO, Dawn and Newmont performed certain RD and RA tasks, including ongoing water treatment and residuals management, site fencing, interim measures to reduce contaminant loading to Blue Creek, and a number of pre-design investigations (summarized in Section 3.0). A complete list of project-related documents dating back to issuance of the UAO is included in Appendix D.

A Consent Decree (CD) for remedy implementation was negotiated among the parties and became effective upon entry into US District Court on 17 January 2012. The CD and attached Statement of Work (SOW) define the specific actions that Dawn and Newmont will undertake to design and implement the Selected Remedy at the Site in accordance with the ROD and the SOW contained in the CD. This RD Work Plan is a requirement of the CD, and has been prepared in accordance with the CD SOW and *Superfund Remedial Design and Remedial Action Guidance* (EPA, 1986).

2.2 CONCEPTUAL SITE MODEL

Open pit mining at Midnite Mine involved blasting bedrock and managing the resulting materials as uranium ore, rock with uranium marginally below ore grade (known as “proto-ore” or “protore”), or waste rock of no economic importance. Most ore was hauled by truck to the mill, but ore that was not hauled off site was stockpiled, as was proto-ore. Some ore and proto-ore stockpiles were incorporated into growing waste rock piles over time. Waste rock was used to fill previously mined pits, dumped in piles, or used for site grading and road construction.

Mining greatly accelerates the process of physical, biological, and geochemical weathering of rock. Exposed rock surfaces oxidize, and, in the presence of certain sulfide minerals, a process called “acid rock drainage” (ARD) causes water contacting exposed rock surfaces to become acidic. The acidified water dissolves minerals (including metals and radionuclides) in the rock, mobilizing the minerals into groundwater and surface water. Exposure to affected media can reach levels that pose a threat to humans and the environment. ARD and the movement of fine particles into and along surface water drainages may also cause contamination of sediments.

At Midnite Mine, mining activities such as blasting, excavation, and disposal of rock have created ARD by increasing rock surface areas and exposing these surfaces to weathering. Uranium-bearing rock is exposed in open-pit walls and in ore, proto-ore, and waste rock stockpiles on the ground surface and in previously mined pits, leading to elevated levels of radioactive decay products (such as radon gas) and ionizing radiation. Humans, plants, and animals may be exposed to elevated concentrations of metals and radionuclides in surface water, groundwater, soil, and sediments, as well as increased levels of radon in air and direct radiation exposure.

The primary sources of contamination at the Site are exposed uranium-bearing rock, with the primary release mechanisms being ARD and radioactive decay. Contaminant migration pathways include surface-water flow, groundwater flow, wind erosion and deposition, and sediment transport. Potential receptors include people who visit the Site for recreational, commercial, or subsistence purposes, as well as potential future residents of the Site. Potential ecological receptors include plants growing in contaminated media and animals living on or using the Site.

2.3 SITE PHYSICAL CHARACTERISTICS

2.3.1 Surface Features

Midnite Mine was developed on the south slope of a ridge that separates Blue Creek and Sand Creek, streams that flow to the southwest across portions of the Spokane Indian Reservation (see Figure 2-1). The Midnite Mine Superfund Site encompasses areas where physical disturbances caused by mining are apparent (the Mined Area; MA) and areas where media are affected by contaminant transport (the Mine Affected Area; MAA).

As shown on Figure 1-3, key site features include the following:

- Open mine pits, Pit 3 and Pit 4 (both partially filled with water).
- An area of interconnected pits filled with waste rock (the “Backfilled Pit Area” or BPA).

- Waste rock fill and waste rock piles (the South Waste Rock Pile [SWRP], Hillside Waste Rock Pile, and others).
- Seven or more piles of rock stockpiled as ore or “proto-ore” (near ore grade).
- A seep collection and pumpback system and WTP.
- Mine roads and buildings, including sheds where rock cores are stored.
- Surface water conveyances and impoundments (such as the PCP).
- Natural drainages that receive surface water from the MA.
- Blue Creek, which receives water from the mine drainages.

Waste rock from the mining process was deposited on the Site in piles; dumped into an area of older, interconnected pits (the BPA); and used to contour the Site and to construct roads. The largest waste rock pile is the South Waste Rock Pile, located downhill from the open pits (Pit 3 and Pit 4). Contaminated seeps occur at three primary locations at the toe of the South Waste Rock Pile, where previous surface water drainages emerge from the waste rock fill. The quality of water in the BPA is very poor and is believed to contribute to the seeps near the PCP. West of Pit 4 is the more recent Hillside Dump, and south and east of Pit 4 are areas of waste rock fill.

Ore-grade or near ore-grade (protore) rocks were stockpiled during the course of mining, including ore-grade rocks that were too high in calc-silicate minerals to mill cost-effectively (Lime Protore). Seven discrete stockpiles are located at the surface, and pockets of similar material are reportedly buried in waste rock, including the BPA.

Two gravel haul roads lead from the MA to the paved BIA road (Operable Unit 2) used to transport ore to the mill at Ford, Washington. The gravel haul roads are reportedly surfaced with crushed waste rock from the mine.

Three drainages (Eastern, Western, and Central) carry surface water from the MA to Blue Creek. Blue Creek originates at Turtle Lake southeast of Midnite Mine and flows to the Spokane River Arm (Spokane Arm) of Franklin D. Roosevelt Reservoir (Lake Roosevelt), the reservoir formed by the Grand Coulee dam. There is a distance of approximately 3.5 miles from the point where the combined flow of the mine drainages enters Blue Creek to the Spokane Arm.

2.3.2 Topography

Midnite Mine is located in a mountainous region with approximately 2,500 feet of relief in the general vicinity of the Site (see Figure 2-1). The area disturbed by mining is approximately 350 acres and falls largely within a single watershed that drains to the south. Adjacent Spokane Mountain is approximately 3,870 feet above mean sea level. Elevations in the watershed range from 3,400 feet at the ridge top to about 2,100 feet where the primary surface drainages join Blue Creek. From this point, Blue Creek flows 3.5 miles to the Spokane Arm of Lake Roosevelt, dropping over 600 feet in elevation in this reach.

2.3.3 Meteorology

The climate is characterized by warm, dry summers and moderately moist, cold winters. The mean annual temperature is approximately 47 degrees F, with monthly average temperatures ranging from 29.2 degrees F in January to 71.0 degrees F in August.

Average annual precipitation at the Site based on a 9-year period was about 18.5 inches, and monthly average precipitation ranges from about 0.3 inch in August to 2.5 inches in December. Of the total annual precipitation, 40 percent falls in April through September. Average seasonal snowfall is 47 inches, with the highest average monthly snowfall in December (17.9 inches). In an average year, at least 1 inch of snow is on the ground for an average of 38 days. Maximum snow depth during the period of record was 34 inches.

The primary prevailing wind direction at the Site is northeast, and the secondary direction is southwest. The average monthly wind speeds range from 3 to 4.9 mph, with average gust speeds from 8.5 mph (January) to 13.1 mph (July). Based on an on-site evaporation study performed by the mining company, the estimated lake evaporation rate is approximately 28.5 inches per year.

2.3.4 Surface Water Hydrology

The watershed that includes the MA currently has eight sub-basins, based on topography and diversion structures (see Figure 2-2). Surface water runoff from three of the sub-basins flows to the PCP or to Pits 3 and 4, while the surface water from the other five sub-basins drain to Blue Creek or (in the case of the Far West Drainage) flow directly into an unnamed creek located between Blue Creek and Sand Creek, and that eventually reports to the Spokane Arm. Three primary drainages (Eastern, Western, and Central) drain the majority of the MA. During water treatment plant operations, treated water is discharged to the East Drainage. Apart from this seasonal discharge, flow in the East Drainage is minimal or absent during the dry summer months and during the winter when any available water is

frozen. The highest surface flow rates occur in the spring during periods of increased rainfall and snowmelt.

Mining operations have significantly altered local hydrology. Upper portions of the three primary drainages were completely excavated or filled with waste rock during mining. Site grading and compaction of haul roads and truck staging areas increased runoff in some parts of the MA. In other areas, unconsolidated, coarse-grained waste rock, ore, and proto-ore have decreased runoff and increased infiltration rates.

Several facilities were constructed for surface water management, which further modified the surface water flow. These facilities include the PCP, seep collection systems, pipes and culverts that route MA surface water to the PCP and Pit 3, and ditches that divert up-gradient surface water around the MA.

Seeps occur where the Western, Central, and Eastern drainages emerge from the South Waste Rock Pile. This water is currently captured and pumped back to the PCP and Pit 3 where it is stored prior to treatment. Starting about 1,500 feet south of the MA, groundwater discharge provides a small base flow for the lower portions of the three drainages. Several small seeps occur in these lower portions of the Central and Western drainages.

Blue Creek is perennial in a normal year, although natural flows can be very low late in the summer. The East Drainage and Blue Creek flow during the dry season is dominated by discharge from the water treatment plant (which normally operates April through November, 4 days a week). Blue Creek average daily flow measured upstream of the mine drainages ranges from 0.04 to 60 cubic feet per second (cfs; United States Geological Survey [USGS], 1984–2002).

The 100-year floodplain is constrained by slopes on both sides of Blue Creek. The MA is above the 100-year floodplain, as is the majority of the MAA south of the mine. A gravel road along Blue Creek within the floodplain (BIA Hwy 55) runs from where the mine drainages enter Blue Creek to where the creek enters the Spokane Arm.

2.3.5 Geology

The bedrock geologic setting of the Midnite Mine and surrounding area is dominated by a granitic quartz monzonite that intruded into a metamorphosed sedimentary (meta-sedimentary) rock, known as the Togo Formation. Much of the overlying meta-sedimentary rock has been eroded away, leaving a “roof

pendant" of Togo Formation rock, which is primarily phyllite schist and calc-silicate rocks, including marble, quartzite, and hornfels.

The Togo Formation is the primary host rock for uranium mineralization at Midnite Mine. The ore bodies at the Midnite Mine were localized within the phyllite and calc-silicate hornfels of the Togo Formation, adjacent to the contact with the granitic quartz monzonite intrusion. Mineralized zones are characterized by an increase in grain size, foliation, and abundance of iron sulfide. Bedding in the phyllite and calc-silicate rocks is oriented generally north-south to north 30 degrees east, and dips about 45 degrees to 70 degrees southeast. Mining followed the contact zone. Generally, on the west side of the MA, the bedrock is predominantly quartz monzonite, while on the eastern side of the MA, the bedrock consists mostly of Togo Formation rock.

Surficial soil deposits overlie the bedrock at the Site, with thicknesses ranging from 0 to over 20 feet. Generally, soil deposits at the Site are thinnest along ridge crests, and thickest along valley bottoms. The soils were laid down by stream and glacial activity and through weathering of bedrock. Deposits from the series of floods from glacial Lake Missoula left sand and gravel deposits in some areas. The hillsides adjacent to Blue Creek downstream of the Oyachen Creek tributary are composed largely of these sand and gravel deposits. Unconsolidated materials in the site area include surficial deposits such as alluvium, colluvium, and glacial deposits, as well as waste rock from mining activities. Weathered bedrock and fractured, more competent bedrock underlie these unconsolidated deposits.

Ore bodies mined at the Midnite Mine were localized within the phyllite and calc-silicate hornfels of the Togo Formation adjacent to the contact with the granitic quartz monzonite intrusion. Eight ore bodies were present at the mine along the intrusive contact for a distance of about 1 mile. The depth to ore was reported to vary from less than 16 feet to about 300 feet. Two ore bodies had no surface expression, and others gave little evidence of their potential at depth. Mining progressed in a northward direction to areas of higher elevation. Consequently, the later pits, Pits 3 and 4, had to be larger and deeper to expose uranium ore along the granite-Togo contact.

The 1981 National Uranium Resource Evaluation identified numerous uranium and other metal anomalies in a study of Midnite Mine and surrounding areas. Some were known ore deposits and others were considered viable as possible areas for mineral exploration. The anomalies were found to occur in both meta-sedimentary and plutonic rocks. Another uranium deposit located less than 5 miles to the

southwest of Midnite Mine was developed in the 1970s by Western Nuclear. This mine and co-located mill have been closed and reclaimed.

2.3.6 Hydrogeology

Precipitation that does not leave the Site through evaporation, transpiration, or runoff enters the groundwater flow system. Outside the MA, the amount of water entering the groundwater system is estimated at 10 percent of precipitation or less. Within the MA, as much as 80 percent of precipitation enters the groundwater system because of the coarse texture, high porosity, and high hydraulic conductivity of the waste rock, as well as the relatively sparse vegetation (URS, 2002).

Following the overall topography of the Site, groundwater flow is generally to the south, from the higher elevation recharge areas toward the lower elevation discharge areas (lower portions of the drainages and Blue Creek). Within the sub-basins, groundwater similarly flows toward the drainages. The downward gradients seen in the recharge areas and upward gradients in lower elevation areas are consistent with a topographically driven groundwater flow system. Local influences on the flow include the mine pits, which act as sinks when pit water levels are below bedrock groundwater elevations nearby.

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 flows toward the buried drainages across the bedrock or buried pre-mining surfaces and emerges as seeps where the drainages surface at the toe of the South Waste Rock Pile and the East Dump. Because this water moves quickly to surface discharge points, a relatively small portion of this water recharges the underlying fractured bedrock.

Groundwater flow within the 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 varied orientation. The weathered bedrock is more fractured and thus has higher hydraulic conductivity than the unweathered bedrock. Increased conductivity also is likely in the contact zone between the Togo Formation and granitic quartz monzonite due to fracturing and below-surface drainage channels, which develop through gradual erosion of structural weaknesses in the rock.

Groundwater recharge to the open and backfilled pits occurs by infiltration of precipitation and snowmelt, interflow along the bedrock surface to the pit walls, and flow from fractures in the bedrock. Groundwater

in the Backfilled Pit Area flows southward over the bedrock rims of the pits and along the bedrock surface where it surfaces at the toe of the South Waste Rock Pile in the Central Drainage (at the PCP).

Average annual pit recharge from groundwater is estimated at 7.9 gallons per minute (gpm) for Pit 4 and 16.5 gallons per minute for Pit 3. Average water volumes entering the pits due to direct precipitation into the open pits are estimated at 22 million gallons per year for Pit 3 and 13 million gallons per year for Pit 4 (URS, 2002). Additional empirical estimates of groundwater inflow into Pit 3 and Pit 4 were conducted after the RI as described in Section 3.7.2.

2.3.7 Ecological Setting

The physically disturbed upland areas at the Site provide limited and poor quality habitat for wildlife, but largely undeveloped land surrounds the disturbed areas. Habitat types at and adjacent to the Site are shown on Figure 2-3.

Upland habitat in the area includes forested, grassland, open, and steep sub-habitats. These habitats and their associated plant diversity provide food and cover for a variety of wildlife. In the vicinity of the mine, the dominant forest cover type is Ponderosa pine and mixed Ponderosa/Douglas fir. Although small remnant stands of coniferous forest occur, the upland habitat in the MA has been physically degraded, and plant diversity in the understory is low, dominated by grasses and knapweed. Upland habitat along the mine drainages and Blue Creek is not physically disturbed by mining.

Areas of riparian and wetland habitat are limited at the Site, occurring as a narrow band on the banks of Blue Creek and as small isolated areas associated with seeps within the mine drainage. These areas provide important habitat and environmental resources (food, cover, and water) to the area.

Aquatic habitat includes poor quality water in the open pits and other surface water impoundments in the MA, as well as surface water in the mine drainages and Blue Creek. The banks and low-lying areas bordering the mine drainages and Blue Creek are riparian habitats which provide food, cover, and travel routes for a diversity of wildlife. An area along the East Drainage between the haul road crossing and Blue Creek is wetland habitat, characterized by saturated soils and grasses, cattail, bulrush, and dogwood species.

Much of the Blue Creek basin is a designated wildlife management area, and the MA pits present an attraction to wildlife such as deer and elk for watering and consuming the salts deposited around the perimeter of the pit lakes.

Existing or former habitat at the Site may be (or may have been) used by species which are listed as threatened or endangered or are candidates for listing under the Endangered Species Act. Threatened and endangered species potentially at the Site include the following: bald eagle, grizzly bear, lynx, woodland caribou, gray wolf, bull trout, rainbow trout (steelhead), kokanee salmon (sockeye), and Ute ladies' tresses.

2.4 NATURE AND EXTENT OF CONTAMINATION

EPA initiated the RI/FS in February 1999. A number of plans, technical memoranda, and reports were prepared during the RI/FS. The *Midnite Mine Remedial Investigation Report* (EPA, 2005a) provides greater detail on subjects summarized below. The following section presents the range of concentrations for key indicator contaminants in different areas and media.

2.4.1 Background Concentrations

To provide a background data set for comparison, EPA characterized sediments and surface water in Sand Creek and its tributaries, as well as Blue Creek up stream of the mine and unaffected tributaries to Blue Creek. Sand Creek drains the watershed north of Midnite Mine and roughly parallels Blue Creek as it flows to the Spokane Arm. EPA sampled areas northeast of Midnite Mine, for soils, radon, and gamma radiation, including an area of subsurface uranium deposits. Monitoring wells were installed in alluvium and bedrock to characterize background groundwater in these areas.

The RI presents these results, as well as confirmatory comparisons to background for groups of samples (area or population comparisons). In addition, the RI presents the 95 percent upper tolerance limit (UTL) of background, a value used as a threshold for selection of contaminants to assess human health risk. The 95 percent UTL is the upper bound of a statistical interval calculated to include, on the average, a specified proportion of future observations from the same population. The 95 percent UTL is frequently used as a background level for purposes of site cleanup. The 95 percent UTL background concentrations developed in the RI/FS for indicator contaminants in groundwater, surface water, surface materials, and sediments are included in Tables 5-2 and 5-3 of the ROD. The 95 percent UTL background levels of radiation and radon gas are 22.3 microroentgen per hour (µR/hr) and 14 picocuries per liter (pCi/L), respectively (*Human Health Risk Assessment*; EPA, 2005b).

2.4.2 Surface Materials

The waste rock, ore, and proto-ore piles are of variable size and, particularly for the waste, contain a mixture of rock type. Although shallow trenching indicates that near-surface materials are oxidized, waste

pile seeps with low pH, high sulfates, and elevated contaminant levels indicate ongoing ARD in the MA. Uranium concentrations of up to 482 milligrams per kilogram (mg/kg) were measured in the MA, as compared to a 95 percent UTL of 43 mg/kg in background soils.

In the RI/FS, geotechnical data were used to evaluate slope stability. Overall, the analyses did not identify any large-scale instability of the waste piles under current conditions, although the analyses indicated the potential for shallow slope failures in limited areas (such as above the PCP), particularly following heavy rains or seismic events.

2.4.3 Sediments

Samples were taken of sediments in Pit 3 and Pit 4, the PCP and other impoundments, and from drainage and stream channels and banks. Sediment concentrations varied greatly, but the highest concentrations of contaminants of concern in sediments were measured in the open pits, and PCP, with generally lower concentrations in the mine drainages and Blue Creek.

RI sediment data for the delta where Blue Creek joins the Spokane Arm are limited to two samples. Sediment concentrations in these samples were not above background. Additional sediment characterization is proposed for Blue Creek as discussed in Section 3.12.

2.4.4 Surface Water

Surface water quality at the Site reflects the impacts of ARD, with elevated sulfate, radionuclides, and metals concentrations. COC concentrations are generally highest in the MA impoundments and in drainages to the south of the MA, with concentrations decreasing in Blue Creek presumably because of dilution. For example, measured concentrations of (metallic) uranium in MA surface water ranged from 1,320 to 30,000 micrograms per liter (µg/L), while Blue Creek down gradient of the mine had a range of 7 to 1,000 µg/L. This compares to a maximum background value of 17 µg/L.

Sulfate concentrations range from over 3,000 mg/L in pits and seeps to 1,500 mg/L in Lower Blue Creek. The maximum sulfate concentration measured in background area surface water was 30 mg/L.

2.4.5 Groundwater

Groundwater quality at the Site is affected by acid mine drainage processes, as demonstrated by concentrations of metals, radionuclides, and sulfate. Mining-affected groundwater generally is limited to the MA and the drainage basins immediately down gradient of the MA (see Figures 5-5 and 5-6 of the ROD).

Concentrations of total uranium in alluvial groundwater ranged from 3,900 to 54,000 µg/L in the MA, and in the Western Drainage measured from 78 to 2,980 µg/L, as compared to the 95 percent UTL of background of 88 µg/L. Bedrock groundwater concentrations of total uranium (metallic) ranged from 0.14 to 419,000 µg/L. Maximum sulfate concentrations in MA wells ranged up to 3,000 mg/L, compared to a maximum background concentration in groundwater of 187 mg/L.

2.4.6 Gamma Radiation and Radon

Gamma radiation and radon gas levels are elevated at the Site, 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 materials used in road construction and particulate transport from the road in dust and surface water runoff.

Gamma radiation surveys in the MA indicated a range of 13.1 to 398 µR/hr. By contrast, the highest reading in the background area was 19.2 µR/hr. Radon measurements in the MA ranged from 1.3 to 372 picocuries per square meter per second (pCi/m^2-s), with a mean of 140 pCi/m^2-s at the stockpiles. By comparison, the maximum background measurement was 11.8 pCi/m^2-s.

2.4.7 Fate and Transport

Contaminant migration has likely been reduced due to the cessation of blasting, dumping, and hauling; the re-vegetation of areas of waste rock; and water management measures such as seep collection, surface water diversion, and reduced accumulation of water in the pits. However, contaminant transport continues through the following principal pathways:

- Migration of dissolved COCs or suspended solids from ore, proto-ore, waste rock, and other surface materials containing COCs to surface water and groundwater.
- Migration of COCs in surface water downstream in drainages and Blue Creek.
- Migration of COCs in groundwater flowing down gradient toward Blue Creek.
- Erosion and deposition of COCs in particulates in the drainages and Blue Creek.

The groundwater impacts observed in unconsolidated material are most severe and extensive south of the mine pits. However, the only indication of ARD impacts to alluvial groundwater measured adjacent to Blue Creek is sulfate; other COCs are below background.

Groundwater impacts in bedrock appear less extensive than impacts to alluvial groundwater. Dilution and changes in pH as water moves through the system may be mitigating the impacts of ARD. Ongoing loading could in time increase the area of bedrock groundwater contamination.

2.5 RECORD OF DECISION

The ROD (EPA, 2006) presents the final Selected Remedy for the Midnite Mine Superfund Site. The Selected Remedy is considered protective of human health and the environment from actual or threatened releases of hazardous substances into the environment. The ROD addresses all contaminated materials at the Site, including surface materials in the MA and mining-affected groundwater, surface water, soils, and sediments.

2.5.1 Remedial Action Objectives

The RAOs for contaminated media at the Site are presented below.

Surface Material and Sediments. Surface material includes soil, ore, proto-ore, waste rock, overburden, and materials used in haul road construction. Sediments include sediments in pits, ponds, creeks, and drainages. RAOs for these materials are:

- Reduce exposure of humans and ecological receptor populations to COCs in and radiation from mining-affected surface materials and sediments to levels that do not result in unacceptable site-related risks.
- Reduce loadings of COCs from surface materials and sediments to surface water and groundwater so that loadings do not result in unacceptable site-related risks.
- Reduce environmental transport of mining-affected surface material from the MA to areas outside of the MA. Prevent people from removing mining-affected surface material.

Surface Water. Surface water includes seeps and water in pits, ponds, and other surface impoundments, and in creeks and drainages. RAOs for surface water include the following:

- Reduce exposure of humans and ecological receptor populations to COCs in surface water to levels that do not result in unacceptable site-related risks.

- Reduce infiltration of surface water into ARD-generating materials and reduce erosion and environmental transport of mining-affected surface materials by surface water.
- Reduce loadings of COCs from surface water to groundwater so that loadings do not result in unacceptable site-related risks.

Groundwater. Groundwater includes subsurface water in unconsolidated alluvium and in bedrock. RAOs for groundwater at the Site include:

- Reduce exposure of humans to COCs in groundwater to levels that do not result in unacceptable site-related risks.
- Reduce loadings of COCs from groundwater to surface water so that loadings do not result in unacceptable site-related risks.

2.5.2 Selected Remedy Summary

The Selected Remedy identified in the ROD includes the following:

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, continue 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 containment, removal of water that enters Pit 3, Pit 4, and the Backfilled Pit Area using pumping wells. Also, 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 Mill 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, re-vegetation, 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, re-vegetation 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.

3.0 SUMMARY OF COMPLETED, ONGOING, AND ANTICIPATED DESIGN STUDIES

This section presents a summary of completed, ongoing, and anticipated studies that have been performed, are being conducted, or are planned to support the design effort for the Selected Remedy at the Midnite Mine. The pre-design data needs previously were identified in a report entitled *Pre-Design Data Needs Report for the Phase I RD/RA: Interim Water Management for the Midnite Mine* (Tetra Tech, 2009). Work plans were prepared and approved by EPA for the tasks that were necessary to fill the design data gaps as identified in that report. Throughout 2010 and into 2011, Dawn Mining Company/Newmont USA have conducted field activities to complete the data collection necessary for the design elements identified in the *Midnite Mine Superfund Site Record of Decision* (EPA, 2006) and the data needs report referenced above. Most of these activities were performed under the Statement of Work (SOW) for Interim Water Management at Midnite Mine in accordance with the Unilateral Administrative Order for Remedial Design and Remedial Action (U.S. EPA Docket No. CERCLA-10-2009-0026; EPA, 2008).

These studies provide data and information beyond that presented in the *Midnite Mine Remedial Investigation Report* and are necessary for design of the Selected Remedy. The studies summarized in this section comprise the data/information required to advance the RD through successive stages of the design process (i.e., 30-, 60-, 90-percent, and final design). The data obtained from the completed investigations in most cases are considered sufficient to support the RD process. However, additional data are being collected in ongoing studies (or will be collected during the anticipated studies), and other data needs may be identified during the design process. It also should be noted that elements of the ongoing design studies can be performed concurrently with the RD effort. The preliminary RD/RA schedule, which includes the ongoing design studies, is included in Section 7.0.

The information presented in this section related to the ***completed*** design studies was obtained from the following reports and technical memoranda:

- *Survey Design Investigation Report* (Tetra Tech, 2010a) – Summarized below in Section 3.1.

- *Geologic Investigations of Pits and Assessment of Sediments Design Investigation Report – Revision 2* (MGC, 2011a) – This report was approved by EPA on April 25, 2011 and is summarized below in Section 3.2.

- *Borrow Source Design Investigation Report – Revision 2* (MGC, 2011b) and *Technical Memorandum Rhoads Property Borrow Investigation Phase II – Revision 1* (MGC, 2011c) – These reports were approved by EPA on June 3, 2011 and July 12, 2011, respectively, and are summarized below in Section 3.3.

- *Mine Waste Investigations – Revision 1* (MGC, 2011d) and *Technical Memorandum– Mine Waste Characterization* (AES, 2011a) - Summarized below in Section 3.4. (Note that additional mine waste investigations are underway as discussed in Section 3.4).

- *Site Access Roads Design Investigation Report – Revision 1* (Tetra Tech, 2011a) – This report was approved by EPA on June 3, 2011 and is summarized below in Section 3.5.

- *Midnite Mine - Site Seismicity Analysis* (MGC, 2010) – This report was approved by EPA on April 6, 2010 and is summarized below in Section 3.6.

- *Midnite Mine Design Investigation Report - Groundwater Investigations – Revision 2* (MGC, 2011e) – This report was approved by EPA on June 13, 2011 and is summarized below in Section 3.7.

- *Surface Water Design Investigation Report – Revision 1* (Tetra Tech, 2011b) – This report was approved by EPA on June 14, 2011 and is summarized below in Section 3.8.

- *Midnite Mine Ion Exchange Treatability Testing Data Report – Revision 2* (TTDR; Tetra Tech, 2010b) – Summarized below in Section 3.9.

- *Ion Exchange Treatability Testing Evaluation Report – Revision 1* (TTER: Tetra Tech, 2010c) – Summarized below in Section 3.10.

- *Blue Creek/Blue Creek Delta Sediment Characterization, Revision 1* (AES, 2011b) – This report was approved by EPA on April 25, 2011 and is summarized below in Section 3.12.

The information presented in this section related to the ***ongoing*** studies was obtained from the *Evaluation of Supplemental RD Data Needs – Revision 2* (MWH, 2012a) and from the following work plans:

- *Proposed Rockfall Hazard Monitoring for Midnite Mine, Revision 1* (MWH, 2011a) – Discussed below in Section 3.2.2.

- *Additional Pit Wall Seep Monitoring Supplement to the Work Plan for Geologic Investigation of Pits and Assessment of Pit Sediments, Revision 1* (MWH, 2012b) – This work plan was approved by EPA on March 9, 2012 and is discussed below in Section 3.2.4.

- *Supplement to the Work Plan for Mine Waste Investigations – Hillside Waste Rock – Revision 1* (MGC, 2011f) – This work plan was approved by EPA on July 12, 2011 and is discussed below in Section 3.4.

- *Blue Creek and Delta Assessment Work Plan – Revision 0* (MWH, 2011b) – Discussed below in Section 3.12.

- *Work Plan for Additional Pilot-Scale Testing of Uranium Removal Using Anionic Exchange Resins* (MGC, 2012) – Discussed below in Section 3.10.

- *Work Plan for Storage Pond Site Investigations* – Revision 2 (MGC, 2011g) – This work plan was approved by EPA on August 23, 2011 and is discussed below in Section 3.11.

- *Data Collection for NPDES Permit Application Work Plan - Revision 3* (Rescan Consultants, Inc., 2011) – Discussed below in Section 3.14.

The summaries of the completed and ongoing design studies contained below are intended to provide the design study backgrounds and relevant results and conclusions. However, these summaries are not comprehensive and the documents listed above should be referenced if more detailed information is required.

The ***anticipated*** design studies include: 1) construction water alternative evaluation, 2) geotechnical investigation along the proposed WTP pipeline route, and 3) geotechnical investigation of the proposed South Waste Rock Pile storage pond location. The objectives, field methods and procedures, and schedules for these anticipated design studies will be included in work plans that will be submitted to the EPA during the summer of 2012. The anticipated design studies will be performed concurrently with the RD (i.e., start of the RD will not be delayed due to the anticipated design studies).

3.1 SURVEY DESIGN INVESTIGATION

The primary objectives of the survey investigations were to develop updated and refined topographic base map(s) and color orthophotography of the mine area, mine-affected area, adjacent areas and the proposed borrow area(s), which can be used for RD and with other design investigation information to:

- Determine the location of existing site features (roads, fences, drainages, channels, vegetation, pipelines, buildings, and pits)
- Provide a tool to aid in determining the boundaries of waste rock piles and ore/protore stockpiles
- Determine pit capacities
- Determine waste quantities that will be consolidated
- Provide data, including information to develop cross sections, for other major design elements and site hydrologic design
- Develop topographic base map(s) of potential borrow area(s) for determination of material quantities.

Surveys were performed to provide data for the RD, including:

- Topographic survey and color orthophotography of Midnite Mine and adjacent areas (provided in both NAD27/NGVD29 and NAD83/NAVD88 coordinate systems for comparison with pre-mining data and most current survey control data).
- Topographic survey and color orthophotography of the proposed WTP outfall pipeline route along Blue Creek.
- Topographic survey and color orthophotography of the potential borrow area south of the Dawn Millsite.
- Topographic survey and color orthophotography of the other potential borrow sites at the Rhoads property and the area east of Pit 3.
- Subaqueous bathymetric survey information (x, y, z) of the ground below the water surface in Pits 3 and 4.
- Survey information (x, y, z) of all culvert crossings beneath the site access roads to support data needed for the Site Access Road Investigation.
- Survey information (x,y,z) of the existing seeps and surface water sampling locations.

The *Survey Design Investigation Report* (Tetra Tech, 2010a) includes all data listed above in electronic format.

Other Sources of Survey Data. Other sources of survey data are included in the reports documenting interim mechanisms construction and the the pre-mining topography maps prepared by the US Bureau of Mines. The interim mechanisms construction reports document the locations and configurations of facilities constructed in 2010 and 2011, and are considered sufficient for design purposes (i.e., it is not anticipated that additional surveying of these features will be required). The pre-mining topography info from the US Bureau of Mines will be used extensively during RD to estimate the depths and locations of mining wastes, and to aid with designing drainage patterns following waste consolidation.

3.2 GEOLOGIC INVESTIGATIONS OF PITS AND ASSESSMENT OF PIT SEDIMENTS

Geologic investigations were performed at Pit 3 and Pit 4 during 2010 focusing on three topics: 1) rockfall and pit slope failure modes, hazards, and mitigation, 2) characterization of seeps and geologic features that could be groundwater pathways, and 3) characterization of pit bottom sediment and sediment management strategies. The results of these investigations are presented in the *Geologic Investigations of Pits and Assessment of Sediments Design Investigation Report – Revision 2* (MGC, 2011a). Pertinent information related to the investigation procedures, results, conclusions and recommendations relevant to the RD process is summarized below.

3.2.1 Completed Rockfall Hazard Evaluations

Engineering geologic mapping and evaluation of Pit 3 and Pit 4 was completed at a level of detail sufficient to identify general slope conditions and predominant pit-slope failure modes. Visible seeps and exposed features on the pit walls that could be pathways for groundwater inflows also were identified and mapped. Based on input from the geologic field investigation, rockfall simulation modeling was completed using the Colorado Rockfall Simulation Program (CRSP). CRSP was used to evaluate rockfall mitigation requirements for representative pit slope sectors having similar geologic and geometric characteristics. The report includes preliminary analyses for sizing perimeter rockfall catchments (either trenches or berms) that should be maintained during construction to contain rock falls and debris from shallow slope failures. The report also includes recommendations for monitoring of specifically identified sectors of the pits where shallow to intermediate depth slope instability is possible based on the engineering geologic characterization. A summary of the rockfall and slope stability contained in the *Geologic Investigations of Pits and Assessment of Sediments Design Investigation Report – Revision 2* (MGC, 2011a) is presented below. Information regarding additional ongoing rockfall hazard investigations is presented in Section 3.2.2.

Rockfall and Shallow Slope Instability. Rockfall is the primary mode of failure and presents the highest risk to workers in the pits due to the high likelihood of occurrence. Rockfall and shallow rock slide

hazards were rated as moderate to high hazard potential, and are present on all pit slope sectors in both Pit 3 and Pit 4. Based on this preliminary analysis, the principal recommended rockfall mitigation approach for the period of pit construction work consists of a 15-foot deep trench (or 15-foot high berm), and a minimum 25-foot horizontal offset to be maintained at the base of the pit walls as the backfill is placed. It is likely that the required trench depths and horizontal offset requirements can be reduced as the increasing fill height results in decreasing rockfall energy at the fill surface. Other rockfall mitigation measures such as scaling, fences, drapes, and netting also may be considered to supplement the perimeter catchment trench in high risk zones. These other mitigation measures may also be implemented during the initial stages of fill placement and in areas where there is inadequate space for implementation of the catchment trench.

Intermediate-Depth Slope Instability. Intermediate-depth failure modes from unfavorably-oriented joints or fractures were considered less likely to occur than rockfall or shallow-depth rock slides, but were reported to present a significant hazard due the larger consequences should a failure of this type occur. Examples of this failure mode were observed as existing and historic significant slide areas in both pits that were mapped on the report figures.

Deep-seated Mass Instability. This failure mode from large-scale, pit slope failure across multiple benches was reported to be highly unlikely and therefore presents a low risk to workers over the temporary construction time frame. The pit highwalls are reported to be generally stable in terms of deep-seated (mass) stability due to the generally advantageous rock mass characteristics (e.g., low continuity of joints) and favorable orientation of geologic structural features (e.g., shear and fault zones oriented normal to the highwall slopes), and past performance.

3.2.2 Ongoing Rockfall Hazard Evaluations

Pit Slope Movement Monitoring. A network of survey prisms were installed during the spring of 2011 to allow for periodic monitoring of pit slope movement, and monitoring of the tension crack near the crest of Pit 4.. These prisms (or movement monuments) are surveyed quarterly and the results are reported in quarterly data reports to the EPA. As of April 2012, the movement monument survey results and tension crack monitoring have not indicated measurable movements.

Ongoing Rockfall Hazard Monitoring. The rockfall hazard analyses discussed above were made using the CRSP program at four critical locations within Pit 3, and three similar locations within Pit 4. Parameters for the analyses were based on assumed conditions that were estimated using existing photographs and mapping available at that time. The developers of CRSP recommend that “in order to

achieve the highest degree of accuracy from CRSP, the program should be calibrated to each distinct study site." Therefore, further evaluations and field calibration of the rockfall hazard models, based upon rockfall monitoring, were recommended to support the RD. These recommendations, which are summarized in the *Proposed Rockfall Hazard Monitoring for Midnite Mine, Revision 1* (MWH, 2011a) technical memorandum, were initiated during the fall of 2011 and are ongoing.

Ongoing Rockfall Hazard Monitoring Study Objectives. The primary purpose of the rockfall monitoring program is to provide site-specific calibrations for the rockfall simulation models. The rockfall simulation models will be used to evaluate the effectiveness of proposed rockfall protection measures and designs. Based upon the results of the rockfall simulations, it may be necessary to modify rockfall protection measures or modify engineering designs to relocate critical facilities or construction operations outside of rockfall zones. Typically, these decisions require the application of engineering judgment by experienced personnel. These risk management and design decisions will be tied to the potential for harm to personnel and equipment rather than to an observed frequency of rockfall during a limited monitoring period.

As an example, initial observations at some of the altered-quartz-monzonite talus slopes in Pit 4 suggest these areas experience rockfalls at a high frequency. However the size of the falling rocks is relatively small, and the velocity of the rocks travelling down these slopes is low. If additional investigations confirm these initial observations, controlling rockfall in these areas would require a minor effort, and critical facilities (in terms of personnel exposure or susceptibility to structural damage) in these areas may not require relocation, in spite of a relatively high rockfall frequency.

Specifically, the proposed rockfall monitoring will provide additional information regarding the:

- Range of rock sizes that can be expected in different sectors within the pit.
- Typical rockfall velocities and runout distances encountered along the pit floor.
- Rockfall frequency in different sectors.
- Seasonal variation in rockfall frequency.

Digital image analysis using motion-activated video cameras was selected as the preferred method for rockfall monitoring at the site to meet the objectives stated above. In addition, outdoor motion-activated digital monitoring equipment can be installed in remote areas on relatively rough terrain and can be powered by relatively compact rechargeable batteries and solar arrays.

In addition to the video monitoring, supplemental still photographs will be taken at regular intervals during periods when the surfaces of the pit lakes are frozen. The still photographs will be evaluated to estimate: 1) The number and size of additional rocks that have accumulated on the ice surface, and 2) the point of origin (to the extent possible) and the runout distance across the ice surface.

Data interpretation will consist of using video monitoring data to perform site-specific calibrations of the rockfall models. It is anticipated that the site specific calibration reports will be presented as part of the 60 percent design reports for each pit. Depending on schedule, it may be necessary to submit the Pit 4 site-specific calibration report as part of the 90 percent design report.

3.2.3 Completed Characterization of Seeps and Groundwater Pathways

Completed Pit Seep Mapping. Mapping of the pit walls was performed during the summer and fall of 2010 to identify existing seeps and pit wall fractures, bedding, and joint sets that could be potential pathways for groundwater inflows. This information was obtained to help assess rates and identify key sources of groundwater flow to Pits 3 and 4 and assess technologies for reducing rates of inflow through grouting or other technologies. Seeps observed in Pit 3 and Pit 4 do not appear to be a source of significant flow into the pits.

Seeps were mapped in Pit 3 in the N, NE, E, and SW sectors of the pit. All of the seeps that could be accessed had estimated flows of 1 gpm or less. The seep flows typically do not reach the pit bottom or are reduced to drips suggesting that the total discharge from the seeps is small. In Pit 4, seep flow of less than approximately 1 gpm was observed near the toe of the north highwall. The seep supports shallow ponds (less than 6-inches deep) and associated wetland areas. It appears that additional flow may discharge from the Pit 4 floor to support the ponds and associated wetland area.

3.2.4 Ongoing Characterization of Seeps and Groundwater Pathways

Because the seep mapping discussed above was performed during summer and fall during base flow, additional visual inspection and mapping of seeps in pits 3 and 4 will be conducted during 2012 in the spring when groundwater levels are typically higher. These data will be used to help define locations and design of drains that will be constructed in the consolidated wastes to intercept inflow from the pit-wall seeps. The additional pit-seep monitoring will be conducted in accordance with the *Additional Pit Wall Seep Monitoring Supplement to the Work Plan for Geologic Investigation of Pits and Assessment of Pit Sediments, Revision 1* (MWH, 2012b). The additional pit-seep monitoring is not expected to delay the overall RD schedule (see Section 7.0).

3.2.5 Characterization of Pit Bottom Sediment and Sediment Management Strategies

Pit 3 sediment (approximately 3,300 cubic yards [cy] total volume) typically occurs in a layer approximately three inches thick on the pit floor with a somewhat thicker layer around the perimeter of the pit floor. Pit 4 sediments (approximately 2,400 cy total volume) are typically in a thicker layer of one to two feet thick on the pit bottom. The sediment in both pits is predominately saturated, silt-sized material, with somewhat coarser material around the margins of the pit floors.

The *Geologic Investigations of Pits and Assessment of Sediments Design Investigation Report – Revision 2* (MGC, 2011a) mentions that during the RA, sediment on the pit bottoms would be removed and stored temporarily prior to disposal in the backfilled pits. The reported approach to sediment management focuses on the use of conventional earth-moving equipment (excavators, front-end loaders, open haul trucks) and the addition of a drying material from fine-grained waste rock or soil to imported cement or fly ash when needed. Additional details of pit dewatering, drying, temporary storage, dust control, and worker safety are discussed in the report. It is not anticipated that additional pre-design data is required to finalize the sediment management techniques, which will be defined in the RD and implemented during the RA.

3.3 BORROW SOURCE DESIGN INVESTIGATION

The *Borrow Source Design Investigation Report – Revision 2* (MGC, 2011b) describes the results of the investigations to identify available quantities and characteristics of candidate borrow sources needed to implement the RA. The materials needed in significant quantities for specific design components include drain rock, cover soil, and topsoil/growth media. Materials also were identified that can be used as cushion materials for the geomembrane and rock for lining surface-water conveyance ditches. Based on the estimates provided in the *Borrow Source Design Investigation Report*, adequate quantities of suitable borrow materials have been identified to complete the RD. The conclusions from the report are provided below.

3.3.1 DMC Mill Site Borrow Area

The Dawn Mining Company (DMC) Mill Site Borrow Area (located approximately 20 miles from the Site) is an approximately 332-acre tract that is a resource for large volumes of granular soil comprising primarily two types of materials:

- Clean uniform sands – These materials have potential applications for use in drainage zones, as geomembrane cushioning materials, and potentially as drainage layers within the soil cover.

- Broadly graded sandy gravels - These materials potentially could be screened, with various products used for durable, permeable drain rock, rock for channel linings and cover soil.

3.3.2 Rhoads Property Borrow Area

The Rhoads Property Borrow Area is an approximately 81-acre parcel situated just southwest of the mine site. Two phases of investigation were performed at the Rhoads Property Borrow Area, which are summarized in the *Borrow Source Design Investigation Report – Revision 2* (MGC, 2011b) and the *Technical Memorandum Rhoads Property Borrow Investigation Phase II – Revision 1* (MGC, 2011c). Phase I borrow investigations indicate this area may yield more than 600,000 cubic yards of clayey sand materials, and Phase II investigations increased this estimate to over 700,000 cubic yards. These materials are considered potentially suitable for use as reclamation soil cover or cap.

3.3.3 Lane Mountain Stockpiles

The Lane Mountain Silica Sand Company has a processing facility near Valley, Washington, about 40 road-miles northeast of the Site. Stockpiles of fines from sand washing operations are an available commercial resource for silty clay and silty sand, for use as topsoil/growth media. The reported volume of this material is approximately 350,000 cy.

3.3.4 On-site Resources – Pit 3 East Rim

Residual soil and weathered rock deposits above the rim of the east high wall of Pit 3 were identified during the RI as a potential resource for fine-grained reclamation cover materials. The borrow investigation found that clayey soil in the identified area is only about 4 to 6 feet thick above bedrock. The small tract (less than 13 acres) and shallow thickness of soil above bedrock could provide very limited quantities of borrow material (estimated on the order of 80,000 cy). As a result, this borrow area was not recommended for further evaluation.

3.3.5 On-site Resources – Mine Waste

Select portions of the mine waste rock, notably the Hillside Waste Rock Pile and the Lime Protore Stockpile #8, were previously identified as potentially suitable for use as on-site borrow for the materials needed to construct the drainage blankets in Pit 3 and Pit 4. The Lime Protore Stockpile was determined to be not suitable for drain material due to its lack of durability. The Hillside Waste Rock Pile was determined likely to be physically suitable for drain material, but humidity cell testing is underway to verify that, if processed to obtain the desired drain rock size, the material will not be chemically reactive. These results are discussed in the Mine Waste Investigation Report summary below.

3.3.6 Commercial Resources for Supplemental Borrow

The report identifies several commercial borrow pits located within 30 miles of the Site that could be used to supplement the sources described above if one or more of the necessary material types was found to be in short supply during the RA.

3.4 MINE WASTE INVESTIGATIONS

3.4.1 Mine Waste Investigations Scope and Objectives

Investigations were performed to characterize key aspects of the mine waste and impacted materials. These investigations included:

Waste Rock Pile Investigations. Drilling, test pitting, sampling and testing in waste rock and ore/protore stockpiles to:

- Refine estimates of in-place quantities of waste rock.
- Estimate waste rock foundation over-stripping requirements and volumes.
- Characterize Hillside Waste Rock Pile and Lime Protore Stockpile #8 materials to determine geotechnical and geochemical suitability for use as on-site borrow resources for drain rock.

Access Road Mine Waste Investigations. Radiologic surveys, sampling and testing in areas along and adjacent to site access roads to:

- Identify and map lateral extent and thickness of roadside areas requiring cleanup.
- Estimate mine waste quantities along access roads.

Mine Drainage Sediment Investigations. Radiologic surveys, sampling and testing in mine site drainages to:

- Identify and map lateral extent and thickness of mine drainage sediments requiring cleanup.
- Estimate mine drainage sediment cleanup quantities.

Mine Waste Characterization Evaluation. Existing Site geochemical and radiological data were evaluated in the *Technical Memorandum – Mine Waste Characterization* (AES, 2011a) to guide placement of the mining wastes as they are consolidated into Pits 3 and Pit 4 during the RA. The objectives of the evaluation were to pre-characterize the wastes so that materials with a high ARD generating potential can be placed in the upper portions of the pits (above groundwater), and materials with a high radon-generating ability can be placed a in lower portions of the pits (beneath the upper 15 to

20 feet of materials classified with low to moderate radon-generating ability) to prevent radon emissions at the ground surface.

3.4.2 Mine Waste Investigations Results

The following conclusions were presented in the *Mine Waste Investigations* report (MGC, 2011d):

- The depth of waste rock determined from the drilling program varied from that estimated previously from pre and post-mining topography. Based on the depths of waste rock from the drilling program, the estimated volume of waste rock (including ore and protore piles) to be excavated and placed in Pits 3 and 4 is 16.7 million cubic yards (cy). The estimated maximum quantity from the Feasibility Study was 18.2 million cy (URS, 2005b). The estimate from the ROD is 16.3 million cy.

- The depth of foundation material under the waste rock piles that will be excavated varied considerably among the piles throughout the site. The waste rock locations were subdivided to refine the estimate of the volume of foundation materials that would require excavation based upon the testing results. The total estimated volume of foundation material is 895,000 cy. Assuming this and an average depth of contamination of one foot in the impacted areas outside of the waste rock pile footprint, the report estimates 995,000 cy of over-excavation of foundation and impacted material in peripheral area.

- The waste rock from the Hillside Waste Rock Pile was evaluated for particle size, acid base accounting (ABA) testing, durability testing and leach testing. Based on the results of these tests, material from the Hillside Waste Rock Pile could potentially be used for drain rock as part of the pit backfill. However, the Hillside Waste Rock material will likely require additional processing (crushing) to achieve sufficient quantities of the required size fraction for the drain material. Therefore, additional samples of waste rock from the Hillside Waste Rock Pile were collected for testing to determine the suitability of crushed rock for use as drainage materials (Phase II Field Investigation), and additional samples were collected from previously un-sampled locations in order to better quantify the amount of usable material that exists in the pile (Phase III Field Investigation). The Phase II and Phase III field investigations were performed during the fall of 2011 and the results are pending. These activities were conducted in accordance with the *Evaluation of Supplemental RD Data Needs – Revision 2* (MWH, 2012a) and the *Supplement to the Work Plan for Mine Waste Investigations – Hillside Waste Rock – Revision 1* (MGC, 2011f).

- The Lime Protore material did not meet durability requirements for drain material.

- A gamma survey supplemented by soil sampling determined the extent and approximate volume of contaminated soil in and along the haul roads. A range in volume of 36,600 to 87,000 cy was estimated. A gamma survey also was used to estimate the location and volume of sediments in the drainages. The volume of sediment in the drainages was estimated to be 17,200 to 160,000 cy.

- The amount of sediment in Pits 3 and 4 is estimated to be 5,700 cubic yards as presented in the *Geologic Investigations of Pits and Assessment of Sediment Design Investigation Report*.

- The volume of material to be excavated and disposed of in Pits 3 and 4 includes mine waste rock (both ore and protore), over-excavation of foundation material and areas adjacent to the waste rock piles, the haul roads, drainage sediments, and pit sediments. The estimated total ranges from approximately 17,800,000 to 19,500,000 cy.

- The estimated total capacity for disposal of material in Pits 3 and 4 ranges from 19,700,000 to 20,900,000 cy.

Table 3-1 provides the refined estimates of the materials to be disposed of and the capacities of the disposal areas. These estimates suggest that the materials can be disposed of according to the ROD, although the final design will require flexibility to accommodate some variability in the actual quantities during remedy implementation, which is common for this type of engineering design. The increase from the low estimate to the high estimate of materials to be consolidated is 8.7 percent, although there is no supporting information available to evaluate the higher estimate of waste rock materials in the FS.

Based on geochemical and radiological characterization, the relative ARD generation potential and radon-generating ability of the mine waste materials is classified as low, moderate, or high, as summarized on Table 3-2. Placement of the mine waste materials in the pits with respect to their relative ARD generation potential and radon-generating ability will be determined during the RD and dependent on the fill prisms for Pit 3 and Pit 4 and the sequence of material excavation and consolidation. Of the total estimated volume of material to be consolidated in the pits, the combined volume of mine waste materials classified as high for either ARD generation or radon-generating ability is small. Due to the relatively small quantity, this material can be placed in the central portions of the pits above the groundwater level and deeper than

15 to 20 feet from the surface. The majority of the mine waste materials to be consolidated in the pits are classified as low-moderate ARD generation potential and moderate radon-generating ability.

3.5 SITE ACCESS ROAD DESIGN INVESTIGATION

The *Site Access Roads Design Investigation Report – Revision 1* (Tetra Tech, 2011a) summarizes the results of the literature review, field activities, laboratory results, and other applicable design information for removal and reconstruction of the Site access roads. The conclusions from the report are summarized below.

3.5.1 Roadway Design Standards

The final remedy will include reconstruction of the existing access roads and designing them as haul roads to meet current federal American Association of State Highway and Transportation Officials (AASHTO) Standards. According to *A Policy on Geometric Design of Highways and Streets* (AASHTO, 2004), the access roads are considered "Special Purpose" roads. Special Purpose roads are generally defined by AASHTO as local service roads that are lightly traveled and operate with low traffic speeds in comparison to major paved street categories like collectors, arterials, and freeways. In addition to the AASHTO guidelines, *Guidelines for Haul Road Design* (Tannant and Regensburg, 2001) provide design recommendations specifically intended for the design and construction of mine haul roads.

3.5.2 Historic Road Construction Information

No design documents, construction plans, or specifications are available for the existing Site access roads. Dawn Mining Company staff indicated that the existing roads were constructed by conventional methods of balancing cut and fill slopes and filling in valleys with waste rock or local borrow material.

3.5.3 Road Surface Inspection

The condition of the roads and accompanying features were evaluated every 500 feet along both the east and west access roads using the following criteria: grade, shape, width, surface condition, evidence of erosion, dust protection, and drainage conditions.

East Access Road Inspection. The East Access Road (EAR) grades ranged from approximately 1 to 4 percent. The travelling road width ranged from 14 to 25 feet. The drainage conditions along the EAR were generally acceptable. There was evidence that sediment from the road was being transported to the natural drainages. Some of the sediment that was washed off the roads was in steep and densely vegetated areas and will need to be evaluated as indicated above in the Mine Waste discussion to determine if contamination exists and if contamination exceeds clean-up levels. The roadside ditches

adjacent to the EAR were observed to be generally shallow or nonexistent with some minor erosion. Where present, the roadside ditches were armored with cobbles, gravel, and grasses. No sediment traps were observed at the time of inspection. Cut slopes adjacent to the EAR ranged from 2 to 20 feet with side slopes ranging from 1/3:1 to 1:1 (horizontal:vertical). The cut slopes were primarily in rock and appeared to be stable. No significant seeps or significant erosion were identified. Fill slopes adjacent to the EAR ranged in height from a few feet to more than 20 feet with slopes at approximately 1:1.

West Access Road Inspection. The West Access Road (WAR) grades ranged from approximately 1 to 6 percent. The travelling road width ranged from 9 to 24 feet. The road surface and drainage conditions along the WAR were not as good as those along the EAR. Roadside ditches adjacent to the WAR were shallow to non-existent. Where present, ditches were armored with some naturally occurring cobbles, gravel, and grasses with minimal erosion. No sediment traps or undercutting of the roadside ditches was observed during the inspection. Cut slopes adjacent to the WAR (where present) ranged from 4 feet to 10 feet high with slopes ranging from 2:1 to ½:1. The surface of the cut slopes was generally covered with grasses or soil with rock at the steeper locations. No fill slopes or seeps were observed during the inspection of the WAR.

3.5.4 Mine Waste Rock in Access Roads

The *Site Access Roads Design Investigation Report includes* several figures that depict the areas and depths of waste rock to be removed from the access roads. These areas are based on the results of the geotechnical subsurface investigation and the mine waste investigation of the access roads.

3.5.5 Traffic Analysis

The *Site Access Roads Design Investigation Report* includes a traffic analysis, based on standard construction vehicles. This analysis estimated that approximately 90,000 trips with a semi-truck and a belly dump trailer, 1,300 trips with the Midnite Mine WTP solids disposal truck, and 70 trips with a semi-truck and a flatbed trailer would be made on the roads throughout the construction phase of the RA. These trips are considered to be round trips with the trailer loaded on the way into the site and empty on the way out. It was also estimated that approximately 14,400 round trips would be made by employees in various passenger vehicles during the RA.

Equivalent Single Axle Loads (ESALs) were computed based on estimated traffic volumes. ESALs are a method to convert a mixed traffic stream of different axle loads and axle configurations into a design number of 18-kilo-pounds single axle loads. These ESALs are then summed over the design period.

Equivalent Daily Load Applications (EDLAs) were calculated from this information. Estimated EDLAs for the EAR and WAR were 313 and 25, respectively.

3.6 SITE SEISMICITY ANALYSIS

The *Midnite Mine – Site Seismicity Analysis* technical memorandum (MGC, 2010) provides a review of available site-specific seismicity information and recommendations for ground motion parameters. The conclusion of the technical memo is that the peak ground acceleration for a probability of exceedance = 10 percent in 250 years is 0.131*g* based on USGS National Seismic Hazard map values. This value is greater than the 0.1*g* criterion established by EPA to trigger a seismic deformation analysis of cover soils (Koerner, 2005).

3.7 GROUNDWATER INVESTIGATIONS

In order to understand surface water and groundwater flows both during remedy construction and post-remedy implementation, groundwater investigations were performed during 2010 to:

- Identify sources and pathways of surface water and groundwater flow to Pit 3, Pit 4, and the Backfilled Pits under current conditions.
- Estimate groundwater flow rates into Pit 3, Pit 4, and the Backfilled Pits.
- Estimate mine impacted surface water and groundwater flow volumes that will require management to support design of a water treatment plant and pit groundwater extraction systems.
- Evaluate potential technologies for reducing groundwater flow into the pits including surface water controls, grouting, cutoff walls, and groundwater interceptor trenches.

These investigations are summarized in the *Midnite Mine Design Investigation Report - Groundwater Investigations – Revision 2* (MGC, 2011e)

Groundwater investigation field activities performed in 2010 included pit dewatering, monitoring well transducer installation, flow meter installation, and surface water monitoring station installation. Additionally, alluvial groundwater pumping was performed and monitoring wells were installed in the Western and Central Drainages. Historic data and data collected during 2010 were evaluated, including climate, stormwater flow, seep-collection rates, alluvial groundwater well discharge, groundwater level, and pit lake level. A summary of the Groundwater Investigations results is presented below.

3.7.1 Sources and Pathways of Flow to Pit 3, Pit 4, and the Backfilled Pits

Pit 3 and Pit 4 were dewatered during summer and fall 2010. While the pits were at minimum elevations, wells surrounding the pits were monitored for water levels and water quality. Water table contour maps of the pit areas were constructed to define the pit groundwater capture area, and an analysis of water quality was performed. The pits are groundwater sinks with a capture zone extending around their perimeter.

The water quality analysis indicates Pit 3 surface water quality is comprised of PCP pumpback water mixed with precipitation, pit seep, and mine area well water. Water quality data comparison indicates Pit 4 surface water quality is similar to the water quality in the pit area wells. The Pit 3, Pit 4, and pit area well water quality is different from the up-gradient well water quality, indicating water quality degrades as it contacts mineralized zones and potentially oxidized zones near where fractures intersect the pit walls.

3.7.2 Groundwater Flow Rates into Pit 3 and Pit 4

Groundwater inflow to Pit 3 and Pit 4 was estimated by URS (2002) using MODFLOW groundwater flow modeling. Estimated groundwater discharge to Pit 3 was 16.5 gpm, and discharge to Pit 4 was 7.9 gpm. URS (2002) reported values obtained by SMI (2001) during dewatering of the Boyd Pit (backfilled pit) of 7.5 gpm for a sustained pumping rate and a recovery rate of 5 gpm during a period of no precipitation.

Empirical estimates of groundwater inflow rate to the pits were made based on data collected during the recovery period following the 2010 dewatering. Estimated groundwater inflow to Pit 3 ranged from approximately 15.1 gpm to approximately 19.9 gpm, and estimated groundwater inflow to Pit 4 was approximately 14 gpm.

The variation in estimated groundwater inflow rates between the modeled values (URS, 2002) and empirically measured values done in 2010 was minimal and provides a level of confidence that the actual amounts following remedy implementation will be close to these estimates. This minimal level of uncertainty will have no effect with regard to design, and no additional data are needed to complete the design.

3.7.3 Groundwater Flow into the Backfilled Pit Area

The *Evaluation of Supplemental RD Data Needs* (MWH, 2012a) evaluated topographic mapping and drilling logs in the vicinity of the BPA in order to assess the potential for groundwater flow into the BPA. The results of this evaluation indicate that that there will be little or no groundwater flow into the BPA once waste rock to the north and west of that area is removed. It is likely that once the BPA is capped, the majority of the water currently infiltrating through the waste rock into the BPA will be shed from this area

as clean surface water runoff. As a result, it is not anticipated that the groundwater intercept trench currently included in the Selected Remedy will be necessary. However, if the topography is different than anticipated from the pre-mine, post-mine, and current mine topographic surfaces information, then once waste rock is removed during the RA, additional studies, design, and construction of the subsurface drains or other controls will occur as necessary.

3.7.4 Water Volumes Requiring Management

Surface water and groundwater flow volumes that require management (capture, storage, and treatment) during the construction and post-remedy periods have been estimated for annual, monthly, and daily periods. A range of values was provided based on variability in available data, and a sensitivity analysis was provided for modeled values. Estimated results were compared with 11 years of current-condition values (from 1999 to 2010) derived from measurement from the various components of the existing water management systems.

Construction period water management volumes were estimated using the Hydrologic Evaluation of Landfill Performance (HELP) model (Schroeder et al., 1994). Conditions modeled during the construction period assumed that approximately 60 percent of the current mine disturbed area would be roads or areas being actively or recently excavated. These areas were assumed to have a hard-packed surface that would generate an elevated amount of runoff compared to the waste rock. Return-period (100-year) estimates of water volumes generated during the construction period were used to provide a range of potential values and do not suggest actual design values. Daily peak water management values were modeled assuming rain-on-frozen-ground or rain-on-ice conditions resulting in nearly all precipitation running off.

Water requiring treatment following implementation of the remedy (post-remedy) was assumed to consist of collected seepage and inflows to Pit 3, Pit 4, and the Backfilled Pits. Runoff during post-remedy was assumed to be dischargeable without treatment; however post-remedy testing would be required to verify this assumption. Table 3-3 provides a range of estimated water management volumes for the construction and post remedy period with current condition values provided for comparison.

In addition to the water volumes discussed above, an evaluation was performed to account for water storage requirements to account for a scenario where the operating WTP is off line during the RA due to unforeseen circumstances (MWH, 2012c). The contingency scenario assumes that the WTP is off-line for a six-week period that coincides with either 100-year or 500-year peak runoff conditions. It is estimated that the water storage requirements for such a contingency scenario during the RA range from

approximately 58 million gallons (assuming 100-year runoff conditions when the WTP is off-line for a six week period) to approximately 71 million gallons (assuming 500-year runoff conditions when the WTP is off-line for a six week period). This contingency water storage evaluation is discussed further in Section 7.0.

3.8 SURFACE WATER DESIGN INVESTIGATION

The *Surface Water Design Investigation Report – Revision 1* (Tetra Tech, 2011b) includes the climatic and streamflow data and the required input parameters necessary to:

- Perform hydrologic and hydraulic modeling to support design of diversion channels and other surface water control features.
- Evaluate the erosional stability of the cover over waste containment areas during RD.

Data collected and evaluated in the *Surface Water Design Investigation Report* includes:

- Climatic Data from the onsite weather station.
- Streamflow Data.
- Design Storm Information.
- Precipitation-Runoff Methods.
- Curve Number Evaluation.
- Routing and Transformation Methods.
- Conveyance Roughness (Manning's n values).

The data presented in the *Surface Water Design Investigation Report* are sufficient and no additional data are needed to complete the RD.

3.9 ION EXCHANGE TREATABILITY TESTING

The *Midnite Mine Ion Exchange Treatability Testing Data Report* (TTDR; Tetra Tech, 2010b) summarizes the pilot-scale treatability testing of Midnite Mine influent water conducted at the Midnite Mine WTP by Tetra Tech and Water Remediation Technologies (WRT). The pilot-scale treatability tests were designed to generate information necessary to determine the technical feasibility and cost effectiveness of full-scale design and implementation of ion exchange (IX) treatment of the source water to the WTP that would result in reduction of uranium concentrations in the WTP sludge under dynamic flow conditions.

The information collected during the IX pilot testing provided data on the following:

- Effectiveness of pretreatment of the feed water prior to IX treatment and investigation of resulting waste product (e.g., backwash solids).
- pH adjustment testing using a two-stage precipitation process provided preliminary information on an alternative process for uranium removal and waste disposal.
- Selection of the appropriate IX resin for uranium removal, determination of the number of bed volumes before uranium breakthrough occurred and the effect of resin regeneration on the efficiency of uranium removal and post-regeneration capacity for uranium.
- Concentration of uranium and Toxicity Characteristic Leaching Procedure (TCLP) metals in the resins at exhaustion and regeneration, and in IX effluent lime treatment sludge.
- Evaluation of sludge disposal options following initial ion exchange treatment then lime treatment of the effluent from that process.
- Evaluation of on-site versus off-site regeneration techniques.

The treatability study resulted in the following findings:

- Based on the testing results, the *Midnite Mine Ion Exchange Treatability Testing Data Report* recommended that the full-scale design of IX treatment include pre-filtration of the feed water to the system, including possible coagulant addition.

- Based on the two-stage pH adjustment testing, the report recommended that further testing in the future may be warranted.

- Based on the resin testing, a) WRT Z-92A media should be considered as a candidate resin for full-scale design, b) DOWEX 21K XLT media, Test No. 10 showed the most promising results of the DOWEX resins and could be considered for full-scale design, and c) DOWEX SAR strong base Type II and the WRT Z92B weak-base resins should not be considered for full-scale design.

- Testing of resin after regeneration for TCLP leachable metals and uranium indicates that the TCLP metals would not leach allowing for non-hazardous waste disposal. Uranium was nearly totally stripped from the resin after regeneration, and the final uranium concentration measured was 3 mg/kg.

- The Midnite Mine Ion Exchange Treatability Testing Data Report recommends optimization of lime addition to the effluent water stream in full-scale design based on actual operating conditions. The backwash solids could be metered back into the front end of the WTP or directed

back to Pit 3 for full-scale design. Preliminary evaluation of the data indicates that the sludge produced after lime treatment of ion exchange effluent to remove uranium and metals can be disposed of at U.S. Ecology, Inc. (a hazardous and radioactive waste facility) located in Grandview, Idaho. It is also possible that the sludge could be disposed of at the municipal landfill in Idaho.

3.10 ION EXCHANGE TREATABILITY EVALUATION

The *Ion Exchange Treatability Testing Evaluation Report* (TTER: Tetra Tech, 2010c) uses the results of the treatability testing (summarized above in Section 3.9) to present a conceptual level cost/benefit analysis for potential modifications to the WTP to design, build, and operate an IX system. The TTER includes the following:

- Existing WTP process changes.
- Existing WTP system modifications.
- Sludge disposal and resin regeneration.
- Conceptual-level capital and Operation and Maintenance (O&M) costs.
- Public and worker safety requirements as a result of WTP modification.
- Conceptual-level design process and instrumentation diagrams.
- Conceptual-level operation and regeneration schedules.

A goal of the treatability testing was to determine if the use of selected IX resins on influent water to the WTP would result in reduced uranium concentrations in the WTP sludge, allowing the sludge to be classified as non-source material. Criteria used during the treatability testing were that uranium concentrations in the effluent from the IX needed to be less than 2.3 milligrams per liter (mg/L) and the sludge must be less than 0.05 percent uranium (wet weight) for WTP-produced sludge to be classified as non-source material. As determined by the treatability testing, the uranium concentration could be reduced from approximately 14 mg/L in the IX influent to less than 2.3 mg/L in the IX effluent. Of the four IX resins tested, two strong base Type I IX resins (DOWEX 21K XLT and Z-92A) had the best performance in terms of uranium removal, regeneration, and run duration. The treatability testing results presented in the TTER, indicate that the Z-92A resin had a slightly greater capacity for uranium removal than the DOWEX 21K XLT. Therefore, the IX evaluation is based on using Z-92A as the IX resin and the report systematically goes through each of the bulleted items above.

3.11 ADDITIONAL ION-EXCHANGE PILOT STUDY (2012)

An additional pilot-study is planned for the spring of 2012 to further evaluate the operational requirements for an IX system, in accordance with the *Work Plan for Additional Pilot-Scale Testing of Uranium Removal Using Anionic Exchange Resins* (MGC, 2012). The objectives of the additional IX pilot study are to determine: 1) the most effective way to optimize regeneration and treatment of uranium-laden regenerant brines from IX treatment; 2) requirements and equipment available for uranium sludge dewatering and drying; 3) the effect of the proposed short-term treatment process modifications for reduced sludge production (i.e., IX pretreatment and two-stage sludge precipitation) on sludge characteristics and classification; 4) the most effective treatment process and condition(s) for operating the existing WTP through the construction period; and 5) the best apparent long-term water treatment approaches and methods for satisfying the conditions in the ROD (i.e., new treatment facility) and in the reissued NPDES permit.

3.12 BLUE CREEK/BLUE CREEK DELTA SEDIMENT CHARACTERIZATION

Section 12.2.6.2 of the ROD requires that a plan be developed for monitoring prior to and during excavation and waste containment construction, to assure the effectiveness of surface water and sediment construction BMPs. Following the waste excavation but, if possible, before placement of a final cover over the waste containment area, synoptic sediment chemistry and biological data (including sediment toxicity tests and benthic community analyses) will be obtained in Blue Creek depositional areas, the Blue Creek delta, and an appropriate reference area. The data will be used to assess baseline conditions in Blue Creek and the potential need for active remediation.

The *Blue Creek/Blue Creek Delta Sediment Characterization, Revision 1* technical memorandum (AES, 2011b) presents a summary of existing sediment data from Blue Creek and the Blue Creek Delta, including data collected during the RI (EPA, 2005a) and data collected by the U.S. Geological Survey (USGS; Church et al., 2008). However, the memorandum does not provide the comprehensive evaluation required by the ROD to determine monitoring requirements and triggers for active sediment remediation.

The sediment evaluations presented in the RI and USGS reports present a detailed characterization of the nature and extent of COC concentrations in Blue Creek and Blue Creek Delta, and therefore provided the framework for the *Blue Creek and Delta Assessment Work Plan – Revision 0* (MWH, 2011b). The Work Plan establishes procedures and a schedule to characterize baseline conditions, triggers to determine if active remediation is warranted prior to mine remedy completion based on these data,

monitoring and data analysis procedures once baseline conditions have been established to determine the need for active remediation after the remedy has been completed and to demonstrate MNA will meet remediation objectives.

3.13 ONGOING STORAGE POND SITE INVESTIGATIONS

Under current Site operations, mine-impacted surface water and groundwater is stored in Pit 3 and Pit 4 prior to water treatment and discharge. Because these pits will be backfilled during the RA, temporary storage ponds will be needed during RA construction to control sediment and to store the mine-impacted water when the pits are no longer available for water storage.

Investigations were performed during the summer/fall of 2011 in accordance with the *Work Plan for Storage Pond Site Investigations – Revision 2* (MGC, 2011g) to identify suitable alternate water storage locations. The objectives of this site investigation are to develop sufficient subsurface data and geotechnical information to evaluate the dam foundation conditions and to characterize potential borrow source materials that would be used for dam construction at each of the candidate dam sites. The work plan outlines the investigation program to collect detailed subsurface geotechnical data to meet these objectives. Specific exploration methods, sampling, and laboratory testing procedures are outlined in the work plan. The plan includes sampling and testing procedures to evaluate suitability of soils for the dam embankment construction, and treatment requirements for the dam foundations. As the design is refined, and the characteristics and quantities of available borrow materials are better understood, the types of dams, their internal zoning templates, and foundation treatment requirements will be further developed. A Storage Pond Investigations Report will be prepared and submitted to EPA that summarizes the results and recommendations.

3.14 ONGOING DATA COLLECTION TO SUPPORT NPDES PERMIT APPLICATION

Data collection activities are being performed in accordance with the *Data Collection for NPDES Permit Application Work Plan - Revision 3* (Rescan Consultants, Inc., 2011) with the following objectives:

- Perform a technology evaluation, which will include the information in the Midnite Mine FS in support of the application for a reissued NPDES Permit.
- Characterize the water quality in the receiving water where treated water will be discharged (i.e., the Spokane River Arm of Lake Roosevelt).
- Characterize the physical conditions of the receiving water.
- Estimate the size of the mixing zone.

It is anticipated that additional water quality samples from the WTP discharge will be collected in 2012 to support modifications to the existing NPDES permit.

4.0 REMEDY WORK ELEMENTS, OBJECTIVES, AND PERFORMANCE STANDARDS

This section describes the Selected Remedy work elements and the associated issues, goals, and objectives that will be considered during the RD. The purpose of this section is to link the RAOs and performance standards to each work element so that that the design team has a clear understanding of what each design component is intended to achieve.

The performance standards discussed herein are defined in the SOW (Appendix B of the CD), and were developed to define attainment of the RAOs of the Selected Remedy. The performance standards include both general and specific standards applicable to the Selected Remedy work elements and associated work components. The main work elements and associated work components of the Selected Remedy for the Site include:

- Mine Waste Containment, which includes the following components:
  - Mine Waste Excavation.
  - Pits 3 and 4 Mine Waste Containment.
  - BPA Mine Waste Containment.
- Water Collection and Treatment, which includes the following components:
  - Water Collection and Conveyance.
  - Water Storage and Treatment.
  - Residuals Management.
- Institutional Controls and Access Restrictions.
- Long-Term Site Management.
- Blue Creek and Delta Sediments Contingent Action.

Achievement of the performance standards will be demonstrated throughout the RD process in the Basis of Design Reports, and during RA construction in accordance with the Construction Quality Assurance Plan (CQAP). The Basis of Design Reports and CQAP are described further in Section 5.0. Descriptions, objectives, and associated RD considerations for the main work elements and associated work components are presented below. Note that the bulk of the text below is verbatim from the CD SOW, and that the CD SOW takes precedence should there be any discrepancies in the text.

4.1 MINE WASTE CONTAINMENT

The Mine Waste Containment work element includes the Mine Waste Excavation, Pits 3 and 4 Mine Waste Containment, and BPA Mine Waste Containment. This work element includes consolidation and containment of mine wastes from the MA and MAA in Pits 3 and 4, and the BPA (Figure 1-2). The objectives of this work element are to:

- Isolate mine waste from water to minimize the formation of ARD and its release.
- Reduce radiation exposure.
- Achieve cleanup levels and RAOs for protection of human health and the environment.

4.1.1 Mine Waste Excavation

The Mine Waste Excavation work component includes the excavation and removal of all mine wastes exceeding cleanup levels identified in Tables 4-1 and 4-2 from the MA and MAA, with the exception of the material currently located in the BPA (which is discussed separately below). The performance standards as stated in the CD SOW include:

A. Mine Waste Excavation

i. Above-Grade Mine Waste Excavation - Mine Wastes located above the premining topographic surface within the MA with the exception of mine wastes currently located in the BPA shall be excavated. All of the above materials located in the MA that exceed the cleanup levels identified in Table 4-1 shall be excavated for consolidation and containment in Pits 3 and 4.

ii. Contaminated Soils and Sediments Excavation - Contaminated soils (impacted by roads or other areas of mine waste) and sediments located in the MA and MAA that exhibit contaminant concentrations above the cleanup levels in Tables 4-1 and 4-2, shall be excavated for consolidation and containment in Pits 3 and 4.

iii. Mine Drainage Sediments Excavation - Mine Drainage Sediments located in drainages downstream of the MA in the MAA have been impacted by the release of contaminated materials from the MA. Mine Drainage Sediments that exhibit contaminant concentrations above the cleanup levels presented in Table 4-2 shall be excavated for consolidation and containment in Pits 3 and 4. The extent of contaminated sediments requiring removal in the mine drainages shall be determined during RD.

iv. Road Materials Excavation – Mine wastes used for the construction of roads and any soils and sediments below, adjacent to, and downstream of the roads that exceed the cleanup levels presented in Table 4-2 shall be excavated for consolidation and containment in Pits 3 and 4. The extent of contaminated materials requiring excavation shall be determined during RD.

v. Soil/sediment sampling shall be conducted following removals to ensure that remaining soils and sediments meet cleanup levels identified in Tables 4-1 and 4-2. The sampling design and frequency shall be developed using methodology that conforms with EPA guidance for the development of sampling and analysis plans and quality assurance project plans.

vi. A layer of suitable soil or soil amendments, as determined during RD, shall be placed over areas cleared of mine waste. Such areas shall be graded and re-vegetated to minimize erosion and ARD formation and to channel water away from waste containment areas.

B. Surface Water and Stormwater Management and Controls During Excavation

i. During the excavation of contaminated materials, surface water and stormwater BMPs shall be applied to prevent, to the extent practicable, sediment transport and the contact of clean surface water and stormwater with contaminated materials.

ii. To the extent practicable, clean water coming into contact with contaminated materials in the excavation areas that results in surface water concentrations exceeding the surface water cleanup levels identified in Table 4-3 shall be collected and conveyed to the WTP for treatment.

iii. Sediments captured by surface water and stormwater controls shall be contained and removed to an approved location designed to prevent redistribution of the sediments to the surrounding environment. The disposition of the sediments shall be determined by sampling the sediments at a frequency and for analytes determined during RD.

iv. Surface water and stormwater controls and water collection and conveyance systems shall remain in place and be monitored for effectiveness until such a time as all contaminated materials requiring excavation have been removed for consolidation and containment in Pits 3 and 4.

v. The Settling Defendants shall develop a monitoring program to ensure that the concentrations of contaminants in surface water leaving the MA are below those listed in Table 4-3. If concentrations are greater than those listed in Table 4-3, the water shall be collected and conveyed to the water treatment plant for treatment.

vi. If, during the course of excavation, the surface water and stormwater BMPs in the BMP Catalog are found to be insufficient to address surface water and stormwater management issues, the Settling Defendants shall develop and implement new BMPs, subject to EPA review and approval.

C. Excavated Materials Staging/Stockpiling

i. If it is determined during design that staging of excavated materials prior to their consolidation and containment is necessary, a Staging/Temporary Stockpile Plan shall be developed and included in the Remedial Design.

ii. The Staging/Temporary Stockpile Plan shall include a list of BMPs that complies with applicable worker protection requirements. In addition, the BMPs shall ensure, to the extent practicable, that staged/stockpiled materials are isolated from contact with surface water and stormwater and that staging/stockpiling processes do not result in the generation of ARD and/or conditions that could lead to the migration of contaminants to the surrounding environment.

4.1.2 Pits 3 and 4 Mine Waste Containment

The Pits 3 and 4 Mine Waste Containment work component includes the consolidation and containment of excavated mine wastes in the existing open Pit 3 and Pit 4, except as directed or otherwise approved by EPA. The containment system shall include a drainage layer, a sub-waste liner, a cover system, and groundwater and surface water collection and diversion facilities in and around each pit. The performance standards as stated in the CD SOW for the Pits 3 and 4 work component include:

A. Temporary Facilities during Construction Activities

i. During performance of the Pits 3 and 4 Component of Work, temporary facilities, such as covers, runoff controls, temporary sumps, and water capture and removal systems, shall be

provided, as determined in the SWMP and Remedial Design. Water requiring treatment shall be conveyed as soon as practicable to the WTP for storage and treatment.

B. Groundwater Intrusion into Pits 3 and 4

i. Groundwater adjacent to each pit shall be collected and diverted away from the pits or blocked from flowing into the pits, as practicable, by methods determined during RD.

ii. To the degree practicable, clean groundwater shall be segregated from contaminated waters to minimize water volumes requiring treatment.

iii. To the degree practicable, groundwater entering the pits shall not contact reactive mine waste or waste capable of causing groundwater contamination.

iv. Contaminated groundwater shall be captured and treated in the WTP.

C. Surface Water Management - Pits 3 and 4

i. Surface water and stormwater management shall be conducted in accordance with the SWMP. Surface water and stormwater management BMPs shall be developed and constructed to divert clean surface water and stormwater away from the pits during construction. Surface water and stormwater that enters the pits shall be captured and conveyed to the WTP. Surface water and stormwater BMPs constructed shall remain in place and be monitored for effectiveness until consolidation and containment of excavated materials in the pits is completed and permanent surface water and stormwater management facilities are in place and functional.

ii. Facilities shall be constructed to divert clean surface water away from the pits. The diversion facilities shall be designed using standard engineering techniques for capacity and erosional stability to convey the 100-year, 24 hour storm event in a stable manner and to withstand a 500-year, 24 hour storm event.

iii. To the degree practicable, clean surface water shall be segregated from contaminated water to minimize water volumes requiring treatment.

iv. Contaminated surface water shall be captured and treated in the WTP.

D. Pits 3 and 4 Preparation and Mine Waste Excavation

i. Each pit shall be dewatered prior to any mine waste emplacement.

ii. Water removed during such dewatering shall be conveyed to and treated at the WTP.

iii. To the extent practicable, water shall be kept from accumulating in the pits during and after construction of the containment system. If water accumulates in the pits during construction, the water shall be collected and conveyed for treatment at the WTP.

iv. Existing sediments which have collected at the bottom of the pits shall be removed prior to preparation of the pit floors. Such removed sediments shall be staged for subsequent re-emplacement in the pits. The need and process for dewatering of the sediments and conveyance and treatment of water from the sediments shall be determined during RD.

v. As determined during remedial design, pit walls shall be prepared to ensure worker health and safety during construction.

vi. The pit surfaces shall be contoured to efficiently drain water entering the pits to low points located below the drainage layer. The need to perform additional excavation of the current pit bottoms to ensure gravity drainage to the low points shall be determined during RD.

E. Drainage Layer – Pits 3 and 4

i. A continuous drainage layer of non-reactive rock or other suitable material, approved by EPA, shall be constructed overlying the base of the pit and extending up the sides of each pit as necessary to intercept groundwater entering the pit.

ii. If during remedial design suitable material for the drainage layer can be found on site, EPA may approve the use of such materials, following consultation with the Tribe.

iii. The drainage layers shall extend vertically along the side walls of each pit to elevations determined during RD, to keep water entering the pits from contacting mine waste and to effectively channel water to the pit bottoms.

iv. The drainage layers shall be designed and constructed in a manner to provide efficient drainage of water along the sidewalls and bottoms of each pit.

v. Water entering the pits and transported through the drainage layers shall be collected in a sump or sumps placed at the bottom of the pits. The water collection sump(s) shall be constructed in the lowest portion of the pit bottom and gravity drainage from the pit walls and pit bottom shall be used to direct water to the sump. The design of such sump(s) may require additional excavation into the pit bottom to ensure gravity drainage.

vi. The installation of the drainage layers along the pit walls and bottoms shall be coordinated with the emplacement of mine wastes into the pits and the sub-waste liners, described below.

vii. Water levels in the sumps shall be maintained at elevations determined during RD which minimize hydraulic head, scaling, and fouling, and prevent water contact with the mine waste. Water collected in the sumps shall be conveyed by pumping or gravity for treatment at the WTP.

F. Sub-waste Liner – Pits 3 and 4

i. A sub-waste liner shall be constructed in each pit below and adjacent to the emplaced mine wastes in locations and to vertical elevations determined during RD.

ii. The sub-waste liners shall be placed between the mine wastes and the drainage layers: additional materials shall be placed, as necessary, to protect the integrity of the sub-waste liners, as determined during RD.

iii. The sub-waste liners shall be constructed of a synthetic material determined during RD.

iv. The sub-waste liners shall be designed to effectively isolate the mine waste and minimize the passage of both water and mine waste particles between the adjacent drainage layers and the emplaced mine wastes.

v. The sub-waste liners shall be constructed in such a way as to transmit water collected on the liners to sump(s) located above the liner at its low point. The sumps shall be constructed in such a manner that water from the mine waste materials shall concentrate in the sump area using gravity drainage.

G. Pits 3 and 4 Mine Waste Consolidation

i. All materials excavated as part of the Mine Waste Excavation Component of Work and existing sediments from the pit bottoms shall be consolidated in the pits.

ii. Mine waste shall be emplaced in lifts above the sub-waste liner and any protective layer determined necessary during RD. Placement shall minimize settling.

iii. The emplacement of mine waste lifts shall be coordinated with the installation of the adjacent sub-waste liner and drainage layer along the pit walls and bottoms, as determined during RD.

iv. Mine waste emplaced in the pits shall be compacted to design specifications during backfilling.

v. Emplacement of mine waste in the pits shall ensure efficient drainage to sumps constructed above the sub-waste liner.

vi. Water levels in the sumps above the sub-waste liner shall be maintained at an elevation determined during RD, which minimizes hydraulic head, scaling, fouling and infiltration through the sub-waste liner.

vii. Water collected in such sumps shall be conveyed by pumping or gravity for treatment at the WTP.

viii. As determined during RD, the least reactive (ARD generating) mine waste materials shall be placed in portions of the pits below the surrounding groundwater level.

ix. As determined during RD, materials with high radon-generating ability, such as ore and proto-ore, shall be placed in the pits so as to minimize radon flux at the top of the backfill and below the cover.

x. The mine waste materials shall be mounded above the top elevation of each pit and sloped to support a cover and surface water management system designed to maximize runoff and minimize infiltration into the mine wastes, while preserving slope stability.

H. Pits 3 and 4 Cover Construction

i. A cover made of geologic material and a synthetic liner shall be constructed over the emplaced mine waste in each pit in such a way as to permanently meet the ROD cleanup standards for soil and radon flux and to minimize the infiltration of water into the pits.

ii. Cover specifications shall be determined during RD and shall ensure that the thickness of the geologic materials alone shall be sufficient to limit the radon flux rate to less than 20 $pCi/m^2/sec$ as required in Section 8 of the ROD, in accordance with the Nuclear Regulatory Commission guidance document NUREG 1620 (NRC, 2003). Radon flux shall be measured using standard NRC techniques presented in 40 CFR Part 61, Appendix B, Method 115 to ensure that the average radon flux from the cover remains less than 20 $pCi/m^2/sec$.

iii. The cover shall be constructed in compacted lifts and include a synthetic liner of a material determined during RD, to minimize infiltration of precipitation into the underlying mine wastes.

iv. The cover shall be constructed to efficiently minimize infiltration of water, while preserving slope stability, minimizing erosion and biointrusion, and supporting vegetation. The cover shall be designed using standard engineering techniques and a factor of safety of 1.3 for static and 1.0 for dynamic slope stability. The cover shall be erosionally stable under the 100-year, 24-hour storm event.

v. The cover shall overlay mounded mine waste and shall slope out to a surface water management system to maximize runoff and minimize infiltration into the mine wastes, while preserving slope stability.

vi. Once constructed, the cover shall be vegetated as determined during RD, in consultation with the Tribe, for purposes of evapotranspiration, ecological habitat, slope stability, and long-term effectiveness.

4.1.3 Backfilled Pit Area Waste Containment

The BPA Mine Waste Containment work component includes the contouring and consolidation of mine wastes in the BPA. The containment system will include a cover system and surface water and groundwater collection and diversion facilities. The performance standards as stated in the CD SOW for the BPA component of work include the following:

A. Temporary Facilities During Construction Activities

i. During performance of the BPA Component of Work, temporary facilities, such as covers, runoff controls, temporary sumps, and water capture and removal systems, shall be provided, as determined in the SWMP and RD. Water requiring treatment shall be conveyed as soon as practicable to the WTP for storage and treatment.

B. Groundwater Diversion - Backfilled Pit Area

i. Groundwater adjacent to the BPA shall be collected and diverted away or blocked from flowing into the BPA, as practicable, by methods determined during RD.

ii. To the degree practicable, clean ground water shall be segregated from contaminated ground water to minimize water volumes requiring treatment.

iii. Contaminated ground water shall be captured and treated in the WTP.

C. Surface Water - Backfilled Pit Area

i. Facilities shall be constructed to divert surface water away from the BPA. The diversion facilities shall be designed using standard engineering techniques for capacity and erosional stability to convey the 100-year, 24 hour storm event in a stable manner and to withstand a 500-year, 24 hour storm event.

ii. To the degree practicable, clean surface water shall be segregated from contaminated water to minimize water volumes requiring treatment.

iii. Contaminated surface water shall be captured and treated in the WTP.

D. Groundwater Removal from Backfilled Pit Area

i. Water in the BPA shall be removed using wells or other methods approved by EPA during RD, to elevations determined during RD which minimize hydraulic head in the pit, scaling, and fouling.

ii. Water removed from the BPA shall be conveyed to the WTP for treatment.

E. Mine Waste Excavation and Consolidation

i. As approved during remedial design, mine waste materials shall be mounded above the top elevation of the BPA and sloped to support a cover and surface water management system designed to maximize runoff and minimize infiltration into the mine wastes, while preserving slope stability

F. Cover Construction

i. A cover made of geologic material and a synthetic liner shall be constructed over the mounded mine waste in the BPA in such a way as to permanently meet the ROD cleanup standards for soil and radon flux and to minimize the infiltration of water into the pits.

ii. Cover specifications shall be determined during RD and shall ensure that the thickness of the geologic materials alone shall be sufficient to limit the radon flux rate to less than 20 $pCi/m^2/sec$ as required in Section 8 of the ROD, in accordance with the Nuclear Regulatory Commission guidance document NUREG 1620 (NRC 2000). Radon flux shall be measured using standard NRC techniques presented in 40 CFR Part 61, Appendix B, Method 115 to ensure that the average radon flux from the cover remains less than 20 $pCi/m^2/sec$.

iii. The cover shall be constructed in compacted lifts and include a synthetic liner of a material determined during design, to minimize infiltration of precipitation into the underlying mine wastes.

iv. The cover shall be constructed to efficiently minimize infiltration of water, while preserving slope stability, minimizing erosion and biointrusion, and supporting vegetation. The cover shall be designed using standard engineering techniques and a factor of safety of 1.3 for static and 1.0 for dynamic slope stability. The cover shall be erosionally stable under the 100-year, 24-hour storm event.

v. The cover shall overlay mounded mine waste and shall slope out to a surface water management system to maximize runoff and minimize infiltration into the mine wastes, while preserving slope stability.

vi. Once constructed, the cover shall be vegetated as determined during RD, in consultation with the Tribe, for purposes of evapotranspiration, ecological habitat, slope stability, and long-term effectiveness.

4.2 WATER COLLECTION AND TREATMENT

The Water Collection and Treatment work element includes the continued operation of the existing WTP and its replacement with a new WTP. The objective of this work element is to prevent releases of water exceeding discharge limits. The Water Collection and Treatment work element includes the following components, which are discussed further below: Water Collection and Conveyance, Water Storage and Treatment, and Residuals Management.

4.2.1 Water Collection and Conveyance

The Water Collection and Conveyance work component includes construction, operation, and maintenance of a system for the collection and conveyance of contaminated water to the water treatment plant. The performance standards as stated in the CD SOW include:

A. All water requiring treatment, as described both above in this SOW and in this Component of Work, shall be collected and then conveyed to and treated at the WTP operating at the time of conveyance.

B. Water collection and conveyance facilities shall be provided with capacities and in locations to be determined in remedial design.

C. Collection and conveyance facilities shall be sufficient to collect and convey all water requiring treatment and shall utilize BMPs for automatic operations, alarms, and other operational controls.

D. Groundwater seeps in the MA and MAA that exceed concentrations listed in Table 4-4 or which may result in concentrations in surface water downgradient greater than the concentrations listed in Table 4-3 shall be intercepted and collected.

E. Seep collection shall continue at the existing Eastern, Western and Central seep collection points, as well as any other seepage locations in the vicinity of these systems, unless otherwise approved by EPA.

F. Following waste containment or as determined necessary by EPA, new seep collection structures shall be designed, constructed, operated and maintained to replace the current seep collection system and ensure effective capture of contaminated groundwater seepage to the ground surface. Such facilities shall continue to be operated, unless otherwise approved by EPA.

G. Contaminated seep water shall be conveyed to the WTP for treatment.

H. Construction of the new systems shall be coordinated with operation of the existing seep collection systems such that there is no lapse in seep collection and treatment.

I. Contaminated groundwater in the alluvium and weathered bedrock that exceeds concentrations listed in Table 4-4 or which may result in concentrations in surface water downgradient greater than the concentrations listed in Table 4-3 shall be intercepted and collected.

J. This groundwater collection system shall be sited in locations to be determined during RD and shall consist of an interception trench excavated to competent bedrock, a designed drain backfill, a low permeability barrier on the down-gradient side of the drain backfill, and a collection sump and pump back system or other system approved by EPA.

K. All water collected in the groundwater collection system shall be conveyed to the WTP for treatment.

L. The groundwater collection system shall be constructed as early as practicable during the Work to provide effective capture of contaminated groundwater during up gradient construction and to accelerate the recovery of Blue Creek surface water and sediment quality.

M. The groundwater collection system shall continue to be operated until otherwise approved by EPA.

4.2.2 Water Storage and Treatment

The Water Storage and Treatment work component includes: ongoing water treatment; design and construction of necessary facilities to store collected water; and design, construction, permitting, operation, maintenance and monitoring of a replacement WTP. The performance standards as stated in the CD SOW include:

A. All water collected for treatment shall be delivered to the water storage and treatment facility as soon as practicable, as determined during design.

B. Water treatment shall minimize the need for water storage, as determined during RD.

C. The existing WTP shall reduce contaminant concentrations in collected water to interim discharge limits specified in Table 4-5 or lower.

D. The existing WTP shall be operated and maintained as long as necessary, but not later than when off-site discharge to the Spokane River Arm of Lake Roosevelt is permitted and a replacement WTP is operational and functional, except as approved by EPA.

E. A Clean Water Act NPDES permit shall be sought for off-site discharge to the Spokane River Arm of Lake Roosevelt. The application for the permit and all Work necessary to support the permit application shall be completed as soon as practicable by the Settling Defendants.

F. A replacement WTP shall be designed, constructed, and made operational as soon as practicable.

G. As soon as practicable, but no later than completion of mine waste containment, all contaminated water collected must be treated to meet discharge limits in the applicable NPDES permit prior to off-site discharge via pipeline to the Spokane River Arm of Lake Roosevelt. If upon completion of mine waste containment a permit has not been granted, then subject to EPA approval discharge may occur on site pending issuance of the permit. Discharge must at a minimum meet the interim discharge limits in Table 4-5; however, to aid in achievement of cleanup standards for surface water and sediment in Blue Creek, EPA approval of on-site discharge will consider the ability of the replacement WTP to achieve more stringent discharge limits, including those likely to be in the NPDES permit.

H. Offsite discharge of effluent from the replacement WTP shall comply with effluent discharge limits in the applicable NPDES permit.

I. Dawn Mining Company, LLC and Newmont USA Limited shall perform water quality monitoring of site waters, WTP effluent, and downstream receiving waters as required by the NPDES permit. Additional water quality monitoring in these areas to include expanded frequency, locations, and analytes may be required to support site-wide and remedial action effectiveness monitoring

activities. The need for such additional monitoring shall be determined during the implementation of this SOW.

J. Once the replacement WTP is constructed and operational, all waters requiring treatment shall be treated at this plant, except as otherwise approved by EPA. The existing plant shall be dismantled and disposed in a manner determined during RD.

K. The pipeline to the discharge location of the WTP and the discharge outfall shall be sited in coordination with the Tribe, shall not interfere with the functioning of existing structures (e.g. roads, culverts, bridges), and constructed as determined in RD.

L. To ensure effective long-term water treatment, the replacement WTP shall be maintained and periodically replaced as determined in the RD and the long term operation of the plant.

4.2.3 Residuals Management

The Residuals Management work component includes on-site management and storage, as well as the transportation and off-site disposal, of residuals generated during water treatment. Currently, residuals from the existing WTP are managed under the *Residuals Management Plan for the Midnite Mine Water Treatment Plant - Revision 7* (MGC, 2011i). This plan will be updated if upgrades are implemented on the existing WTP and incorporated into the OM&M Plan as the new WTP comes on line. The performance standards as stated in the CD SOW for the Residuals Management work component include:

A. Residuals shall be disposed of in accordance with a Residuals Management Plan approved by EPA.

B. There shall be no onsite storage of residuals except as necessary to accumulate residuals for transportation, in compliance with ARARs and as approved by EPA.

C. Residuals shall be handled and transported in compliance with applicable laws, regulations, permits, and policies.

D. Offsite disposal of residuals shall comply with applicable laws, regulations, permits, and policies.

E. If the treatment plant requires modification, Dawn Mining Company, LLC and Newmont USA Limited shall prepare and submit design documents and, as necessary, modifications to the Residuals Management Plan for EPA approval.

4.3 INSTITUTIONAL CONTROLS AND ACCESS RESTRICTIONS

The ICs and Access Restrictions (ARs) work element includes implementation of effective controls that achieve the goals stated in Section 12.2.5 of the ROD and requirements set forth in Section IX of the CD. The primary objectives of this work element are to ensure long-term protection of human health and the environment and to protect the integrity of the remedy. The performance standards as stated in the CD SOW include:

A. Institutional controls shall, to the degree practicable, be implemented to achieve the RAOs and to meet the objectives for the geographic areas as described in Section 12.2.5 of the ROD.

B. In coordination with the Tribe, Bureau of Indian Affairs (BIA) and landowners, Dawn Mining Company, LLC and Newmont USA Limited shall submit for EPA review and approval an Institutional Controls Implementation and Assurance Plan (ICIAP) for implementing, maintaining, monitoring and reporting on the ICs selected in the ROD. The ICIAP shall include mechanisms to ensure long-term effectiveness of the institutional controls.

C. If Tribal ordinances, land-use planning documents, and other mechanisms solely within the Tribe's authority are used to establish institutional controls, Settling Defendants shall assist the Tribe by providing information and other assistance necessary.

D. If agreements or Proprietary Controls are used to establish ICs, Settling Defendants shall make best efforts to secure such controls.

E. During RD, Dawn Mining Company, LLC and Newmont USA Limited shall make best efforts to coordinate with the Tribe and BIA on future land use plans for the mined area and adjacent areas in order to, as reasonable, adjust aspects of the remedial design (such as utilities corridors, infrastructure, revegetation, siting of facilities) to support or, at a minimum, not to conflict with such uses.

F. In accordance with the ROD, and as otherwise approved during RD, physical barriers to access shall be installed and maintained to meet the objectives of Section 12.2.5 of the ROD.

G. Access restrictions shall be designed and constructed to prevent damage to the integrity of the remedy. This includes a permanent barrier, such as a boulder barrier, to prevent unauthorized

vehicle access to the waste containment area, fencing around water collection, storage and treatment facilities, signage, and other facilities as appropriate and approved by EPA.

4.4 LONG-TERM SITE MANAGEMENT

The Long-Term Site Management work element includes activities necessary to maintain the integrity and function of the remedy, and to support statutory reviews of remedy protectiveness of human health and the environment. The objective of this work element is to ensure integrity and functionality of the implemented remedy and to provide information required for regulatory reviews of the protectiveness of the remedy. The performance standards as stated in the CD SOW include:

A. Operations and Maintenance shall be performed as necessary to ensure that the remedy continues to function as designed and to meet performance standards in perpetuity.

i. Surface Water and Stormwater Management shall be performed to ensure that the remedy functions as intended and that contaminants are not transported off-site in surface water, stormwater, and sediment. Surface Water and Stormwater Management includes the development of a Storm Water Management Plan (SWMP) for the site that details techniques and methods that shall be employed to manage and monitor surface water, stormwater, and sediment following the implementation of the remedy.

B. Monitoring shall be performed in accordance with the Site Wide Monitoring Plan (SMP) as discussed in Section 5.6 of this RD Work Plan to demonstrate the integrity and functioning of the remedy, to monitor the continued effectiveness of the RA in achieving performance standards, to document the effectiveness of ICs and access restrictions, to demonstrate progress towards achieving cleanup levels in sediment, surface water, and groundwater, and to develop appropriate corrective action if necessary.

C. Annual reports shall document O&M and monitoring results, and a corporate officer of Dawn Mining Company, LLC and/or Newmont USA Limited shall certify whether, to the best of his or her knowledge, the access restrictions and ICs remain in place and have been complied with, and shall propose corrective actions as needed, for EPA approval.

4.5 BLUE CREEK AND DELTA SEDIMENTS CONTINGENT ACTION

Although the Selected Remedy anticipates that sediments in Blue Creek and Delta will meet cleanup standards through natural recovery within a reasonable timeframe (approximately ten years following waste containment), active sediment remediation may be required under certain conditions. This work

element includes assessment and, in accordance with the Selected Remedy, removal of in-stream and riparian sediments in Blue Creek and Delta. The performance standards as stated in the CD SOW for this work element include:

A. Dawn Mining Company, LLC and Newmont USA Limited shall perform studies to assess the chemistry, biological toxicity and benthic conditions of Blue Creek and Delta to determine whether impacts in all or part of the creek warrant active cleanup and whether sediment conditions indicate significant progress towards achieving sediment cleanup levels within 10 years of completion of mine waste containment. Waste containment shall be considered complete upon Final Construction Inspection, unless otherwise determined by EPA.

B. Settling Defendants shall submit a Blue Creek and Delta Assessment Work Plan (see Section 3.12 of this RD Work Plan). The work plan shall propose (1) an appropriate reference area and an approach to synoptic sediment characterization, including benthic analysis, toxicity testing, and sediment chemistry; (2) criteria for determining (a) what biological and chemical characteristics warrant remediation of sediments before waste containment is completed and (b) what biological and chemical characteristics warrant removal of the sediments within the first ten years after waste containment is completed; and (3) a detailed monitoring plan (including SAP and QAPP) and schedule for monitoring, assessing and reporting on conditions in Blue Creek and the Delta. The work plan shall address (a) assessment of baseline conditions for natural recovery, (b) assessment of depositional and erosive areas, source control, and other relevant aspects of the natural recovery process (c) estimation of rates of natural recovery, (d) monitoring at intervals before, during, and upon completion of the ten year period to assess the need for active remediation and/or to verify predicted natural recovery.

C. Dawn Mining Company, LLC and Newmont USA Limited shall implement the approved work plan and shall submit reports with recommendations regarding sediment cleanup. EPA may at any time determine that sediment cleanup is necessary.

D. If during the ten year period following waste containment, and in consultation with the Tribe, EPA determines that sediment cleanup is necessary to address (i) significant biological effects or (ii) sources of contamination to downstream areas, or (iii) sediments that do not show or are unlikely to show significant progress towards meeting sediment cleanup levels within the ten year timeframe, Dawn Mining Company, LLC and Newmont USA Limited shall submit a focused feasibility study for evaluation of sediment removal methods and, upon EPA selection of a

method, shall design and implement the cleanup in accordance with RD and RA submittals determined necessary by EPA.

E. For any contaminated sediments removed as part of the contingent sediment remediation, disposal shall be either off-site, in compliance with all applicable laws and regulations, including the Off-site Disposal Rule (40 C.F.R 300.440), or on-site, as approved by EPA and following consultation with the Tribe and the BIA.

F. If after the ten year period sediments do not meet the cleanup levels, EPA, in consultation with the Tribe, may determine that additional sediment cleanup is necessary. Dawn Mining Company, LLC and Newmont USA Limited shall submit a focused feasibility study for evaluation of sediment removal methods and, upon EPA selection of a method, shall design and implement the cleanup in accordance with remedial design and remedial action submittals determined necessary by EPA.

G. Dawn Mining Company, LLC and Newmont USA Limited shall conduct environmental monitoring during and following any active cleanup of Blue Creek and Delta sediments and shall minimize and repair any damage to habitat in and adjacent to Blue Creek and the Delta.

H. Dawn Mining Company, LLC and Newmont USA Limited shall incorporate long-term monitoring of Blue Creek and the Delta into the SMP and shall conduct monitoring to document surface water and sediment concentrations.

5.0 REMEDIAL DESIGN DELIVERABLES

This section describes the plans and design submittals that will be prepared to support implementation of the Selected Remedy at the Midnite Mine Site. A summary of the anticipated plans and design submittals is included on Table 5-1. All plans and design documents described herein will be submitted for review and approval by the EPA. Additional deliverables may be proposed as the design progresses, subject to approval by EPA.

EPA guidance documents will be used as the basis for development of work plans, sampling plans, monitoring plans, and other documents. EPA guidance documents to be used for these purposes include:

- *EPA Superfund Remedial Design and Remedial Action Guidance (Office of Solid Waste and Emergency Response* [OSWER] *Directive 9355.0-4A, June 1986) and other EPA RD/RA guidance.*
- *EPA QA/R-5, EPA Requirements for Quality Assurance Project Plans.*
- *EPA QA/G-5, EPA Guidance for Quality Assurance Project Plans.*
- *EPA QA/G-4, Data Quality Objectives Process for Hazardous Waste Site Investigations.*

The RD deliverables include supporting documents (or "other named plans") described in Sections 5.1 through 5.8, and the earthwork and water treatment design documents (i.e., the Design Submittals) described in Sections 5.9 and 5.10. The other named plans are comprehensive documents that cover all RA work elements/components. The other named plans will be completed before the initial phases of the RA begin, and will be updated as necessary as subsequent RA phases are designed and implemented. The Design Documents will be will be sequenced to mirror the anticipated chronological order (or phases) of the RA construction. For example, the designs for earthwork activities that are scheduled to occur early during the RA will progress faster than the designs for earthwork and water treatment that are planned to occur later in the RA timeline. Additional discussion regarding the RD Approach and RD Schedule are presented in Sections 7.2 and 7.3, respectively.

5.1 HEALTH AND SAFETY PLAN

A Health and Safety Plan (HASP) will be prepared for the Site RA activities in accordance with U.S. EPA guidance, Occupational Safety and Health Administration (OSHA) requirements outlined in 29 CFR 1920 and 1926; and U.S. Nuclear Regulatory Commission (NRC) Standards for Protection against Radiation

included in 10 CFR 20. Addenda will be prepared as necessary during the RD process to address task-specific health and safety topics. In addition, the RA construction contractor will be responsible for maintaining their own health and safety program/plan. The HASP and addenda will address the following topics:

- Facility Description.
- Personnel.
- Levels of Protection.
- Safe Work Practices and Safeguards.
- Medical Surveillance.
- Personal and Environmental Air Monitoring.
- Personal and Environmental Radiological Monitoring.
- Personal Protective Equipment.
- Personal Hygiene.
- Decontamination – Personal and Equipment.
- Site Work Zones.
- Contaminant Control.
- Contingency and Emergency Planning.
- Logs, Reports, and Record Keeping.
- Training and Safety Audits.

5.2 SUBSTANTIVE ENVIRONMENTAL COMPLIANCE DOCUMENTATION

Applicable documents will be prepared to demonstrate compliance with substantive environmental requirements for the Site remedial activities. These documents will include:

- Biological Assessments and Evaluations in accordance with Section 7(a)(2) of the Endangered Species Act.
- Water Quality Certifications in accordance with Section 401 of the Clean Water Act (CWA).
- Substantive compliance with CWA Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material.

The substantive compliance including but not limited to the above list will be identified and a table of the environmental compliance requirements will be submitted with the Basis of Design Report as part of the Preliminary (30 percent) Design package. Compliance/permitting activities need to be identified, understood and completed prior to implementing the RA as identified in the CD SOW.

CERCLA Section 121(e)(1) provides that "*No Federal, State, or local permit shall be required for the portion of any removal or remedial action conducted entirely on-site, where such remedial action is selected and carried out in compliance with this section.*" This provision applies to all administrative requirements, whether or not they are actually styled as "permits." In other words, the CERCLA permit exemption relieves a party from the permitting process, or any other administrative or procedural requirements. Any substantive elements that would be required by the permit, however, must still be attained. Thus a permit review is warranted to identify those permits that would otherwise be triggered and the associated substantive elements.

As a result, comprehensive permit review for all RAs will be included with the 30 percent design package. This permit review will include the following:

- Consultation with the permitting authorities, including Federal, State, Tribal, and local agencies.
- Identification of triggered permits based upon the project understanding from the CD SOW, which describes the remedial activities.
- Classification of "on-site" vs. "off-site" triggered permits (as "off-site" triggered permits are not covered by the CERCLA permit exemption).
- Identification of all substantive compliance requirements.
- Identification of activities, milestones, levels of effort, duration of activities, and timing constraints associated with the triggered permit substantive requirements.

Once substantive compliance requirements (including permitting substantive requirements) have been identified, all of the associated activities, milestones, levels of effort, duration of activities, and timing constraints will be established. From this information, a critical-path schedule for necessary permitting will be developed and integrated into the overall RD/RA schedule. As discussed above, this substantive compliance requirement and permitting review will be submitted with the 30 Percent Design Package and will be included in the Basis of Design Report. Substantive compliance requirement activities then will be planned and implemented consistent with the overall project schedule and critical path prior to the RA.

After submittal of the substantive compliance requirements and permitting review with the Basis of Design Report at the 30 percent design stage, these requirements will be reviewed and updated in subsequent design phases (60 percent, 90 percent, and Final Basis of Design Reports). Progress on implementation and completion of the substantive compliance requirement activities also will be reported. Annually thereafter, during the RA, the substantive compliance requirements will be reviewed, updated, and reported in ongoing status reports.

5.3 STORMWATER MANAGEMENT PLAN

A comprehensive SWMP will be prepared to address the control of contaminants in surface water and mitigation of damage associated with RA. The SWMP will describe how stormwater, surface water, and sediments at the Site will be managed to prevent the release of contaminants to unaffected downstream areas. The SWMP will include a catalog of all BMPs that will be employed at the Site to minimize the transport of disturbed material by water, wind erosion, dust migration, or vehicles. The SWMP will be designed in parallel with RD activities and will be included as part of the Basis of Design Reports for each phase of the RD (e.g., 30 percent, 60 percent, 90 percent, and final). As remedial activities progress, the SWMP will be updated prior to each construction season and as required during the construction season to reflect new BMPs and changes in Site conditions.

At a minimum, the following BMPs will be defined in the SWMP:

- Isolation techniques to minimize transport of potentially contaminated sediments from work areas by surface water runoff.
- Inspection, maintenance, and repair of sedimentation controls throughout the construction activities to maintain the function of the controls.
- Techniques to minimize damage to existing vegetation, wetlands, and surface water.
- Dewatering or surface water diversion techniques that limit impacts to wetlands and surface water bodies.

If, during the course of excavation, the surface water and stormwater BMPs in the BMP Catalog are found to be insufficient to address surface water and stormwater management issues, new BMPs will be developed, subject to EPA review and approval. If contingent cleanup of Blue Creek and Delta sediments is required, a revised or new SWMP and 401 and 404(b)(1) analyses shall be submitted, as necessary.

5.4 OPERATIONS MAINTENANCE AND MONITORING PLAN – WATER MANAGEMENT

A comprehensive OM&M Plan will be prepared for water management activities at the Site. The OM&M Plan will address all site facilities including surface water management, seep collection and pumpback systems, water storage, water treatment, and residuals management and disposal. Facilities and features constructed as part of the *Remedial Action Work Plan, Interim Mechanisms, Midnite Mine, Revision 1* (Tetra Tech, 2010d) currently are included in the *Operation, Maintenance and Monitoring Plan for the Midnite Mine Water Collection System and Water Treatment Plant for the Phase I RD/RA: Interim Water Management for the Midnite Mine - Revision 2* (Tetra Tech, 2010e). This existing OM&M Plan will be updated to include additional facilities and features that are constructed during the RA. The OM&M

Plan will be updated as necessary to reflect changes in operation or design until approval of the Remedy O&M Plan.

The OM&M Plan will include documentation for the existing system including specific mechanical system OM&M plans; system and discharge monitoring data; inspection, maintenance, and monitoring protocols or procedures; schedule and staffing; equipment, instrument, and reagent supplier information; health monitoring practices; waste characterization data; waste transportation agreements; cost documentation; and any other relevant information. The OM&M Plan will include a contingency plan describing procedures in the event of an accident or emergency.

5.5 PERFORMANCE MONITORING PLAN

A Performance Monitoring Plan (PMP) has been prepared for monitoring groundwater, surface water, and sediment within and downstream of the MA. The *Performance Monitoring Plan for the Phase I RD/RA: Interim Water Management for the Midnite Mine –Rev3* (AES, 2011c) defines the data quality objectives (DQOs), monitoring network and sampling frequency design, sampling methodology, selection of media and analytes, QA/QC procedures, data validation, and chain-of-custody. The overall objectives of the PMP are to:

- Describe the monitoring of groundwater, surface water, and sediment required to evaluate the effectiveness of current site facilities to prevent migration of mine-contaminated media to downstream areas.
- Document additional pre-remediation conditions of groundwater, surface water, and sediment for the purpose of monitoring the effectiveness of the Selected Remedy upon implementation.
- Describe monitoring of the WTP effluent for compliance with the interim discharge limits.

5.6 SITE-WIDE MONITORING PLAN

A Site-Wide Monitoring Plan (SMP) will be prepared to describe monitoring site conditions during the RA and following implementation of the Selected Remedy. In general, the SMP will use the existing PMP as the foundation for monitoring during the RA and post-RA. The SMP will include a Quality Assurance Project Plan (QAPP) by reference and a Field Sampling Plan (FSP) containing appropriate Standard Operating Procedures (SOPs). The EPA DQO process (EPA QA/G-4HW; EPA, 2000a) will be used to define the DQOs and guide the development of the SMP. The QAPP and FSP will be prepared in accordance with the requirements of EPA QA/R-5 *EPA Requirements for Quality Assurance Project Plans* (March 2001, or latest revision available), EPA QA/G-5 *EPA Guidance for Quality Assurance Project*

Plans (December 2001, or latest revision available), and *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA, October 1998).

During remedy implementation, the SMP will describe monitoring of groundwater, surface water, soils, sediments, and air to determine if remedy implementation activities are releasing contaminants from the MA to down-gradient or downwind areas. Following implementation of the Selected Remedy, the SMP will 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 and in accordance with the PMP during pre-remediation sampling will be compared with SMP data collected during the active-remediation and post-remediation to evaluate conditions throughout the remedial process. In addition, the SMP will include a long-term monitoring component to evaluate the need for contingent actions in Blue Creek and the Blue Creek Delta (refer to Section 3.12).

5.7 STAGING/TEMPORARY STOCKPILE PLAN

If it is determined during the RD process that it is necessary to stage the excavated materials prior to their placement into the final containment areas, a Staging/Temporary Stockpile Plan will be prepared. The Staging/Temporary Stockpile Plan will include a list of BMPs that:

- Comply with applicable worker protection requirements.
- Isolate the staged/stockpiled materials from contact with surface water and stormwater to the extent practicable.
- Prevent generation of ARD and/or conditions that could lead to the migration of contaminants to the surrounding environment.

5.8 WATER SOURCE IDENTIFICATION AND DEVELOPMENT PLAN

A plan will be prepared to identify potential sources of water for use during the RA. It is anticipated that the Water Source Identification and Development Plan will include the following information:

- Water use requirements (e.g., water necessary for dust suppression, equipment decontamination, compaction during backfill operations, etc.) and anticipated volumes of water needed for each activity.
- Water quality requirements.
- Potential water sources and suitability.
- Permitting and access requirements.
- Conceptual design for water conveyance and/or water storage at the Site.

5.9 DESIGN SUBMITTALS (30-, 60-, 90-PERCENT, AND FINAL DESIGN PACKAGES)

The objectives of the Midnite Mine RD are to produce engineering plans and technical specifications that: 1) meet the RAOs and performance standards defined in the CD SOW, and 2) are suitable for procuring construction contractors to implement the Selected Remedy. The design process will further define the scope of work and performance criteria (beyond those stated in the CD SOW), and the general methods to be used. All plans and specifications will be developed in accordance with *Superfund Remedial Design and Remedial Action Guidance* (EPA, 1986), standard engineering practices, and relevant guidelines for mine reclamation. The plans and specifications will meet or exceed the Performance Standards identified in the Consent Decree SOW. Examples of the standard engineering practices and relevant guidelines that will be referenced for applicable and appropriate information during the design include:

- ASTM International (formerly known as the American Society for Testing and Materials).
- ASME Codes, Standards and Publications (American Society of Mechanical Engineers).
- ANSI (American National Standards Institute).
- National Electrical Safety Code (NESC).
- Best Management Practices for Reclaiming Surface Mines in Washington and Oregon (Washington Division of Geology and Mineral Industries).
- The Handbook of Western Reclamation Techniques (Ferris et al., 1996).
- A Handbook of Technologies for Avoidance and Remediation of Acid Mine Drainage (Skousen et al. 1998).
- Abandoned Mine Site Characterization and Cleanup Handbook (EPA, 2000b).
- Environmental Handbook: Effects of Mining on the Environment and American Environmental Controls on Mining (Marcus, 1997).

Four progressive design packages will be prepared for review as described below. In general, the successive designs will be completed to an approximate level of 30 percent (preliminary), 60 percent, 90 percent (pre-final), or 100 percent (final). However, some of the 30-, 60-, and 90-percent designs will be progressed further and some delayed depending on the nature of a particular design component and how a particular design component relates to the anticipated RA construction schedule.

For example, the preliminary designs necessary for Mine Waste Containment in Pit 4 will be progressed more quickly than the designs necessary for the new WTP. This is because Pit 4 backfilling will be one of the first activities during the Midnite Mine RA, whereas construction of the new WTP relies on approval of a reissued NPDES permit. As a result, once the 30 percent WTP design is completed, it will be shelved

until the discharge limits are finalized in the reissued NPDES permit, at which time the WTP design can be finalized and subsequently constructed. Additional details regarding the RD sequencing are presented in Section 7.2.2.

Each design submittal will include a Basis of Design Report narrative, with supporting documentation included as appendices (e.g., design drawings, specifications, cost estimates, calculations, etc.). The specific deliverables to be prepared and their respective content are discussed below.

5.9.1 Preliminary (30 Percent) Design Submittal

The preliminary design establishes the design basis and allows for accurate scoping and execution of the design effort based on an agreed-upon concept. The intent of the submittal is to provide enough information related to all RA major work elements in order to gain consensus on the approach before proceeding with developing the detailed design. The preliminary design phase is a critical component in the engineering process and is the phase when all significant questions and concerns are addressed and resolved in order to avoid untimely and costly changes later in the design process. Once the preliminary design is accepted, this would constitute a concept design freeze so that future efforts are focused on developing the design details required for competitive bidding and construction of the final approved project.

It is anticipated that in accordance with the CD SOW, the preliminary (30 percent) design submittal will include the following:

- A Basis of Design Report that includes (at a 30 percent level of detail):
    - Summary of data and references used in the design, including results of design investigations.
    - Preliminary design calculations and sketches.
    - Preliminary design of rockfall protection systems, including documentation of the evaluation of rockfall mitigation measures for shallow, intermediate, and deep instability.
    - Water balance analyses.
    - Material Balance Analysis/construction scheduling.
    - Grading Plans based upon Material Balance Analysis.
    - Dewatering system design calculations (pipe and pump sizing, etc.), configuration, subdrain and slope drain material requirements (permeability, material and filter compatibility requirements), load calculations on sub-drain piping, for pits 3 and 4.
    - Pit liner – material requirements, survivability vs. load, anticipated strain, etc.
    - Settlement and deformation analyses – backfilled pits.

- Cap/Cover Design (material requirements, compatibility with settlement/strain estimates, veneer stability).
- Surface Water Management (hydrology and design of controls for intermediate construction and final reclamation phases).
- Storage Ponds (configuration, construction material balance analyses, hydrology, stability).
- Preliminary calculations for design of groundwater collection system(s).
- BPA – Reclamations design (material balance analyses; design calculations for dewatering systems, pipe, pump capacities, etc.)
- Water Treatment Plant calculations.
- Design assumptions and parameters, including waste material volume estimates, borrow material estimates, materials management strategies, pit capacity estimates, compaction requirements, surface and groundwater volume estimates, cover design parameters, liner design parameters, water treatment facility parameters (including a process flow diagram and process instrumentation diagram), sludge-disposal facility parameters, treatment outfall parameters, haul and access road improvements, erosion and surface water controls, pit drainage and extraction systems, and pit backfill parameters.
- Design criteria for covers and liners, including permeability, porosity, re-vegetation, soil amendments, moisture, radiation and radon flux attenuation, material specifications, and thickness.
- Demonstration that the design will attain the Performance Standards through supporting technical documentation, justification and quality control procedures.
- Expected long-term monitoring and operation requirements.
- SWMP including a BMP catalog (see Section 5.3).
- Substantive environmental compliance documentation, including a biological assessment, Endangered Species Act (ESA) consultation, and CWA requirements (See Section 5.2).
- Blue Creek and Delta Assessment Work Plan (see Section 4.5).

- Preliminary design drawings and schematics that reflect the 30 percent level of design. The engineering drawings will be submitted in full size and half size reproductions. The drawings in this submittal will include an overall site plan, anticipated limits of excavations, soil stockpiling and laydown areas, surface water management facilities, decontamination facilities, and a preliminary grading plan. WTP drawings will include process flow schematics, hydraulic profiles and calculations, preliminary piping and instrumentation diagrams (P&IDs), Blue Creek pipeline alignments, diffusor concept design with modeling, concept-level plans and sections, and building

elevations. A complete list of the drawings and schematics that are anticipated to be included in the 30 percent design package is presented on Table 5-1. Example design drawings are included in Appendix B.

- An annotated outline of the design specifications. An example earthwork specification is included in Appendix C.
- Preliminary RA Compliance and Verification Plan will be prepared to demonstrate achievement of RAOs, and/or cleanup levels for components of the RA. RA effectiveness monitoring plans may be required for specific aspects of the remedy that will require short-term monitoring not included in the SMP.
- Siting, easements or rights of way, documentation related to the reissued NPDES permit for the WTP, and other regulatory and administrative requirements for access, remedy construction, and O&M.
- An annotated outline for the CQAP that describes the site-specific components of the quality assurance program such that the completed project meets or exceeds all design criteria, plans, and specifications. The CQAP will contain:
    - Responsibilities and authorities of all organizations and key personnel involved in the RD and RA construction.
    - Qualifications of the Quality Assurance Official.
    - Testing and sampling protocols to monitor construction, including a Performance Standard Verification table to describe the procedures, inspection, and analytical requirements to demonstrate the performance standards are met during and following the RA activities.
    - Required monitoring to document that the RA construction is performed and completed in compliance with ARARs and site-specific Performance Standards.
    - Proposed quality assurance sampling activities, including sample locations, sample frequencies, acceptance and rejection data sheets, problem identification and corrective measures reports, design acceptance reports, and final documentation.
    - Provisions for final storage of all records.
- Preliminary construction schedule, including construction sequencing and a description and schedule for all associated siting and discharge permit requirements.
- Procurement Plan describing the contracting strategy, including contracting terms and conditions, certifications, qualifications and training requirements, health and safety training, contract submittals, and requirements for compliance with applicable laws, including Tribal Employment Rights Ordinance (TERO).

- Preliminary estimate of remedy implementation cost including long-term operation, maintenance, and monitoring. The 30-percent design cost estimate will have an accuracy of +50 percent to -30 percent of the actual implementation costs.
- Detailed plans for re-vegetation, including technical and performance specifications, for re-vegetation of disturbed areas following construction.
- A GSR evaluation including the core elements as recommended by the EPA:
    - Total energy use and renewable energy use.
    - Air and atmospheric pollutants and greenhouse gas emissions.
    - Water use and impacts to water resources.
    - Materials management and waste reduction.
    - Land management and ecosystem services.

5.9.2 60 Percent Design Submittal

The 60 percent design submittal will be a continuation and expansion of the 30 Percent design submittal and it will include the following as appropriate in accordance with the CD SOW:

- Written response to EPA's preliminary design review comments. The responses will indicate if a design change was made as a result of the comment.
- Update of the schedule for implementation of the RA.
- Draft of the major technical specifications prepared in Construction Specifications Institute (CSI) format.
- Intermediate design drawings.
- Updated Basis of Design Report.
- Draft CQAP.
- Updated cost estimate of implementation of the remedy. The cost estimate will have an expected accuracy of +30 percent to -15 percent of the actual implementation costs. The estimate will include costs for projected operation and maintenance activities.
- Updated SMP (See Section 5.6).

5.9.3 Pre-Final (90 Percent) and Final (100 Percent) Design Submittals

A Pre-Final Design will be submitted when the design is 90 percent complete, and the Final Design will be submitted when the design effort is 100 percent complete. The Pre-Final Design will fully address comments made to the 30 and 60 percent design submittals. The Final Design will fully address comments made to the Pre-Final Design and will include all reproducible drawings and specifications

suitable for bid advertisement. The Pre-Final and Final Design submittals will include those elements listed for the Preliminary Design, as well as the following in accordance with the CD SOW:

- Draft Final CQAP (to be finalized following contractor procurement).
- Draft and Final Contingency Plan (to be finalized following contractor procurement) describing procedures in the event of an accident or emergency at the Site (e.g., power outages, water impoundment failure, WTP failure, slope failure, etc.) or off the Site (e.g., interruptions to material transport). The Contingency Plan will include:
    - Name of the person or entity responsible for responding in the event of an emergency incident.
    - Plan and dates for meetings with the local community, including local, tribal, state, and federal agencies involved in the cleanup, as well as local emergency squads and hospitals.
    - First aid information.
    - Air monitoring plan.
    - Spill Prevention, Control, and Countermeasures (SPCC) Plan, as specified in 40 CFR Part 109, describing measures to prevent and contingency plans for potential spills and discharges from materials handling and transportation.
- Final Engineer's Capital and Operation and Maintenance Cost Estimate. This cost estimate will reflect the detail presented in the final design.

5.10 ANTICIPATED REMEDIAL DESIGN DRAWINGS AND CONTENT

It is anticipated that the design effort will comprise the following drawings (refer also to Table 5-1):

5.10.1 General

The general design sheets will show site location, access, general location of existing and proposed facilities, site boundaries, and survey control points, standard symbols and abbreviations used in subsequent drawings. Anticipated drawings include:

1. Cover Sheet.
2. Index of Drawings.
3. General Notes & Acronyms.
4. Site Location, Principal Site Features and Survey Control.
5. Remedial Components.

5.10.2 Construction Support Facilities

Design of the construction support facilities will include identifying the location and configuration of site construction support facilities, including locations and details for temporary construction roads, material laydown, construction water storage and load-out system, and the permanent vehicle decontamination facility. It also includes the location, design, and sizing of the material processing and stockpile area, assuming that Hillside Waste Rock Pile material will be used as drain material in the Pits 3 and 4 dewatering system. Anticipated drawings include:

1. Construction Facilities Layout.
2. Material Screening, Stockpile and Laydown Areas.
3. Fuel and Maintenance Areas.
4. Vehicle Decontamination Facilities Plan and Details.
5. Construction Water Loadout Areas.
6. Construction Roads Plan and Profile.
7. Construction Road Details.

5.10.3 Borrow Area

As currently envisioned, borrow material for reclamation cover construction will be obtained primarily from the Rhoads Area Property. It is possible that some material will be required from the Mill Site borrow area or Lane Mountain facility, and if so, borrow plans will be developed for those area as well. The availability of suitable quantities of material required for reclamation construction will be evaluated during the preparation of the borrow area plans. It is not currently envisioned that development of additional off site borrow sources is needed. Anticipated drawings include:

1. Borrow Source Location Map.
2. Rhoads Property Access Road.
3. Rhoads Property Borrow Development Plan.
4. Mill Site Borrow Development Plan.
5. Rhoads Property Reclamation Plan.
6. Mill Site Borrow Area Reclamation Plan.

5.10.4 Mine Waste Excavation

Per the SOW in the Final CD, mine waste excavation and final grading plans will be developed for excavation of Above-Grade Mine Waste, Contaminated Soil and Sediment, Mine Drainage Sediments, and Mine Road Materials. It is envisioned that Above Grade Mine Waste Excavation Plans will be developed for key phases of construction, including: 1) initial construction/processing of Hillside Waste Rock Pile material; 2) BPA reclamation; 3) Pit 4 Backfilling; and 4) Pit 3 Backfilling. It is also envisioned

that a preliminary plan will be developed for excavation and removal of potentially impacted sediments that have accumulated in the delta that has formed at the outfall of Blue Creek into Lake Roosevelt. Anticipated drawings include:

1. Mine Waste Location Map.
2. Phase 1 - Above-Grade Mine Waste Excavation and Final Grading.
3. Phase 2 - Contaminated Soil and Sediment Excavation and Final Grading.
4. Phase 3 - Mine Drainage Sediments Excavation and Final Grading.
5. Phase 4 - Mine Road Materials Excavation and Final Grading.
6. Phase 5 - Blue Creek Delta Excavation.
7. Details.

5.10.5 Surface Water and Sediment Controls

Mine Waste excavation will be carried out in such a manner that contaminated surface water runoff will be contained on site during RA construction. As such, design of surface water and sediment controls will be developed for each of the key phases of construction identified in Section 4 above. Anticipated drawings include:

1. Site Drainage Basin Plan.
2. Phase 1 – Above-Ground Mine Waste Excavation Surface Water Control Plan.
3. Phase 1 - Diversion Ditch Plan and Profile.
4. Phase 1 - Diversion Ditch Sections.
5. Phase 1 - Diversion Ditch Details.
6. Phase 1 - Surface Water Retention Basin Plan.
7. Phase 1 - Surface Water Retention Basin Sections.
8. Phase 1 - Surface Water Retention Basin Details.
9. Phase 2 – Contaminated Soil and Sediment Excavation Surface Water Control Plan.
10. Phase 2 - Diversion Ditch Plan and Profile.
11. Phase 2 - Diversion Ditch Sections.
12. Phase 2 - Diversion Ditch Details.
13. Phase 2 - Surface Water Retention Basin Plan.
14. Phase 2 - Surface Water Retention Basin Sections.
15. Phase 2 - Surface Water Retention Basin Details.
16. Phase 3 – Mine Drainage Sediment Excavation Surface Water Control Plan.
17. Phase 3 - Diversion Ditch Plan and Profile.
18. Phase 3 - Diversion Ditch Sections.

19. Phase 3 - Diversion Ditch Details.
20. Phase 3 - Surface Water Retention Basin Plan.
21. Phase 3 - Surface Water Retention Basin Sections.
22. Phase 3 - Surface Water Retention Basin Details.
23. Final Reclaimed Surface Water Management Plan.
24. Final Diversion Ditch Plan and Profile.
25. Final Diversion Ditch Sections.
26. Final Diversion Ditch Details.
27. Final Surface Water Detention Pond Plan.
28. Final Surface Water Detention Pond Sections.
29. Final Surface Water Detention Pond Details.
30. Best Management Practices.

5.10.6 Storage Ponds

Current water balance calculations indicate that temporary storage ponds will need to be constructed within the fenced area to store mine-impacted surface water during the RA. Storage pond design drawings will include plan views and sections (including subsurface geotechnical data) at a level of detail typical for design of small to intermediate-sized, low-hazard water retention dams in the State of Washington. Anticipated drawings include:

1. Storage Pond General Layout (Plan View).
2. Phase II South Storage Pond – Plan.
3. Phase II South Storage Pond–Profiles and Sections.
4. Phase II South Storage Pond – Details.
5. Phase III Storage Pond – Plan View.
6. Phase III Storage Pond- Sections and Embankment Profile.
7. Phase III Storage Pond – Details.

5.10.7 Mine Waste Containment in Pit 4

Design for the Waste Containment in Pit 4 will include the pit dewatering (pumps, wells, discharge lines) and pit floor drain system, pit liner (drain isolation liner) extents and details, pit backfilling plan, and cover system design. Development of the Pit 4 backfilling plan will be done in conjunction with the mine waste excavation plan, and material balance analyses in order to identify the quantity and types of material that can be located within the Pit 4 backfill. The location and extent of various wastes within the Pit 4 backfill will be identified as part of this design. It is envisioned that the Protore and other ARD-generating mine wastes will be located near the center of the backfill where it is less likely to be impacted by groundwater

fluctuations. Mine waste with high radon-generating potential will be located lower in the backfill to minimize potential for radon emissions at the surface of the cap. The Pit 4 cover/final surface design will include both details for the cover system, as well as surface water controls and erosion protection. Anticipated drawings include:

1. Rockfall Protection Plan.
2. Rockfall Protection Details.
3. Pit Dewatering Plan (sumps, drains, wells, lines).
4. Pit Liner Installation Plan and Sections.
5. Pit 4 Regraded Surface – Cover Subgrade.
6. Pit 4 Reclamation Surface – Top of Cover.
7. Pit 4 Cross Section.
8. Details.

5.10.8 Mine Waste Containment in Pit 3

Design for the Mine Waste Containment in Pit 3 will include the pit dewatering (pumps, wells, discharge lines) and pit floor drain system, pit liner (drain isolation liner) extents and details, pit backfilling plan, and cover system design. Development of the Pit 3 backfilling plan also will be done in conjunction with the mine waste excavation plan, and material balance analyses to identify the appropriate location for materials within the Pit 3 backfill. The location and extent of various wastes within the Pit 3 backfill will be identified as part of this design. The Pit 3 cover/final surface design will include both details for the cover system, as well as surface water controls and erosion protection. Anticipated drawings include:

1. Rockfall Protection Plan.
2. Rockfall Protection Details.
3. Pit Dewatering Plan (sumps, drains, wells, lines).
4. Pit Liner Installation Plan and Sections.
5. Pit 3 Regraded Surface – Cover Subgrade.
6. Pit 3 Reclamation Surface – Top of Cover.
7. Pit 3 Cross Section.
8. Details.

5.10.9 Mine Waste Containment in Backfilled Pit Area

Designs for the Mine Waste Containment in the BPA will include the design of pit dewatering systems (pumps, wells, and discharge lines), development of a BPA subgrade plan, and cover system design. Development of the BPA subgrade plan also will be done in conjunction with the mine waste excavation plan, and material balance analyses to identify the quantity of material that can reasonably be

incorporated within the BPA cover subgrade. Existing Mine Waste in the BPA will be incorporated into the design of the reclaimed BPA configuration to the maximum extent practicable. Anticipated drawings include:

1. Pit Dewatering Plan (sumps, drains, wells, lines).
2. Regraded Surface (Cover Subgrade).
3. Reclamation Surface – Top of Cover.
4. Cross Section and Details.

5.10.10 Groundwater Controls

Preliminary designs for groundwater cutoff and/or interceptor trenches will be included for each of the three major drainages.

1. Cut-off Trench Plan and Profile.
2. Trench Details.

5.10.11 Demolition

Design drawings related to demolition of the existing WTP and other ancillary buildings include:

1. West Drainage Facilities and Water Treatment Plant - Existing Layout.
2. Demolition Sequence.
3. Demolition Cross Sections.
4. Demolition Details.
5. Location of Demolition Debris the Pit Backfill.

5.10.12 Water Treatment Plant, Effluent Pipeline and Outfall Pipe/Diffuser

The WTP design will include the following drawings (arranged by discipline):

General. The General design drawings provide the standards used in the development of the drawing set including location, access, standard symbols, and abbreviations used. The General drawings also will provide complete hydraulic information for the WTP (from plant influent to effluent discharge), and a process flow schematic with necessary equipment references. Anticipated drawings include:

- Cover Sheet.
- Location Map, Vicinity Map, and Index of Drawings.
- Standard Symbols.
- Standard Abbreviations.
- Hydraulic Profile.

- Process Flow Schematic.

Civil. The Civil design drawings will provide survey control data and a yard piping plan for the WTP site. Also included under the civil design discipline are plan sheets with topographic survey data for the effluent pipeline alignment along Blue Creek, as well as plan sheets for the outfall pipe and diffuser in the Spokane Arm of Lake Roosevelt. There will be approximately 50 plan sheets (scale: 1”=20’) for the 30,000 lineal feet of effluent pipe along the Blue Creek alignment, and approximately 6 plan sheets (scale: 1”=20’) for the outfall pipe and diffuser. Anticipated drawings include:

- General Notes and Symbols.
- Site Control Data.
- Site Key Plan.
- Yard Piping Plan.
- Blue Creek Outfall Pipe Alignment Plan.
- Lake Roosevelt Outfall Diffuser Plan.

Architectural. The Architectural design drawings will include summary design criteria on governing building codes, occupancy classification, construction type, and building area for the new WTP building. The design drawing package also will contain a floor plan, roof plan, and sections for the new WTP building. Anticipated drawings include:

- Architectural Design Criteria.
- Floor Plan.
- Roof Plan.
- Building Section N-S.
- Building Section E-W.

Structural. The Structural design drawings will include summary design criteria on soil loads, floor live loads, roof live loads, wind loads, snow loads, and seismic loads for the new WTP building. The design drawing package also will contain a foundation plan and floor plan for the new WTP building. Anticipated drawings include:

- Structural Design Criteria.
- Foundation Plan.
- Floor Plan.

Process Mechanical. The Process Mechanical design drawings will have fully developed piping schedules and equipment schedules for all of the process piping and equipment in the new WTP building. The design drawing package also will contain plans for each of the unit processes to be included in the new WTP building. Anticipated drawings include:

- Piping Schedule.
- Equipment Schedule.
- Process Mechanical Floor Plan.
- Chemical Storage and Delivery Systems.
- Ion Exchange System.
- Lime Softening Reactor/Clarifiers.
- Granular Media Filters.
- Sludge Dewatering System.

HVAC. The HVAC design drawings will include equipment schedules for all heating, ventilation, and air conditioning equipment in the new WTP building. The design drawing package also will contain a floor plan for all HVAC equipment in the new WTP building. Anticipated drawings include:

- Equipment Schedules.
- HVAC Floor Plan.

Electrical. The Electrical design drawings will include a single line diagram for all major electrical equipment, and power/lighting plans for the new WTP building. Anticipated drawings include:

- Yard Power and Lighting Plan.
- Single Line Diagram.
- WTP Building Power and Lighting Plan.

Instrumentation and Controls. The Instrumentation and Control design drawings will include P&IDs for all unit processes in the new WTP building. Anticipated P&IDs include:

- Lime Feed and Control System.
- Hypochlorite Feed and Control System.
- Barium Chloride Feed and Control System.
- Miscellaneous Chemical Feed.
- Ion Exchange System.
- Lime Precipitation.

- Granular Media Filtration.
- Solids Dewatering System.

5.11 DELIVERABLE FORMAT AND DISTRIBUTION

An electronic copy, four bound copies, and one unbound copy of each deliverable will be submitted to EPA, and an electronic copy and one bound copy will be submitted to the Tribe. For the design submittals that include drawings, a half-size (11 inch by 17 inch) drawing set will be included with each copy. Electronic files will be pdf and native files when appropriate (e.g., Word, Excel). In addition, EPA will be provided with one full-size set of drawings at each stage (i.e., preliminary, intermediate, pre-final/final) of the design. Example design drawings are included in Appendix B and an example earthwork specification is included in Appendix C.

6.0 REMEDIAL DESIGN QUALITY ASSURANCE/QUALITY CONTROL

QA/QC procedures will be implemented throughout the design process to ensure that the final design is technically sound, cost-effective, biddable and constructible, and that the design meets the remedial action goals for the site. This section describes the QA/QC roles and responsibilities and QA/QC mechanisms that will be employed during the RD process.

6.1 QA/QC ROLES AND RESPONSIBILITIES

Figure 6-1 depicts the anticipated RD team organization and lines of authority. The roles and responsibilities of the team members are discussed below.

6.1.1 Environmental Protection Agency – EPA

The EPA, as the lead agency governing the Midnite Mine Superfund Site remediation, is responsible for final approval of the RD. At its discretion, the EPA will review each design submittal described in Section 5.0 for overall content, quality, and compliance with the requirements of the CD. EPA will consult with the Spokane Tribe in keeping with their government to government relationship and EPA's tribal policy.

6.1.2 Spokane Tribe of Indians

As stated in Section 1.3, the Site is located on lands owned by the Federal Government and held in trust for the Tribe and individual tribal members. In its capacity as a support agency under CERCLA, the Tribe will have the opportunity to review each design submittal described in Section 5.0 and provide comment to the EPA.

6.1.3 Dawn Mining Company/Newmont USA Limited

As the responsible party for implementing the Selected Remedy, Dawn Mining Company/Newmont USA Limited will provide EPA with a technically sound RD that complies with the CD. All RD deliverables will receive internal review and approval by Dawn Mining Company/Newmont USA Limited prior to submittal to the EPA.

6.1.4 Worthington Miller Environmental - WME

The WME, as the Supervising Contractor, is responsible on behalf of Dawn/Newmont for assuring the overall quality control of the RD and compliance with the performance standards outlined in the CD. WME will review the QA/QC policies and procedures of the Remedial Design Engineer (MWH) to confirm they meet the minimum requirements of the WME Quality Management Plan (WME, 2012). WME will communicate QA/QC issues and results to Dawn/Newmont and EPA.

6.1.5 MWH Project Manager

The MWH Project Manager (Vance Drain, P.G.) is responsible for assuring that sufficient resources, including budget, staff, expertise, and time are dedicated to QA/QC for the Midnite Mine RD. The MWH Project Manager is ultimately responsible for confirming that the MWH QA/QC policies and procedures are followed and that the design deliverables meet MWH and industry standards. The MWH Project manager will communicate all QA/QC issues and results to the Supervising Contractor (i.e., WME). Additional info regarding the roles and qualifications of the MWH Project Manager is included in Section 1.3.

6.1.6 MWH Engineering Manager and Water Treatment Lead Engineer

The MWH Engineering Manager (Clint Strachan, P.E.) and the MWH Water Treatment Lead Engineer (Dan Dupon, P.E.) are responsible for overseeing the QA/QC related to the earthwork and water treatment designs, respectively. The MWH Engineering Manager and Water Treatment Lead Engineer are responsible for confirming that the respective design teams are qualified, the appropriate QA/QC mechanisms are implemented, and for communicating QA/QC issues and results to the MWH Project Manager. These two engineers ultimately are responsible for having each design drawing and design report stamped by an appropriate discipline engineer. Additional information regarding the roles and qualifications of the MWH Engineering Manager and Water Treatment Lead Engineer is included in Section 1.3.

6.1.7 Design Team Members

The earthwork and water treatment design teams will include qualified engineers and scientists working under the guidance and supervision of the MWH Engineering Manager or Water Treatment Lead Engineer. Each design team member assumes full responsibility for the quality of their work products and adherence to MWH standards and procedures.

6.1.8 Project Reviewers

Mike Gronseth, P.E. and Ed Cryer of MWH will be assigned as Project Reviewers to the earthwork and water treatment design efforts, respectively, and will be responsible for implementing QA/QC throughout the design process. The Project Reviewer role is to coordinate and facilitate the QA/QC mechanisms described below and confirm that the RD meets or exceeds the RAOs and performance standards defined in the CD. The Project Reviewers will communicate QA/QC issues and results to the MWH Engineering Manager or Water Treatment Lead Engineer.

6.1.9 Discipline and Inter-Discipline Checkers

Discipline Checkers are subject-matter experts assigned to review individual components of a design (e.g., geotechnical, civil). The role of the Discipline Checker is to verify adherence to appropriate design criteria and governing code requirements. Inter-Discipline Checkers perform a cross-check between each of the various design components to confirm compatibility and completeness. The discipline checks will be documented on standard MWH calculation forms that are used to document design analyses and calculations, and include provision for documentation of checking and review. The appropriate form to be used will be selected by the type of analysis that is conducted. For design products such as drawings and specifications, the checking history and personnel will be provided in appropriate locations on these documents.

The key disciplines include:

- Geotechnics
  - ✓ Material characterization
  - ✓ Slope stability
  - ✓ Foundation conditions
  - ✓ Burial conditions
- Hydrology and hydraulics
  - ✓ Surface water hydrology
  - ✓ Saturated and partially saturated subsurface flow
  - ✓ Erosion protection
  - ✓ Sediment control
- Civil works
  - ✓ Above-ground structural elements
  - ✓ Below-ground structural elements
  - ✓ Pipeline design
  - ✓ Pump design
- Water treatment
  - ✓ Water quality characterization
  - ✓ Treatment technology application
  - ✓ Facility design
- Geology and geochemistry
  - ✓ Seismicity

- ✓ Structural geology
- ✓ Geochemistry

- GSR and related impacts

6.1.10 Constructability, Biddability, and Operability Reviewers

An individual(s) with significant construction and procurement experience will review the design to confirm it can reasonably be constructed and that the relevant and appropriate information is available to obtain realistic construction bids. An individual with O&M experience will review the design documents to evaluate the ease with which the completed project can be operated and maintained. The overall goals of the constructability, biddability, and operability reviews are to confirm that the design can be efficiently constructed with minimal cost and schedule growth, and to assure safe and efficient operations by the end user.

6.1.11 Cost and Schedule Reviewers

MWH professionals with significant and relevant construction experience will review the RD cost estimates and schedules for accuracy and reasonableness.

6.2 QA/QC MECHANISMS

The following mechanisms will be used to assure that the remedial design is completed in a high quality manner.

- Criteria Committee Meetings.
- Design checks at each design phase.
- Operability reviews.
- Constructability reviews.
- Biddability reviews.
- Technical Manager Meetings.
- Subcontractor reviews.

Each quality check mechanism is summarized below and the QA/AC process is depicted on Figure 6-2.

6.2.1 Criteria Committee Meetings

Criteria Committee Meetings (CCMs) are internal project review meetings with both the project team and outside experts to obtain input from experienced individuals at critical junctures in the project. The CCM members are selected from the most current list of MWH technical experts and include MWH staff members from outside the Project Team that are experienced in similar projects. The first CCM will be held early in the design phase to set appropriate criteria and direction for the work. A second CCM will be held at the 60 percent design stage to provide continued input throughout the project. Meeting

participants and CCM members will remain consistent between meetings to provide important continuity in quality review throughout the early and middle stages of the design. The objectives of the meetings are to critically review the project scope and direction, criteria, budget, and schedule. Minutes of the CCMs will be sent to each participant.

6.2.2 Design Checks

Design checks are crucial to the overall success of the remedial design process and will consist of the following:

- A design check will be performed at every phase of the design process, with the level of effort increasing as the design progresses.
- The design checks will be performed by a senior person within the appropriate discipline.
- The Project Reviewer will verify that all components of the design have been checked. In some cases, particularly in the early phases of design, the Project Reviewer also may conduct the checks.

- **30 Percent Design Check:** Checking will include the following:
  - Review the design criteria and assumptions.
  - Check and approve all calculations.
  - Review the Basis of Design Report and associated planning documents (e.g., SWMP, BMP catalog, Blue Creek and Delta Assessment Work Plan, etc.).
  - Check and approve drawings.
  - Review the specifications outline.
  - Review construction cost estimate and schedule.
- **60 Percent Design Check:** Checking will include the following:
  - Review the technical specifications.
  - Check and approve all calculations and equipment data sheets.
  - Check and approve drawings.
  - Review the construction cost estimate and schedule.
  - Review the Construction Quality Assurance Plan.
  - Review the Basis of Design Report.
  - Perform a Constructability and Operability Review as discussed later in this section.

- **<u>90 Percent Design Check</u>:** Checking will include the following:
  - Perform Discipline Checks. This is accomplished by having a senior person within each discipline review the calculations, specifications, and drawings for that aspect of the design.
  - Perform Inter-discipline Check. After the comments from the Discipline Checkers have been incorporated, a complete set of drawings, specifications, calculations, and previous review comments are given to a single, qualified individual who is familiar with the project. The Project Reviewer often serves this role. The Project Reviewer conducts a detailed item-by-item check of all the documents.
  - Review the detailed construction cost estimate and schedule.
  - Perform a Biddability Review as described later in this section.
  - Review updated sections of the Basis of Design Report.
- **<u>100 Percent (Final) Design Check</u>:** Checking will include the following:
  - Verify that design changes are technically sound and do not compromise the integrity of the project or create a potential safety hazard. If necessary, have the Criteria Committee members evaluate the effects of modifications (see Section 6.2.1).
  - Verify that changes have been incorporated into the drawings, specifications, design analysis, and cost estimate.
  - Conduct final check and approve the drawings.

6.2.3 Operability Reviews

An operability review will be conducted after completing the 60 Percent Design phase. The review determines if the facilities associated with the Selected Remedy can be operated and maintained with a reasonable level of effort, and without creating a health and safety hazard for the operators or the general public. For the Midnite Mine Selected Remedy, these reviews would include the WTP operability review including the influent pumping and conveyance, treatment process, and effluent discharge systems. The review will be performed by a professional or professionals with experience in the startup and/or operation of similar facilities.

6.2.4 Constructability Reviews

A constructability review will be conducted after completing the 60 Percent Design phase to evaluate the ease and efficiency with which the design can be built. The goals of the review are to confirm that the design documents are sufficient to produce a safe, cost-effective, quality construction and to investigate opportunities for cost reduction and construction schedule improvements. The review focuses on determining the following:

- Can the work be executed as shown?
- Are there conflicts between the specifications and drawings?
- Can the project be completed within the time frame allotted?

Constructability reviews allow for evaluation of the design for accuracy and completeness and provides an opportunity to eliminate impractical and inefficient requirements as well as deficiencies in the contract documents. Involvement of experienced construction personnel ensures that their knowledge can guide the designers to deliver the best possible facility at the best value. Projects designed with constructability in mind can result in lower contract prices and minimization of risks. Attention to constructability also facilitates timely completion of the project while minimizing contractor claims.

6.2.5 Biddability Reviews

At the 90 Percent Design stage, the drawings and specifications will be reviewed to assess the ease with which a construction contractor can bid the job. The purpose of the biddability review is to define the degree to which the design documents can be understood, readily bid, administered, and enforced during project construction. Objectives of the biddability review are to reduce significant design errors, omissions, and ambiguities in the construction bid package so that prospective bidders can respond in an informed manner and with realistic costs. In this review, the design is analyzed for consistency with the bid documents, and the bid and design documents are assessed to confirm they are clear, comprehensive, and manageable. The review also assesses whether the schedule in the contract documents is reasonable for the work to be completed.

6.2.6 Technical Manager Teleconference

The Technical Manager Teleconferences described in Section 1.2 will include reviews of QA/QC activities and results to date. These meetings also will be used to discuss particular design elements and any problems encountered during the design preparation so that brainstorming among the group participants can occur and resolutions can be made to progress the design. Also discussed in this teleconference will be the planned next steps in the RD. EPA input will be solicited for concurrence that the ongoing and planned QA/QC processes and solutions for design problems are adequate.

6.2.7 Subcontractor Reviews

It is anticipated that subcontractor review of select portions of the design will be solicited at various stages of the RD process. These may include additional constructability and biddability reviews from construction contractors or technical review by specialty firms (e.g., geotechnical or water treatment engineering firms).

7.0 REMEDIAL DESIGN / REMEDIAL ACTION APPROACH AND SCHEDULE

7.1 RD/RA CONSIDERATIONS

The Midnite Mine RD will be prepared in a manner that accommodates the complex and multi-faceted nature of the Selected Remedy. The goal is to integrate the RD and RA such that the overall implementation of the remedy is high quality, remains on schedule, and is as streamlined and cost efficient as possible, while meeting the RAOs, performance standards, and stakeholder expectations. Elements of the Selected Remedy that bear consideration in the overall RD approach and schedule include:

7.1.1 Water Treatment Requirements

The existing WTP treats mining-impacted water to interim discharge standards and discharges the treated water to the nearby East Drainage, a tributary to Blue Creek. The Selected Remedy requires that mining-impacted water be treated to achieve standards required by a reissued NPDES permit, and discharged to the Spokane River Arm of Lake Roosevelt. Because the existing WTP is built atop mining wastes that require removal, a new WTP will need to be built at a more suitable location and operated at some point during the RA. The new discharge location (i.e., the Spokane River Arm of Lake Roosevelt) will require a reissued NPDES permit. Because the reissued NPDES permit is not yet in place and the final discharge limits are not currently known, the design of the new WTP cannot be finalized. The RD approach (outlined below) is intended to account for the continued operation of the existing WTP for a period of time while the RA earthwork activities are initiated and the NPDES permit is finalized.

7.1.2 Water Balance

Mining-impacted water from seeps, springs, surface water, and groundwater currently is stored in Pit 3, Pit 4, and the PCP prior to treatment at the existing WTP (with Pit 3 providing the bulk of the water storage). These locations will become unavailable for water storage as the RA progresses and mining wastes are consolidated in the pits. It is anticipated that the amount of water requiring treatment during the RA will remain relatively close to pre-RA volumes during initial phases of construction and then will decrease systematically as areas (e.g., Pit 4, the BPA, etc.) are capped and clean surface water is shed from these reclaimed areas. As a result, the RD will need to account for varying water storage requirements, and the new WTP sized to accommodate varying flow rates that are anticipated during the RA (i.e., when the reissued NPDES permit becomes effective) and following the earthwork activities. New temporary water storage impoundments will need to be designed and constructed to store pre-treated water during the RA, and reclaimed as the mining wastes are consolidated and isolated and the

volume of mining-impacted water is reduced. It is anticipated that temporary water storage impoundments will be built and reclaimed in phases as the earthwork progresses and the site configuration changes throughout the RA. All temporary impoundments will be located within the pre-RA mined area.

7.1.3 Temporary Water Storage and Sequencing

As discussed above, the RD needs to account for water storage during the RA. Since 1996, pits 3 and 4 have stored between 19 and 108 million gallons of water per year (averaging 48 million gallons), primarily depending on each year's precipitation. During the RA backfilling activities, once Pit 4 is backfilled and Pit 3 backfilling begins, it will be necessary to store untreated water in temporary pond(s) located on the mine area property. The necessary storage capacity for any temporary ponds will include a contingency scenario where the WTP is off line during the RA due to unforeseen circumstances (MWH, 2012c). This "worst case" scenario assumes that the WTP is off-line for a six-week period that coincides with 100-year peak runoff conditions for the six-week duration. The estimated water storage requirement for such a contingency scenario during the RA is 58 million gallons. Although other potentially suitable water storage locations have been identified outside the footprint of the MA, the contingency water storage volume (i.e. 58 million gallons) must be retained within the fenced MA boundary at the request of the Tribe.

Although the probability of an assumed WTP shutdown coinciding with a maximum inflow period is remote, the RA construction sequencing likely will include consolidating wastes in Pit 4 while Pit 3 is left open to accommodate contingency water storage. Pit 3 storage capacity is sufficient for contingency water storage for the approximate 3.5 years duration required to consolidate wastes into Pit 4 (the RD/RA schedule is discussed in more detail below). After Pit 4 is backfilled and capped, a portion of the meteoric water that is currently being collected and treated may be shed without requiring water treatment; however that is not expected to significantly reduce the necessary storage. As a result, during the backfilling of Pit 4, it is anticipated that a temporary pond with a capacity exceeding 60 million gallons (the Phase II South Storage Pond) would be excavated into the SWRP and the waste material from this excavation would be placed into Pit 4. This temporary pond would provide the necessary water storage capacity during dewatering and backfilling of Pit 3. It is envisioned that initial backfilling of Pit 3 would be accomplished with waste material on the western flank of the SWRP, which would allow for the cleanup of the Western Drainage. It is currently anticipated that remediation of the Eastern Waste Dump area, including decommissioning and demolition of the current WTP, would occur after completion of the Western Drainage remediation. Remediation of the entire South Dump within the Western Drainage, along with remediation of the Eastern Drainage would allow for a significant portion of the meteoric water

currently falling on the site to be shed as clean water. The Central Drainage underlying the SWRP would be the last drainage where waste rock is removed. During this final phase of waste rock removal, the Phase II South Storage Pond on the SWRP would be decommissioned, and a final temporary, lined Phase III Storage Pond would be constructed at some suitable location on Site (e.g., in the Western Drainage) to complete the RA. This smaller, temporary Phase III Storage Pond would be removed when the final quantity of water from the pump back systems installed during the RA reaches steady state. When a steady state flow is reached, a storage structure (i.e., tank or small pond) will be designed and installed to meet the needs of the new WTP. The location of this storage structure will be determined during the RD.

7.1.4 Material Balance

The RD will account for the relatively large volume of material that needs to be excavated, sorted according to contaminant properties, temporarily staged/stockpiled, and consolidated according to contaminant properties. For example, the RD will account for 1) excavation and processing of non-reactive materials from the Hillside Waste Rock Pile (pending approval from EPA) to construct the drainage layers, 2) placement of materials with high ARD-generating potential higher in the pits to minimize potential contact with groundwater, and 3) placement of materials with high radon-generating ability lower in the pits to minimize potential releases through the engineered cap. Likewise, the design will identify how stormwater will be managed at various phases of the RA as the site topography is altered and waste materials are placed within the pits or stockpiled.

7.2 REMEDIAL DESIGN APPROACH

7.2.1 Work-Element Specific Design Efforts

The Midnite Mine RD will comprise two separate design efforts that align with: 1) mine waste containment (or earthwork) and 2) water treatment. The earthwork design will include all activities associated with mine waste excavation, pits 3 and 4 mine waste containment, the BPA mine waste containment, water collection and conveyance, and water storage. The water treatment design will include all activities associated with construction of the new WTP, effluent pipeline from the new WTP to the Spokane River Arm of Lake Roosevelt, and the outfall pipe/diffusor.

The earthwork and water treatment design efforts will be conducted separately largely due to the different nature of the two main work elements (i.e., earthwork vs. water treatment), and unique professional disciplines are required to prepare the designs. The design efforts also will follow separate schedules due to the ongoing efforts to secure a reissued NPDES permit for the new discharge location of the treated water, and because the construction sequencing is such that the water treatment design will

progress after the earthwork construction has started (refer to the RD Schedule below). Although the earthwork and water treatment designs will be performed separately, the overall RD effort will be coordinated throughout the design process to ensure that the designs are complementary, and that the implemented remedy efficiently and effectively meets the performance standards outlined in the CD.

7.2.2 Design Sequencing

The RD will need to accommodate site conditions, the ongoing requirement for water treatment, and the anticipated RA construction sequencing. It is anticipated that mine waste consolidation will begin in Pit 4 in order to allow Pit 3 to be used for temporary water storage prior to treatment at the operating WTP.

7.2.2.1. Based on the anticipated construction sequencing, the RD will be sequenced as follows:

- All components of earthwork and water treatment designs will be progressed to the preliminary (30 percent) phase as described in Section 5.0.
- Following submittal and approval of the preliminary design, only the earthwork designs related to Pit 4 and the BPA mine waste containment will progress through the 60 percent, pre-final, and final design stages.
- After waste consolidation activities have begun in Pit 4 and the BPA, the remaining designs (i.e., earthwork design associated with Pit 3 mine waste containment and the water treatment design following receipt of the reissued NPDES permit) will progress through the 60-percent, pre-final and final design stages.

In addition to accommodating the anticipated water storage requirements and WTP considerations, the design sequencing described above will allow lessons learned and best practices identified during initial RA field activities to be efficiently integrated into subsequent designs before they are finalized. For example, lessons learned during the Pit 4 waste consolidation field activities can be integrated into the Pit 3 design before the design is finalized. Staggering the design in this fashion will greatly simplify the design process as it is much easier to incorporate design changes at the 30- or 60-percent complete phase than it is to make revisions to a final design. Additional details regarding the overall RD schedule and sequencing is discussed in Section 7.3.

7.3 RD/RA SCHEDULE

The anticipated RD/RA schedule is shown in Figure 7-1a (summary schedule) and Figure 7-1b (detailed schedule). Please note that this schedule has been prepared at the pre-design stage, and therefore should be considered preliminary and likely to change as the RD progresses. As discussed in sections

7.1 and 7.2, the RD is staggered such that all design activities are not progressed to 100 percent complete prior to initiating the RA construction activities. This staggered design approach is expected to streamline the overall RD/RA schedule because lessons learned during the initial construction phases will be more easily integrated into subsequent designs, and because earthwork activities can start while the NPDES permit application process proceeds.

Because the schedule is aggressive, a concerted effort of all parties will be necessary to meet the deadlines shown. This will be facilitated by frequent Technical Manager meetings to discuss progress on deliverables and major issues, making sure that the first drafts of documents are as complete as possible, and focused reviews by the agencies and their consultants. In addition to these efforts, it will also be necessary to prioritize the various deliverables and allow those designated as a lower priority to slip until after the critical path deliverables are complete. As the project progresses, the priorities of various key tasks will be revisited and, if necessary, the schedule will be revised to assure that the critical path tasks are being given the highest priority.

The schedule also is intended to be flexible and dynamic in order to accommodate additional design investigations that may be identified during the design process and initial RA activities. For example, if during consolidation of wastes in Pit 4 it becomes apparent that the selected method for dewatering the existing pit-bottom sediments is ineffective or infeasible, then alternate dewatering procedures will be proposed for the Pit 3 bottom sediments prior to finalizing the Pit 3 earthwork design. Likewise, the timing of the WTP design is dependent on the timing of the reissued NPDES permit and the results of ongoing WTP treatability studies.

Additional notes regarding the Schedule depicted on figures 7-1a and 7-1b include:

- The schedule was developed using working days where five days represents one week and 20 days represents one month.
- The start of this RD Work Plan is tied to the effective date of the CD, which is 17 January 2012.
- Certain data-needs investigations/reports do not link directly to the start of the RD process because the RD can begin prior to obtaining/evaluating these data. Information obtained from these non-critical-path data-needs investigations will be used to refine elements of the design as it progresses. For example, the RD will be initiated as rockfall monitoring data continues to be collected and evaluated, and the results of the rockfall monitoring integrated into the design as it progresses.

- Approval of the report prepared for the second and third phases of the Hillside Waste Rock Pile Investigation is linked to the start of the RD.
- EPA review periods may include comments from the Tribe and community.
- The NPDES permit application process must be completed before the WTP design can progress beyond the 30-percent stage. This is because the discharge standards in the reissued NPDES permit could necessitate additional water treatment technologies if they are available to meet these standards. The current schedule assumes the reissued NPDES permit will be approved near the end of 2014; however, the 60-percent design process will begin for the new WTP when the NPDES permit is reissued by EPA.
- Preparation of the RA Work Plan and Construction Quality Assurance Plan (RAWP/CQAP) is linked to EPA/Tribal comments on the 90-percent RD submittal. A similar linkage occurs with procurement of the RA construction contractor. It is anticipated that bid packages for the Midnite Mine RA can be sent out at the 90-percent design stage because the designs are complete enough at the 90-percent stage to allow the procurement process to begin (in advance of EPA approval of the 100 percent design and the RAWP/CQAP). Similarly, preparation of the RAWP/CQAP can begin at this point in the schedule because the design likely will change little between the 90- and 100-percent stages.

7.4 GENERAL APPROACH FOR REMEDIAL ACTION

As discussed in Section 1.2.1, the RD/RA will be a design-bid-build project delivery. The EPA-approved RD documents described in Section 5.0 will be used to solicit competitive bids from qualified remediation contractors. The selected RA contractor will be hired by Dawn/Newmont and will be required to conform to the EPA-approved Final RD and the RAWP/CQAP (which will be prepared and submitted on behalf of Dawn/Newmont within 60 days of EPA approval of the Final RD). In accordance with the CD, the RAWP/CQAP will describe how each Element/Component of the Selected Remedy will be addressed during the RA, identify tasks necessary for completing the RA, and provide an overall management strategy for completion of all such tasks. The RAWP/CQAP also will include an updated project schedule for each major activity and submission of deliverables to be generated during the RA.

The RA contractor will participate in a preconstruction conference prior to each construction season as well as regular meetings with EPA and the Tribe to discuss the RA construction as it progresses. The RA contractor will provide full and complete access to EPA (or their designated representatives) for periodic inspections intended to assure that the RAs are proceeding or have been completed in substantial compliance with the approved Final RD and RAWP/CQAP. The RA contractor will be required to take

necessary steps to correct deficiencies and/or bring the construction into compliance with the approved Final RD and RAWP/CQAP.

During the course of the RA, it is anticipated that weekly and monthly reports will be prepared and submitted to EPA. The weekly reports will provide a summary of construction progress, inspection activities, construction test results, issues and resolution of issues, and accidents/health and safety issues. The monthly reports will include a summary of all work performed during that month, including investigations, design, construction, sampling and analysis, engineering change notices, and issues/resolution. Dawn/Newmont also will prepare and submit for EPA approval periodic reports in accordance with the CD documenting the progression or completion of the RA, including:

- Pre-Final and Final Inspection Reports.
- Blue Creek and Delta Assessment Report.
- Remedy O&M Plan.
- Annual Reports and IC Certification.
- Interim and Final RA Reports.

In addition, focused FS and RD/RA documents for any Contingent Actions, if required, will be submitted with schedules approved by EPA.

During and following implementation of the RA, site-wide monitoring will be performed by a Dawn/Newmont representative in accordance with the EPA-approved SMP described in Section 5.6. Operation and Maintenance activities will be performed during the RA (in accordance with the OM&M Plan described in Section 5.4) and following completion of the RA (in accordance with the Remedy O&M Plan that will be prepared and submitted within 30 days of EPA approval of the Final Construction Inspection Report).

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TABLES

TABLE 3-1

ESTIMATED VOLUME OF DISPOSAL MATERIALS AND CAPACITY OF DISPOSAL AREAS

	VOLUME (Cubic Yards)	
Mine Waste	**(Low Estimate)**	**(High Estimate)**
Roads	36,600	87,000
Mine Drainage Sediments	17,200	160,000
Pit Sediments	5700	5700
Foundation Materials	995,000	995,000
Waste Rock	16,700,000	18,200,000
TOTAL VOLUME	**17,800,000**	**19,500,000**
	CAPACITY (Cubic Yards)	
Disposal Area Capacities	**(Low Estimate)**	**(High Estimate)**
Pit 4	4,000,000	4,500,000
Pit 3	15,200,000	15,900,000
Existing Backfilled Pit Area	540,000	540,000
TOTAL CAPACITY	**19,700,000**	**20,900,000**

Source: *Mine Waste Investigations – Revision 1* (MGC, 2011d)

Table 3-2

Relative Comparison and Classification of Acid Rock Drainage (ARD) and Radon Generation Potential

Mine Waste	Area	Approximate Volume (CY)	ARD Generation Potential[1]	Radon Generating Ability[2]
Waste Rock	South Waste Rock Pile	10.5 million	Moderate	Moderate
	East Waste Rock Pile	1.1 million	Moderate	Moderate
	Hillside Waste Rock Pile	2.5 million	Low	Moderate
	Pit 4 Overburden Pile[3]	433,000	Low	Moderate
	Area 5 Waste Rock Pile[4]	772,000	Moderate	Moderate
Ore/Protore	Protore Stockpile #1	45,000	High	High
	Protore Stockpile #2	40,500	High	High
	Ore Stockpile #3	72,000	High	High
	Protore Stockpile #4	250,000	High	High
	Ore/Protore Stockpile #5	42,000	High	High
	Ore/Protore Stockpile #6	611,000	Moderate	High
	Ore Stockpile #7	64,000	Moderate	High
	Lime Protore Stockpile #8	344,000	Low	High
Other	Pit Sediment	5700	Moderate[5]	High
	Mine Drainage Sediment	17,200-160,000	Low[5]	Low
	Access Road Material	36,600-87,000	Low[5]	Low
	Foundation Material	995,000	Low[5]	Low

[1]Relative classification of ARD generation potential based on acid base accounting (ABA) guidelines:

Low - material will not generate acidity or the ARD generation potential of the material ranges from potentially acid neutralizing to uncertain net acid production.

Moderate - ARD generation potential of materials are considered to be uncertain with respect to the acid generation or neutralization guidelines, but have a mineralogic composition indicating that the material may have a low potential to generate acid

High - materials are potentially acid generating according to ABA guidelines.

[2]Radon-generating ability is classified as low, moderate or high relative to the comparative evaluation of the measured ^{226}Ra activity concentrations and/or gamma exposure rates for each of the mine waste material areas.

[3]Classified same as Hillside Waste Rock Pile since both piles were generated from Pit 4.

[4]Classified same as South Waste Rock Pile.

[5]Classified based on chemical concentration data.

Source – Technical Memorandum Mine Waste Characterization (AES, 2011a)

TABLE 3-3

ESTIMATED WATER MANAGEMENT VOLUMES

Current Conditions (1999-2010)	Construction Period	Post-Remedy
Estimated Annual Water Management Volumes (gallons)		
Average Annual 52,700,000	Average 79,000,000	Low estimate 18,000,000
Maximum 110,000,000	Maximum (100-year) 149,000,000	High estimate 25,600,000
Minimum 26,000,000		
Estimated Monthly Treatment Volumes (gallons)		
	Construction Period	**Post-Remedy**
	Average 24,000,000	Low estimate 2,500,000
	Maximum (100-year) 60,000,000	High estimate 3,600,000
Estimated Peak 24-Hour Treatment Volumes (gallons)		
	Maximum (100-year) 15,000,000	
	High Estimate (10-year) 10,400,000	

Source: *Midnite Mine Design Investigation Report - Groundwater Investigations – Revision 2* (MGC, 2011e).

TABLE 4-1

CLEANUP LEVELS FOR MIDNITE MINE SURFACE MATERIAL

COC	Cleanup Level	Risk Driver	Basis for Cleanup Level
Uranium (total)	43 mg/kg	Human Health and Ecological	Background
Lead-210	7.5 pCi/g	Human Health	Background
Radium-226	4.7 pCi/g	Human Health	Background

Source: *Midnite Mine Superfund Site Record of Decision* (EPA, 2006)

Note: Radium cleanup level in soil is consistent with OSWER Directive No. 9200.4-25, Use of Soil Cleanup Criteria in 40 CFR Part 192 as Remediation Goals for CERCLA sites, dated February 12, 1998.

COC contaminant of concern
mg/kg micrograms per kilogram
pCi/g picoCuries per gram

TABLE 4-2

CLEANUP LEVELS FOR MIDNITE MINE SEDIMENTS

COC	Cleanup Level	Risk Driver	Basis of Cleanup Level
Lead-210	20 pCi/g	Human Health	Background
Uranium-238	31 pCi/g	Human Health	Background
Uranium-234	41 pCi/g	Human Health	Background
Radium-226	13 pCi/g	Human Health	Background
Chromium	43.4 mg/kg	Ecological	Spokane Tribe Sediment Standard (HSCA)
Manganese	1,179 mg/kg	Human Health and Ecological	Background
Selenium	1.7 mg/kg	Ecological	Background
Uranium (total)	93.2 mg/kg	Human Health and Ecological	Background
Vanadium	41 mg/kg	Ecological	Background

Source: *Midnite Mine Superfund Site Record of Decision* (EPA, 2006)

COC contaminant of concern
mg/kg micrograms per kilogram
pCi/g picoCuries per gram

TABLE 4-3

CLEANUP LEVELS FOR MIDNITE MINE SURFACE WATER

COC	Cleanup Level	Risk Driver	Basis of Cleanup Level
Lead-210	2.5 pCi/L	Human Health	Background
Uranium-238	7.6 pCi/L	Human Health	Background
Uranium-234	8.8 pCi/L	Human Health	Background
Aluminum (total)	9,073 µg/L	Ecological	Background
Barium (total)	165 µg/L	Ecological	Background
Beryllium (total)	0.53 µg/L	Ecological	Benchmark, EPA Regions 4 and 9
Cadmium (dissolved)[a]	2.0 µg/L (acute) 0.5 µg/L (chronic)	Ecological	National recommended water quality criterion
Cobalt (total)	3 µg/L	Ecological	Background
Copper (dissolved)	13.4 µg/L (acute) 8.96 µg/L (chronic)	Ecological	Spokane Tribe WQS
Lead (dissolved)	64.6 µg/L (acute) 2.52 µg/L (chronic)	Ecological	Spokane Tribe WQS
Manganese (total)	72 µg/L	Human Health and Ecological	Background
Nickel (dissolved)	468 µg/L (acute) 52 µg/L (chronic)	Ecological	Spokane Tribe WQS
Silver (dissolved)	3.2 µg/L (acute) 0.8 (chronic)	Ecological	National recommended water quality criterion
Uranium (total)	19.6 µg/L	Human Health and Ecological	Background
Zinc (dissolved)	114 µg/L (acute) 105 µg/L (chronic)	Ecological	Spokane Tribe WQS

COC constituent of concern
µg/L micrograms per liter
pCi/L picoCuries per liter
WQS Water Quality Standard
a Criteria are hardness dependent. Cleanup level calculated at a hardness of 100 mg/L as CaCO3. Actual Applicable or Relevant and Appropriate Requirements (ARARs) are equations used to derive the values.

Source: *Midnite Mine Superfund Site Record of Decision* (EPA, 2006)

TABLE 4-4

CLEANUP LEVELS FOR MIDNITE MINE GROUNDWATER

COC	Cleanup Level	Risk Driver	Basis of Cleanup Level
Uranium-238	35 pCi/L	Human Health	Background
Uranium-234	37 pCi/L	Human Health	Background
Manganese	1,990 µg/L	Human Health	Background
Uranium (total)	88 µg/L	Human Health	Background

Source: *Midnite Mine Superfund Site Record of Decision* (EPA, 2006)

COC constituent of concern
µg/L Micrograms per liter
pCi/L picoCuries per liter

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TABLE 4-5

INTERIM DISCHARGE LIMITS TO SURFACE WATER
(page 1 of 2)

Pollutant or Contaminant	Interim Discharge Limit[a,b]	Comments
Uranium[c] (total)	4,000 µg/L max. 2,000 µg/L avg.	Treatment system discharge shall meet the lowest concentrations achievable with the treatment methods currently in use and as appropriate for site conditions. Permit discharge reports indicate that uranium concentrations of less than 200 µg/L are achievable under current conditions.
Radium-226[c] (dissolved)	10 pCi/L max. 3 pCi/L avg.	Treatment system discharge shall meet the lowest concentrations achievable with the treatment methods currently in use and as appropriate for site conditions. Permit discharge reports indicate that dissolved radium-226 concentrations of less than 3 pCi/L are achievable under current conditions.
Radium-226[c] (total)	30 pCi/L max. 10 pCi/L avg.	Treatment system discharge shall meet the lowest concentrations achievable with the treatment methods currently in use and as appropriate for site conditions. Permit discharge reports indicate that total radium-226 concentrations of less than 3 pCi/L are achievable under current conditions.
Manganese (total)	10,000 µg/L max. 3,000 µg/L avg.	Treatment system discharge shall meet the lowest concentrations achievable with the treatment methods currently in use and as appropriate for site conditions. Permit discharge reports indicate that manganese concentrations of less than 1,500 mg/L are achievable under current conditions.
Copper[d] (total)	184 µg/L max. 126 µg/L avg.	Treatment system discharge shall meet the lowest concentrations achievable with the treatment methods currently in use and as appropriate for site conditions. Permit discharge reports indicate that copper concentrations of less than 20 µg/L are achievable under current conditions.
Cadmium[d] (total)	15 µg/L max. 10 µg/L avg.	Treatment system discharge shall meet the lowest concentrations achievable with the treatment methods currently in use and as appropriate for site conditions. Permit discharge reports indicate that cadmium concentrations of less than 4 µg/L are achievable under current conditions.
Zinc[c] (total)	1000 µg/L max. 500 µg/L avg.	Treatment system discharge shall meet the lowest concentrations achievable with the treatment methods currently in use and as appropriate for site conditions. Permit discharge reports indicate that zinc concentrations of less than 20 µg/L are achievable under current conditions.
pH[c]	6-9	
TSS[c]	30 mg/L max. 20 mg/L avg.	
COD[c]	200 mg/L max. 100 mg/L avg.	

COD chemical oxygen demand
TSS total suspended solids
µg/L micrograms per liter

TABLE 4-5

INTERIM DISCHARGE LIMITS TO SURFACE WATER
(page 2 of 2)

a Discharge limits are consistent with NPDES Permit WA-002527-1 and must not be exceeded. Treatment system discharge shall meet the lowest concentrations achievable with the treatment methods currently in use and as appropriate for site conditions.

b Monitoring of parameters shall continue per NPDES Permit WA-002572-1 until alternate monitoring plan is approved by EPA. Alternate plan may include monitoring per methods in 40 CFR 136 for whole effluent toxicity (WET), ammonia, temperature, DO, TDS, antimony, mercury, lead, iron, sulfate, and other parameters necessary to develop a future permit application. EPA may also require interim monitoring of COCs (aluminum, barium, beryllium, cobalt, lead, nickel, silver, lead-210, uranium-238, and uranium-234).

c NPDES permit limit based on technology-based effluent limit guidelines (ELGs) for uranium mines at 40 CFR 440.32 and 440.33.

d NPDES permit limit based on Washington State water quality standards at the time the permit was issued.

Source: *Midnite Mine Superfund Site Record of Decision* (EPA, 2006)

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TABLE 5-1

ANTICIPATED DESIGN PLANS, DESIGN DRAWINGS, AND DESIGN SUBMITTAL CONTENT
MIDNITE MINE SUPERFUND SITE
(page 1 of 6)

REMEDIAL DESIGN COMPONENT	30 % DESIGN SUBMITTAL	60 % DESIGN SUBMITTAL	90 % DESIGN SUBMITTAL	100 % DESIGN SUBMITTAL
REMEDIAL DESIGN PLANS				
Health and Safety Plan	Annotated Outline	Draft	Draft Final	Final
Substantive Environmental Compliance Documentation	Preliminary List of Known or Anticipated	Draft	Draft Final	Final
Tribal Access/Right-of-Way Documentation	Preliminary List of Known or Anticipated	Updated status and documentation	Updated status and documentation	Updated status and documentation
Stormwater Management Plan (SWMP)	Annotated Outline	Draft	Draft Final	Final
Operations Maintenance and Monitoring Plan (OMMP)	Annotated Outline	Draft	Draft Final	Final
Site-Wide Monitoring Plan (SMP)	Annotated Outline	Draft	Draft Final	Final
Staging/Temporary Stockpiling Plan	Annotated Outline	Draft	Draft Final	Final
Confirmation Sampling and RA Effectiveness Monitoring Plan	Annotated Outline	Draft	Draft Final	Final
Water Source Identification and Development Plan	Annotated Outline	Draft	Draft Final	Final
REMEDIAL DESIGN SPECIFICATIONS	**30 % DESIGN SUBMITTAL**	**60 % DESIGN SUBMITTAL**	**90 % DESIGN SUBMITTAL**	**100 % DESIGN SUBMITTAL**
Specifications (working list to be identified in 30% submittal)	Annotated Outline	Draft	Draft Final	Final
REMEDIAL DESIGN DRAWINGS	**30 % DESIGN SUBMITTAL**	**60 % DESIGN SUBMITTAL**	**90 % DESIGN SUBMITTAL**	**100 % DESIGN SUBMITTAL**
SECTION 1 – GENERAL				
Cover Sheet	•	•	•	•
Index of Drawings	•	•	•	•
General Notes & Acronyms	•	•	•	•
Site Location, Principal Site Features and Survey Control	•	•	•	•
Remedial Components	•	•	•	•

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TABLE 5-1

ANTICIPATED DESIGN PLANS, DESIGN DRAWINGS, AND DESIGN SUBMITTAL CONTENT
MIDNITE MINE SUPERFUND SITE
(page 2 of 6)

REMEDIAL DESIGN COMPONENT	30 % DESIGN SUBMITTAL	60 % DESIGN SUBMITTAL	90 % DESIGN SUBMITTAL	100 % DESIGN SUBMITTAL
SECTION 2 – CONSTRUCTION SUPPORT FACILITIES				
Construction Facilities Layout	•	•	•	•
Material Screening, Stockpile and Laydown Areas	•	•	•	•
Fuel and Maintenance Areas	•	•	•	•
Vehicle Decontamination Facilities Plan	•	•	•	•
Vehicle Decontamination Facilities Details		•	•	•
Construction Water Loadout Areas	•	•	•	•
Construction Roads Plan and Profile		•	•	•
Construction Road Details		•	•	•
SECTION 3 – BORROW AREA				
Borrow Source Location Map	•	•	•	•
Rhoads Property Access Road	•	•	•	•
Rhoads Property Borrow Development Plan		•	•	•
Mill Site Borrow Development Plan		•	•	•
Rhoads Property Reclamation Plan		•	•	•
Mill Site Borrow Area Reclamation Plan		•	•	•
SECTION 4 – MINE WASTE EXCAVATION				
Mine Waste Location Map	•	•	•	•
Phase 1 - Above-Grade Mine Waste Excavation and Final Grading	•	•	•	•
Phase 2 - Contaminated Soil and Sediment Excavation and Final Grading	•	•	•	•
Phase 3 - Mine Drainage Sediments Excavation and Final Grading	•	•	•	•
Phase 4 - Mine Road Materials Excavation and Final Grading	•	•	•	•
Phase 5 - Blue Creek Delta Excavation		•	•	•
Details		•	•	•
SECTION 5 – SURFACE WATER AND SEDIMENT CONTROLS				
Site Drainage Basin Plan	•	•	•	•
Phase 1 – Above-Ground Mine Waste Excavation Surface Water Control Plan	•	•	•	•
Phase 1 - Diversion Ditch Plan and Profile	•	•	•	•
Phase 1 - Diversion Ditch Sections		•	•	•
Phase 1 - Diversion Ditch Details		•	•	•
Phase 1 - Surface Water Retention Basin Plan	•	•	•	•

TABLE 5-1

ANTICIPATED DESIGN PLANS, DESIGN DRAWINGS, AND DESIGN SUBMITTAL CONTENT
MIDNITE MINE SUPERFUND SITE
(page 3 of 6)

REMEDIAL DESIGN COMPONENT	30 % DESIGN SUBMITTAL	60 % DESIGN SUBMITTAL	90 % DESIGN SUBMITTAL	100 % DESIGN SUBMITTAL
SECTION 5 – SURFACE WATER AND SEDIMENT CONTROLS (continued)				
Phase 1 - Surface Water Retention Basin Sections		•	•	•
Phase 1 - Surface Water Retention Basin Details		•	•	•
Phase 2 – Contaminated Soil and Sediment Excavation Surface Water Control Plan	•	•	•	•
Phase 2 - Diversion Ditch Plan and Profile	•	•	•	•
Phase 2 - Diversion Ditch Sections		•	•	•
Phase 2 - Diversion Ditch Details		•	•	•
Phase 2 - Surface Water Retention Basin Plan	•	•	•	•
Phase 2 - Surface Water Retention Basin Sections		•	•	•
Phase 2 - Surface Water Retention Basin Details		•	•	•
Phase 3 – Mine Drainage Sediment Excavation Surface Water Control Plan	•	•	•	•
Phase 3 - Diversion Ditch Plan and Profile	•	•	•	•
Phase 3 - Diversion Ditch Sections		•	•	•
Phase 3 - Diversion Ditch Details		•	•	•
Phase 3 - Surface Water Retention Basin Plan	•	•	•	•
Phase 3 - Surface Water Retention Basin Sections		•	•	•
Phase 3 - Surface Water Retention Basin Details		•	•	•
Final Reclaimed Surface Water Management Plan	•	•	•	•
Final Diversion Ditch Plan and Profile	•	•	•	•
Final Diversion Ditch Sections		•	•	•
Final Diversion Ditch Details		•	•	•
Final Surface Water Detention Pond Plan	•	•	•	•
Final Surface Water Detention Pond Sections		•	•	•
Final Surface Water Detention Pond Details		•	•	•
Best Management Practices	•	•	•	•
SECTION 6 – STORAGE PONDS				
Storage Pond General Layout	•	•	•	•
Phase II South Storage Pond – Plan	•	•	•	•
Phase II South Storage Pond–Profiles and Sections	•	•	•	•
Phase II South Storage Pond – Details		•	•	•

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TABLE 5-1

ANTICIPATED DESIGN PLANS, DESIGN DRAWINGS, AND DESIGN SUBMITTAL CONTENT
MIDNITE MINE SUPERFUND SITE
(page 4 of 6)

REMEDIAL DESIGN COMPONENT	30 % DESIGN SUBMITTAL	60 % DESIGN SUBMITTAL	90 % DESIGN SUBMITTAL	100 % DESIGN SUBMITTAL
SECTION 6 – STORAGE PONDS (continued)				
Phase III Storage Pond – Plan View	•	•	•	•
Phase III Storage Pond- Sections and Embankment Profile	•	•	•	•
Phase III Storage Pond – Details		•	•	•
Eastern Drainage Storage Pond - Plan	•	•	•	•
Eastern Drainage Storage Pond – Embankment Profile and Sections	•	•	•	•
SECTION 7 –PIT 4 MINE WASTE CONTAINMENT				
Rockfall Protection Plan		•	•	•
Rockfall Protection Details		•	•	•
Pit Dewatering Plan (Sumps, drains, wells, lines)	•	•	•	•
Pit Liner Installation Plan and Sections	•	•	•	•
Pit 4 Regraded Surface – Cover Subgrade	•	•	•	•
Pit 4 Reclamation Surface – Top of Cover	•	•	•	•
Pit 4 Cross Section	•	•	•	•
Details		•	•	•
SECTION 8 –PIT 3 MINE WASTE CONTAINMENT				
Rockfall Protection Plan		•	•	•
Rockfall Protection Details		•	•	•
Pit Dewatering Plan (Sumps, drains, wells, lines)	•	•	•	•
Pit Liner Installation Plan and Sections	•	•	•	•
Pit 3 Regraded Surface – Cover Subgrade	•	•	•	•
Pit 3 Reclamation Surface – Top of Cover	•	•	•	•
Pit 3 Cross Section	•	•	•	•
Details		•	•	•
SECTION 9 –BACKFILLED PIT AREA MINE WASTE CONTAINMENT				
Pit Dewatering Plan (Sumps, drains, wells, lines)	•	•	•	•
Regraded Surface - Cover Subgrade	•	•	•	•
Reclamation Surface – Top of Cover	•	•	•	•
Cross Section and Details		•	•	•
SECTION 10 – GROUNDWATER CONTROLS				
Cut-off Trench Plan and Profile		•	•	•
Trench Details		•	•	•

TABLE 5-1

ANTICIPATED DESIGN PLANS, DESIGN DRAWINGS, AND DESIGN SUBMITTAL CONTENT
MIDNITE MINE SUPERFUND SITE
(page 5 of 6)

REMEDIAL DESIGN COMPONENT	30 % DESIGN SUBMITTAL	60 % DESIGN SUBMITTAL	90 % DESIGN SUBMITTAL	100 % DESIGN SUBMITTAL
SECTION 11 – DEMOLITION				
West Drainage Facilities and Water Treatment Plant Existing Layout	•	•	•	•
Demolition Sequence		•	•	•
Demolition Cross Sections		•	•	•
Demolition Details		•	•	•
Location of Demolition Debris within the Pit Backfill				
SECTION 12 – WATER TREATMENT PLANT				
General				
Cover Sheet	•	•	•	•
Location Map, Vicinity Map, and Index of Drawings	•	•	•	•
Standard Symbols	•	•	•	•
Standard Abbreviations	•	•	•	•
Hydraulic Profile		•	•	•
Process Flow Schematic	•	•	•	•
Civil				
General Notes and Symbols		•	•	•
Site Control Data		•	•	•
Site Key Plan		•	•	•
Yard Piping Plan	•	•	•	•
Blue Creek Outfall Pipe Alignment Plan		•	•	•
Lake Roosevelt Outfall Diffuser Plan		•	•	•
Architectural				
Architectural Design Criteria		•	•	•
Floor Plan	•	•	•	•
Roof Plan		•	•	•
Building Section N-S		•	•	•
Building Section E-W		•	•	•
Structural				
Structural Design Criteria	•	•	•	•
Foundation Plan	•	•	•	•
Floor Plan	•	•	•	•
Process Mechanical				
Piping Schedule		•	•	•

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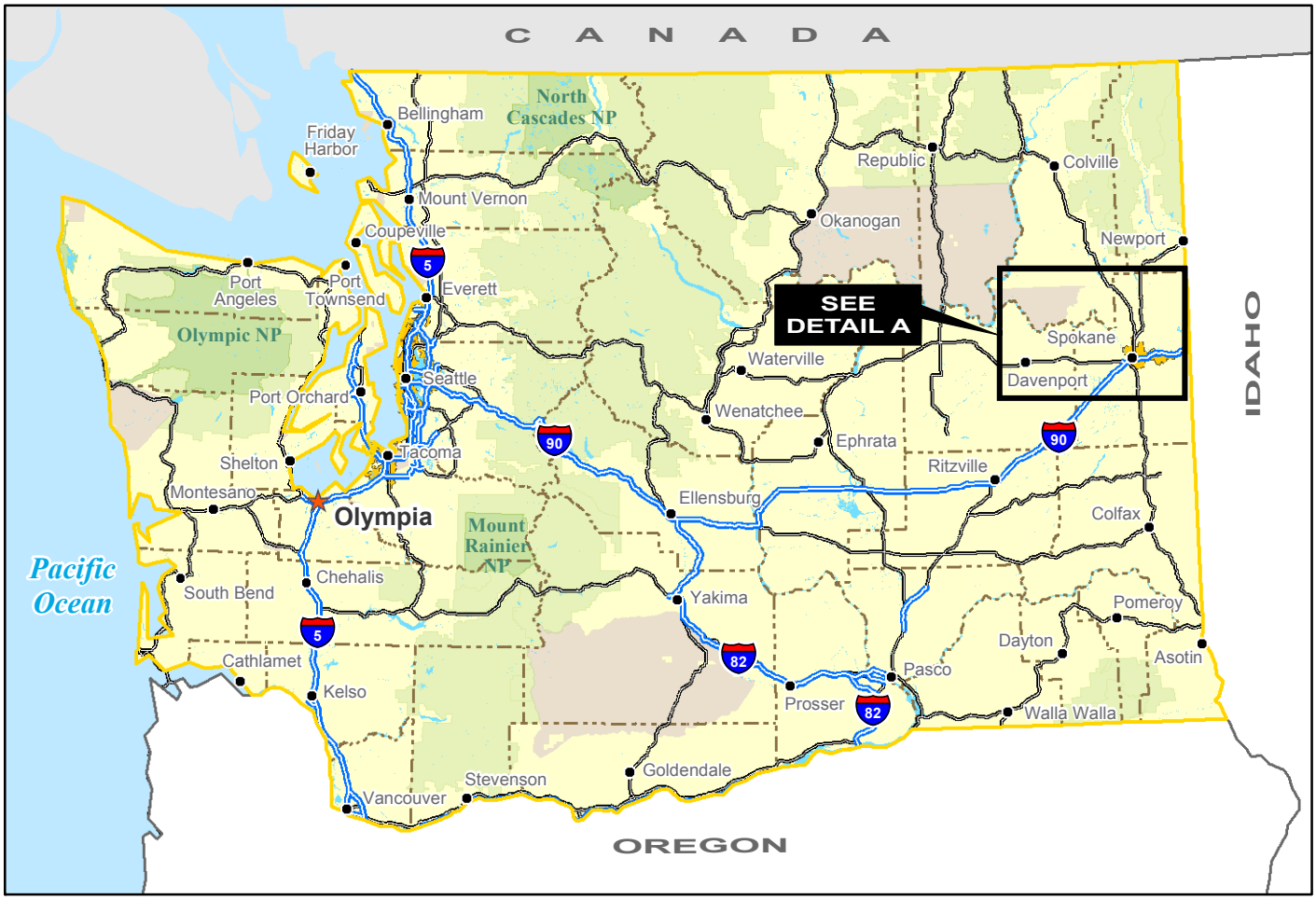
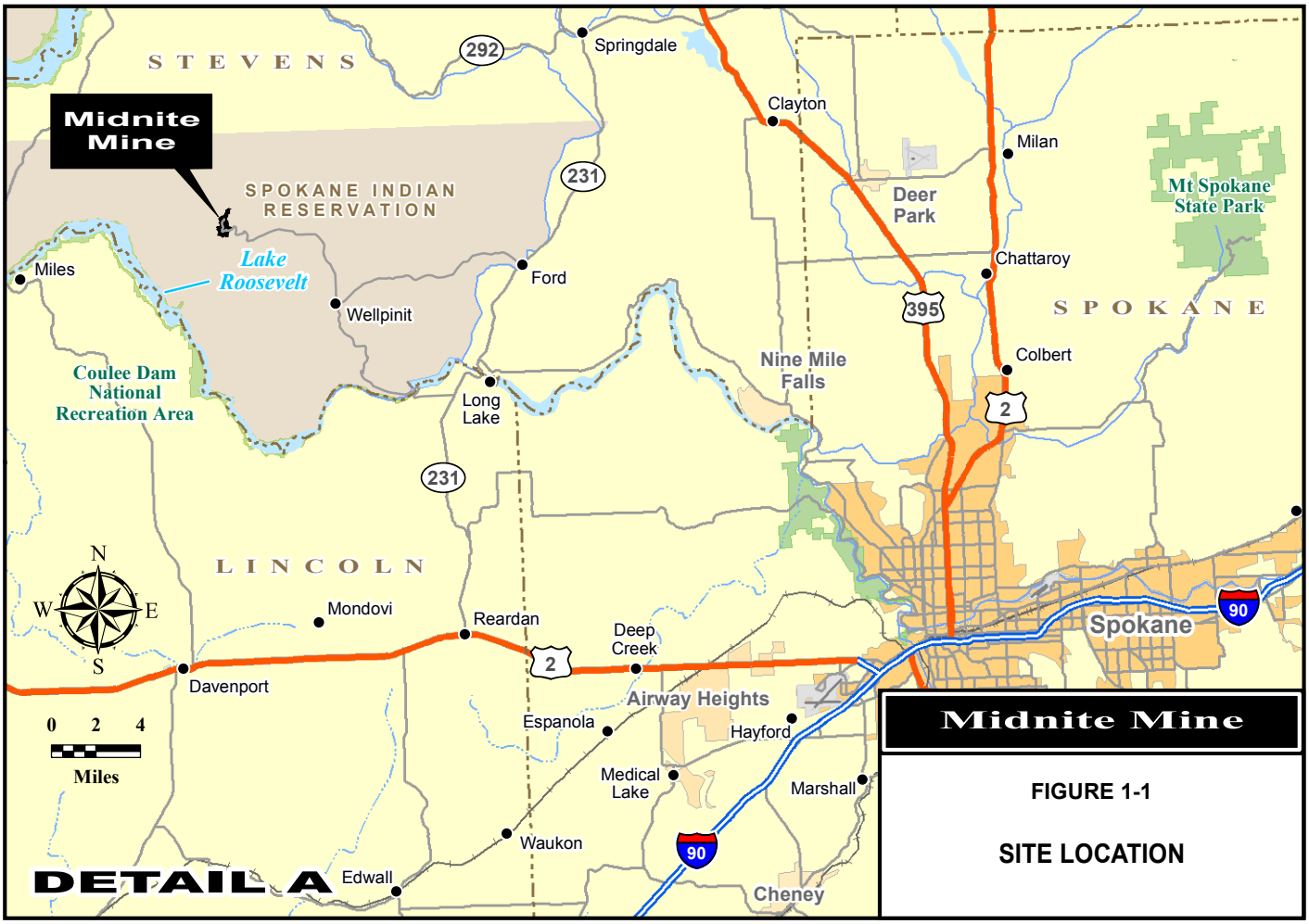
TABLE 5-1

ANTICIPATED DESIGN PLANS, DESIGN DRAWINGS, AND DESIGN SUBMITTAL CONTENT
MIDNITE MINE SUPERFUND SITE
(page 6 of 6)

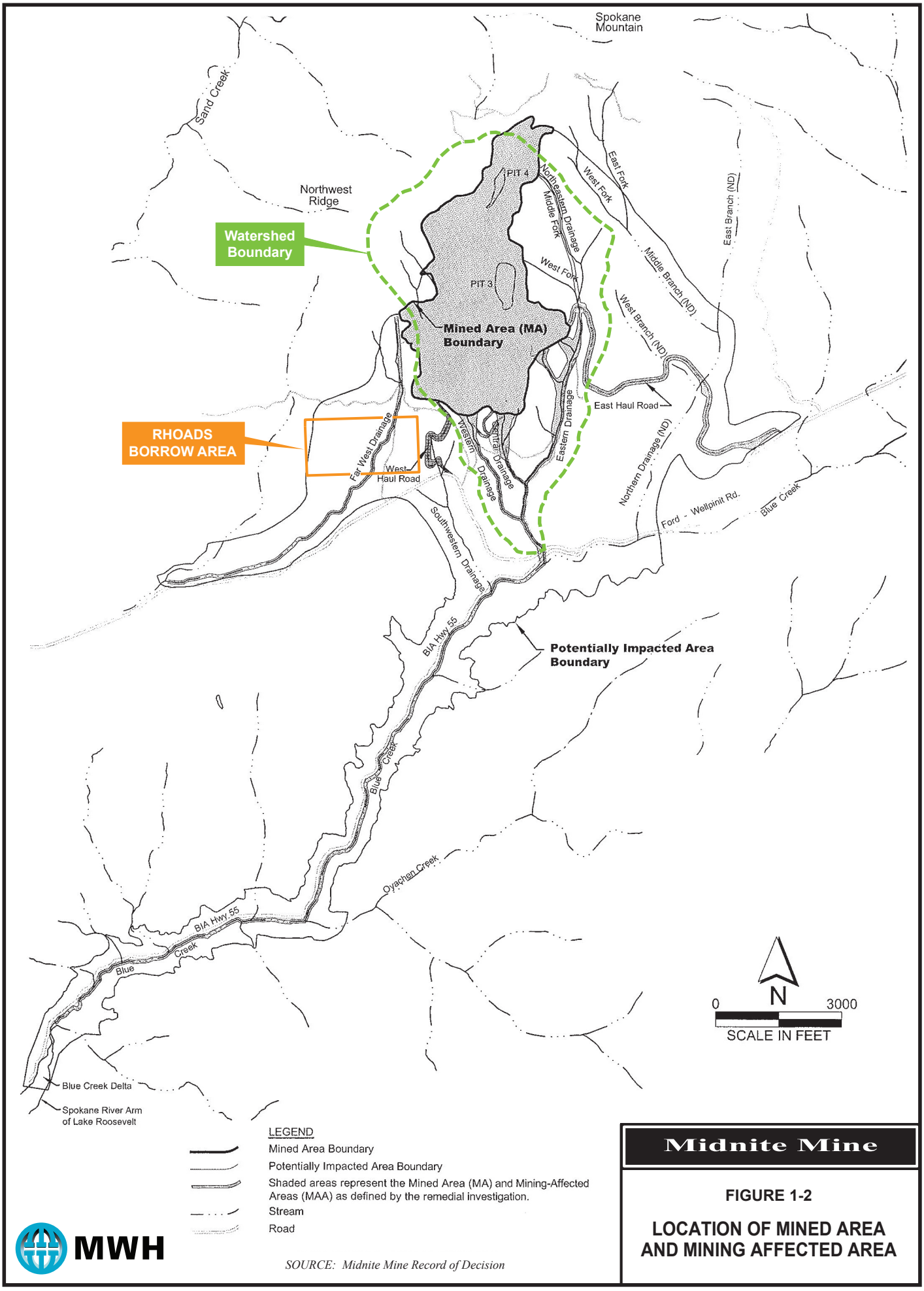
REMEDIAL DESIGN COMPONENT	30 % DESIGN SUBMITTAL	60 % DESIGN SUBMITTAL	90 % DESIGN SUBMITTAL	100 % DESIGN SUBMITTAL
Process Mechanical (continued)				
Equipment Schedule		•	•	•
Process Mechanical Floor Plan	•	•	•	•
Chemical Storage and Delivery Systems	•	•	•	•
Ion Exchange System	•	•	•	•
Lime Softening Reactor/Clarifiers	•	•	•	•
Granular Media Filters	•	•	•	•
Sludge Dewatering System	•	•	•	•
HVAC				
Equipment Schedules		•	•	•
HVAC Floor Plan		•	•	•
Electrical				
Yard Power and Lighting Plan		•	•	•
Single Line Diagram		•	•	•
WTP Building Power and Lighting Plan		•	•	•
Instrumentation and Controls				
Lime Feed and Control System P&ID	•	•	•	•
Hypochlorite Feed and Control System P&ID	•	•	•	•
Barium Chloride Feed and Control System P&ID	•	•	•	•
Miscellaneous Chemical Feed P&ID	•	•	•	•
Ion Exchange System P&ID	•	•	•	•
Lime Precipitation P&ID	•	•	•	•
Granular Media Filtration P&ID	•	•	•	•
Solids Dewatering System P&ID	•	•	•	•

FIGURES





FILE Fig 1-1_Midnite Mine_Site Location_8x11.mxd 21May2012



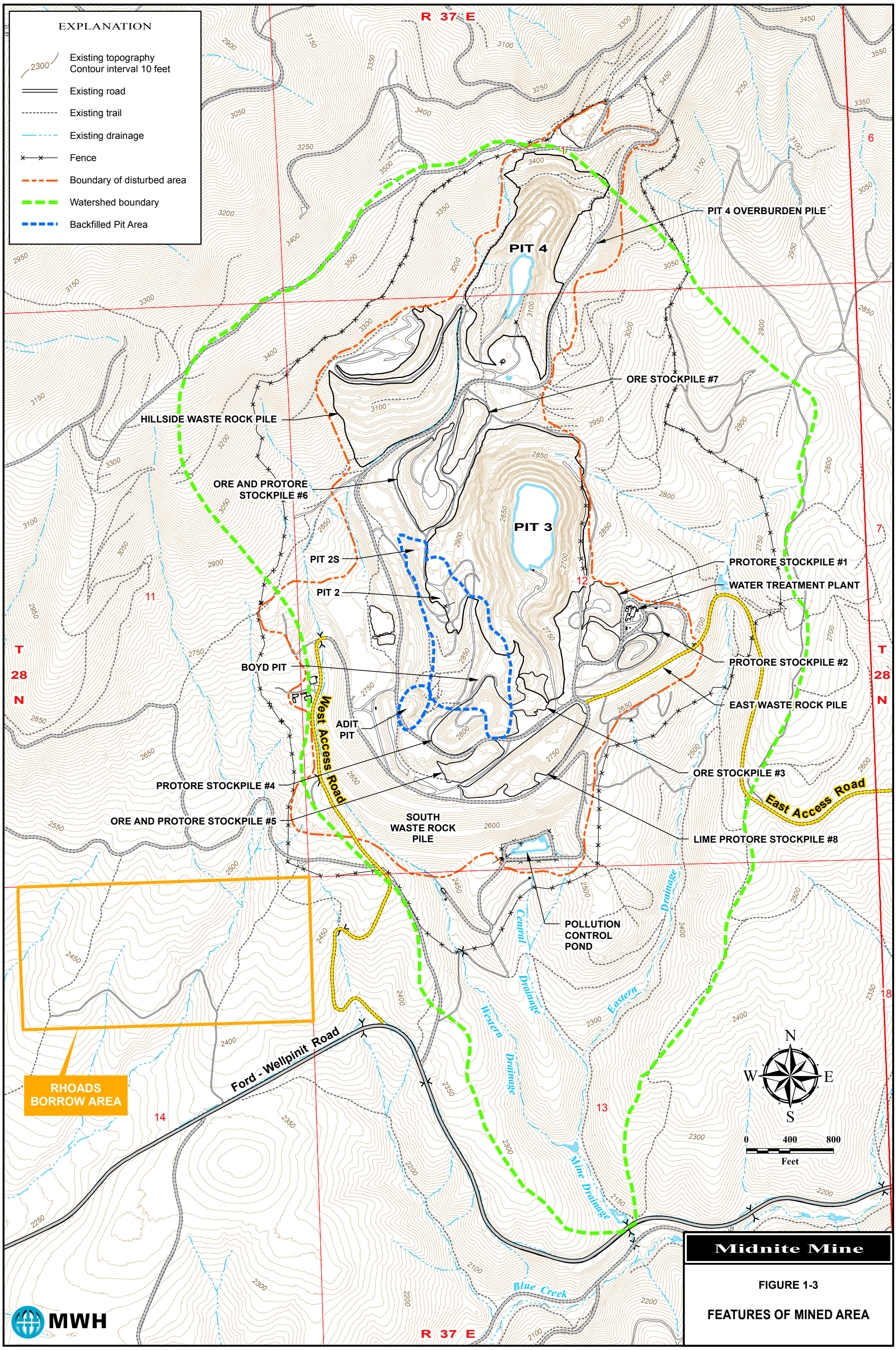
Midnite Mine

FIGURE 1-2

LOCATION OF MINED AREA AND MINING AFFECTED AREA

FILE: Fig 1-2_Location of Mined Area and Mining Affected Area.ai 21May2012

FILE *Fig 1-3_Features of Mined Area_May2012.mxd* 23 May 2012



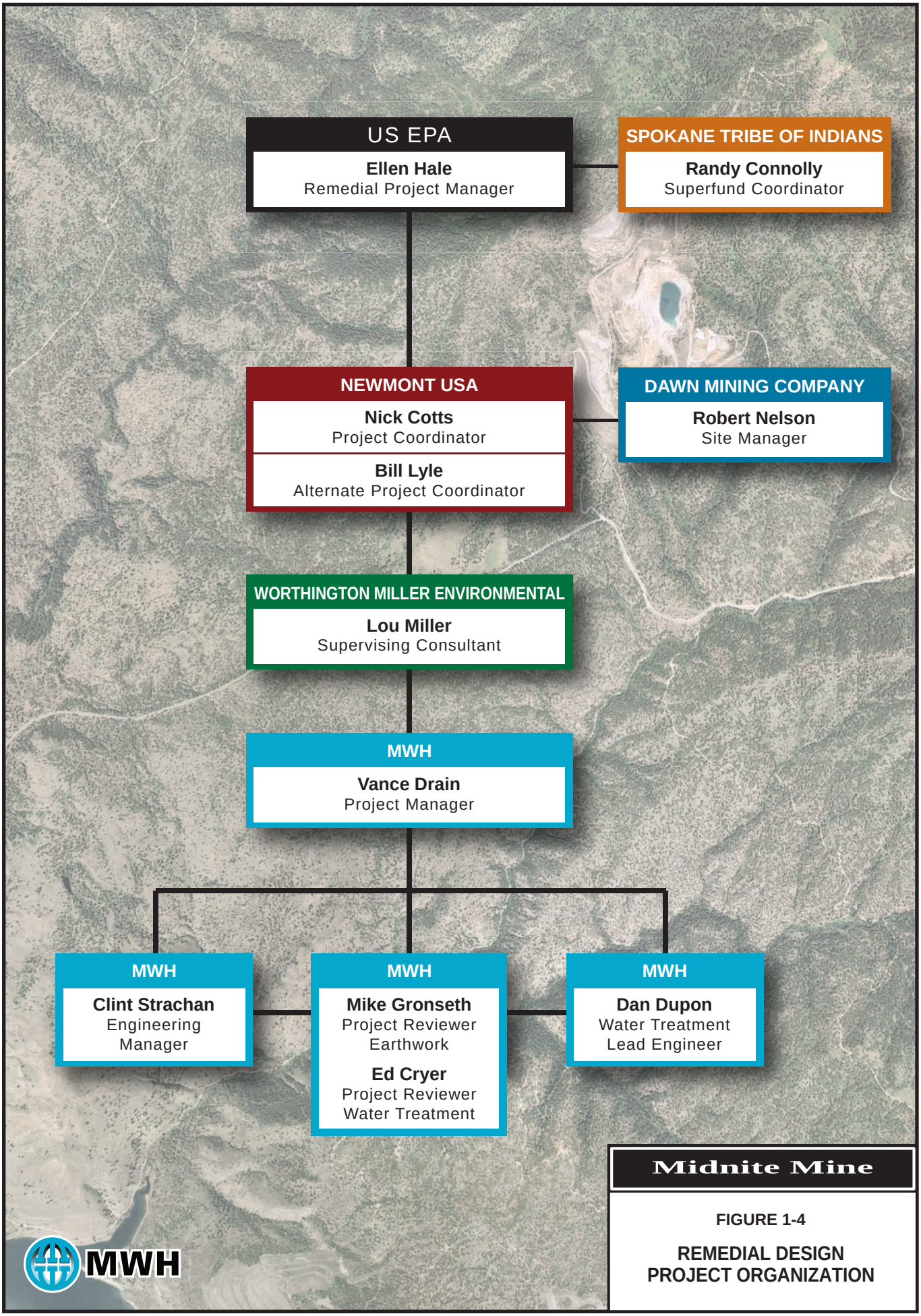
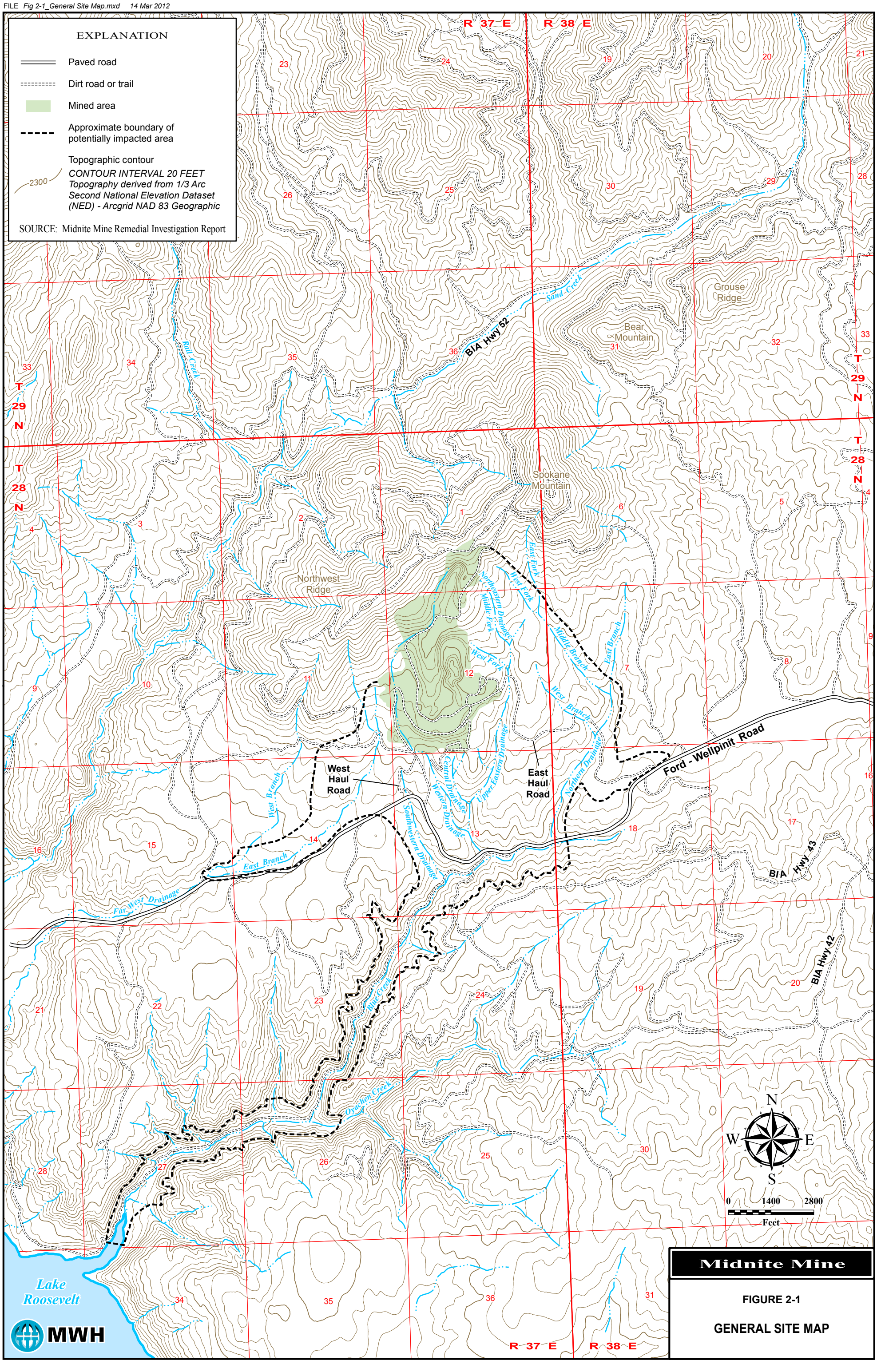


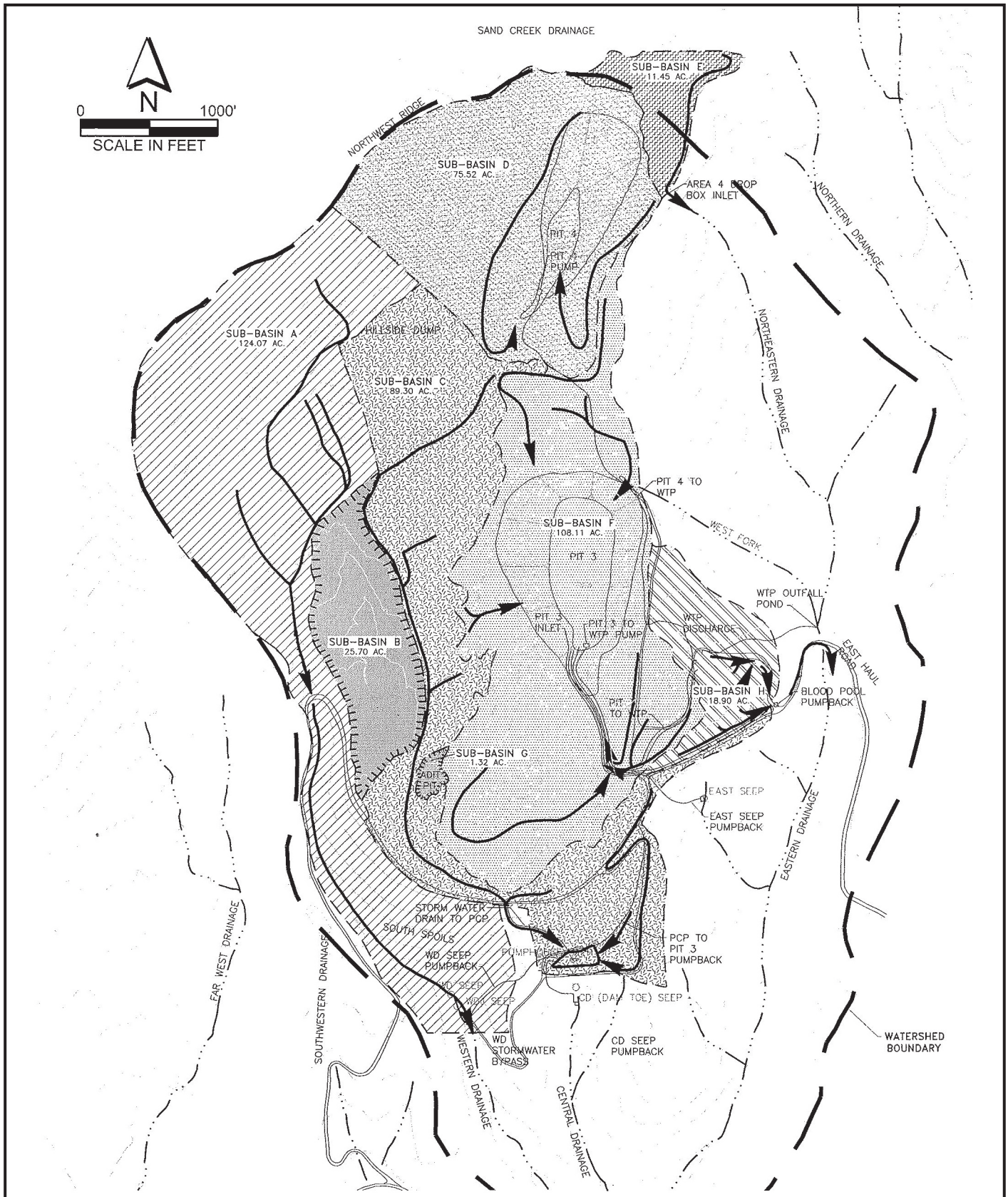
FIGURE 1-4

REMEDIAL DESIGN PROJECT ORGANIZATION

FILE Fig 1-4_Remedial Design Project Org.ai 23 May 2012

FILE *Fig 2-1_General Site Map.mxd* *14 Mar 2012*





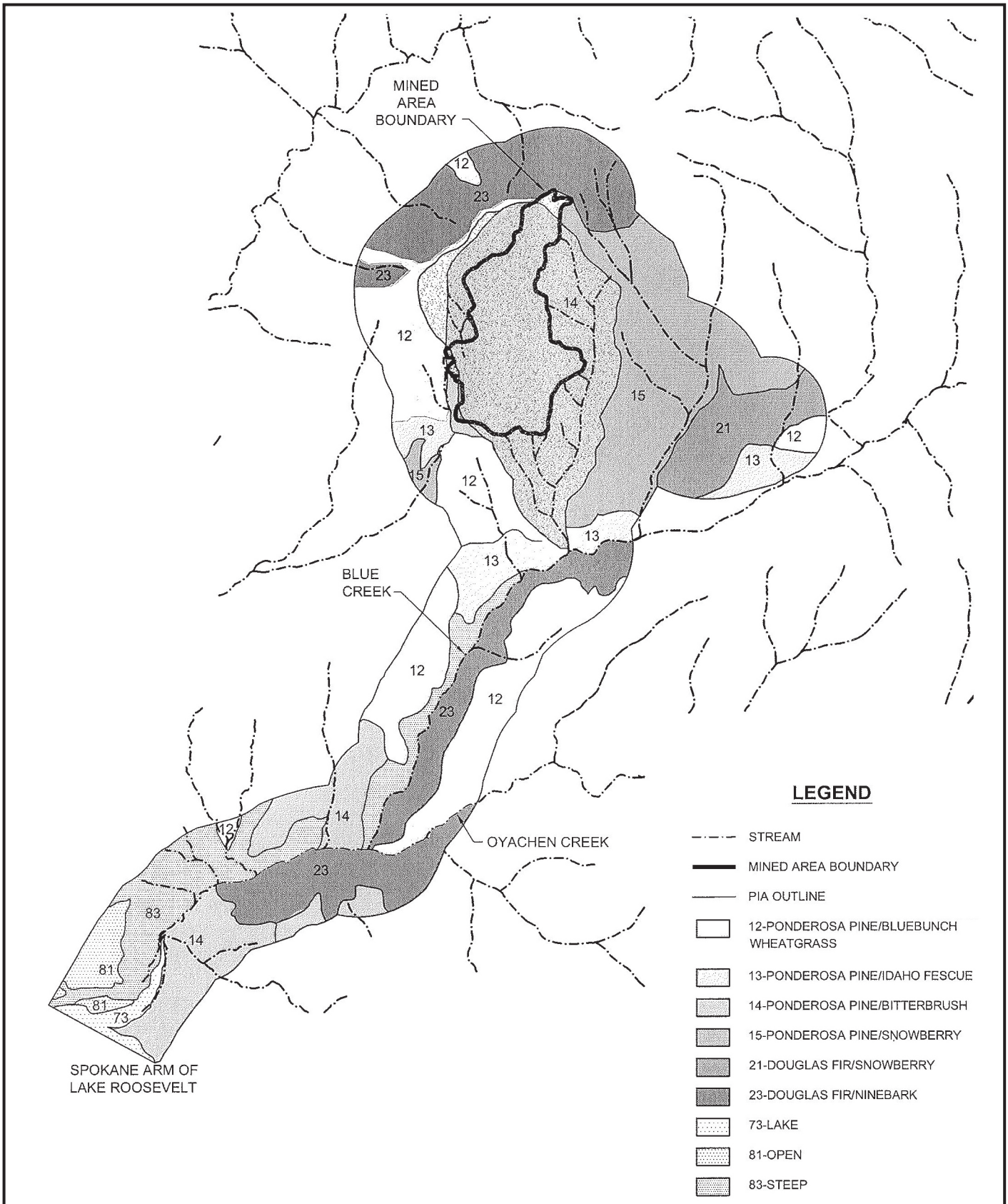
Midnite Mine

FIGURE 2-2

HYDROLOGIC BASINS

MWH

SOURCE: Midnite Mine Record of Decision



SOURCE: *Midnite Mine Record of Decision*

MWH

Midnite Mine

FIGURE 2-3

HABITAT AREAS

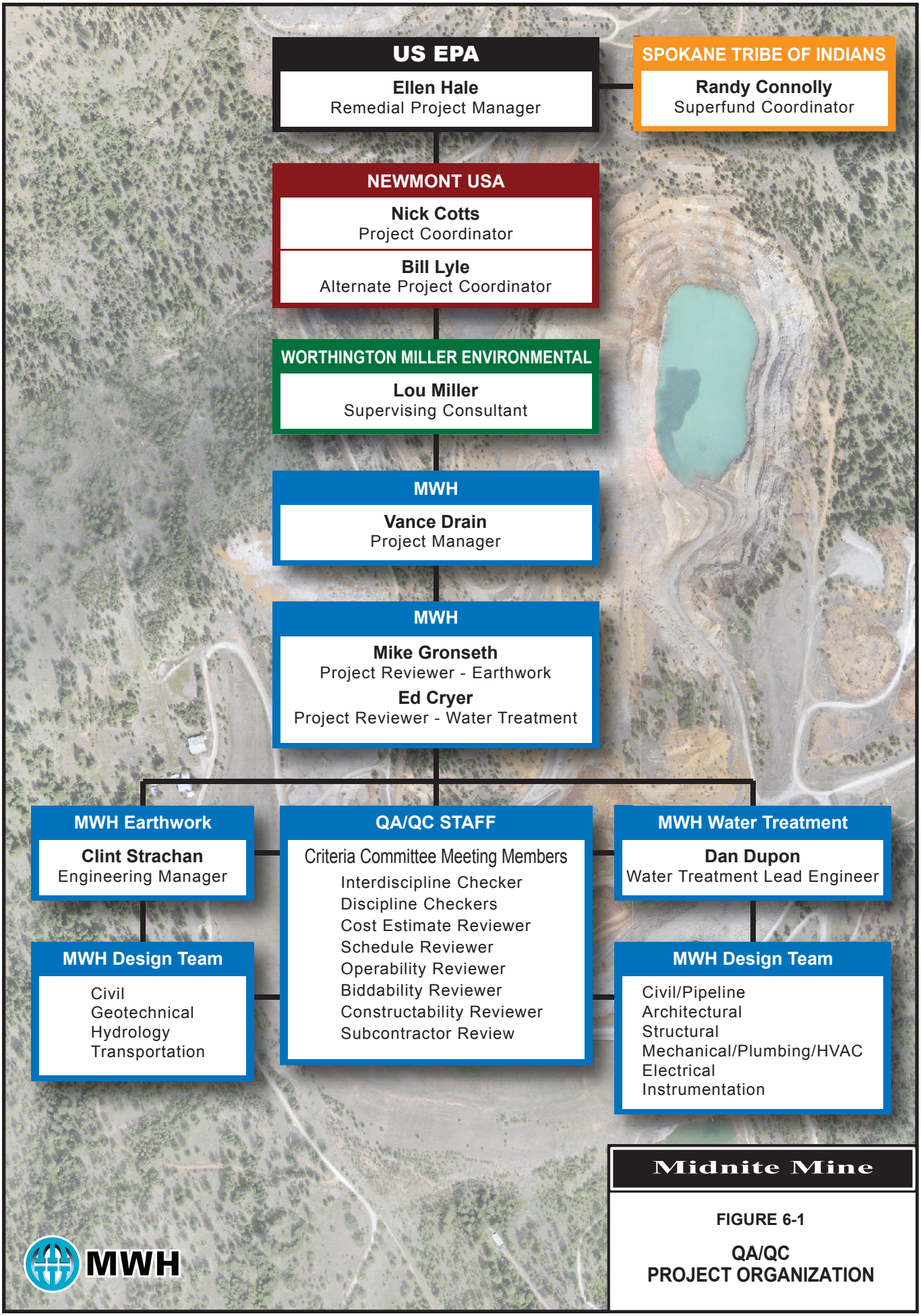
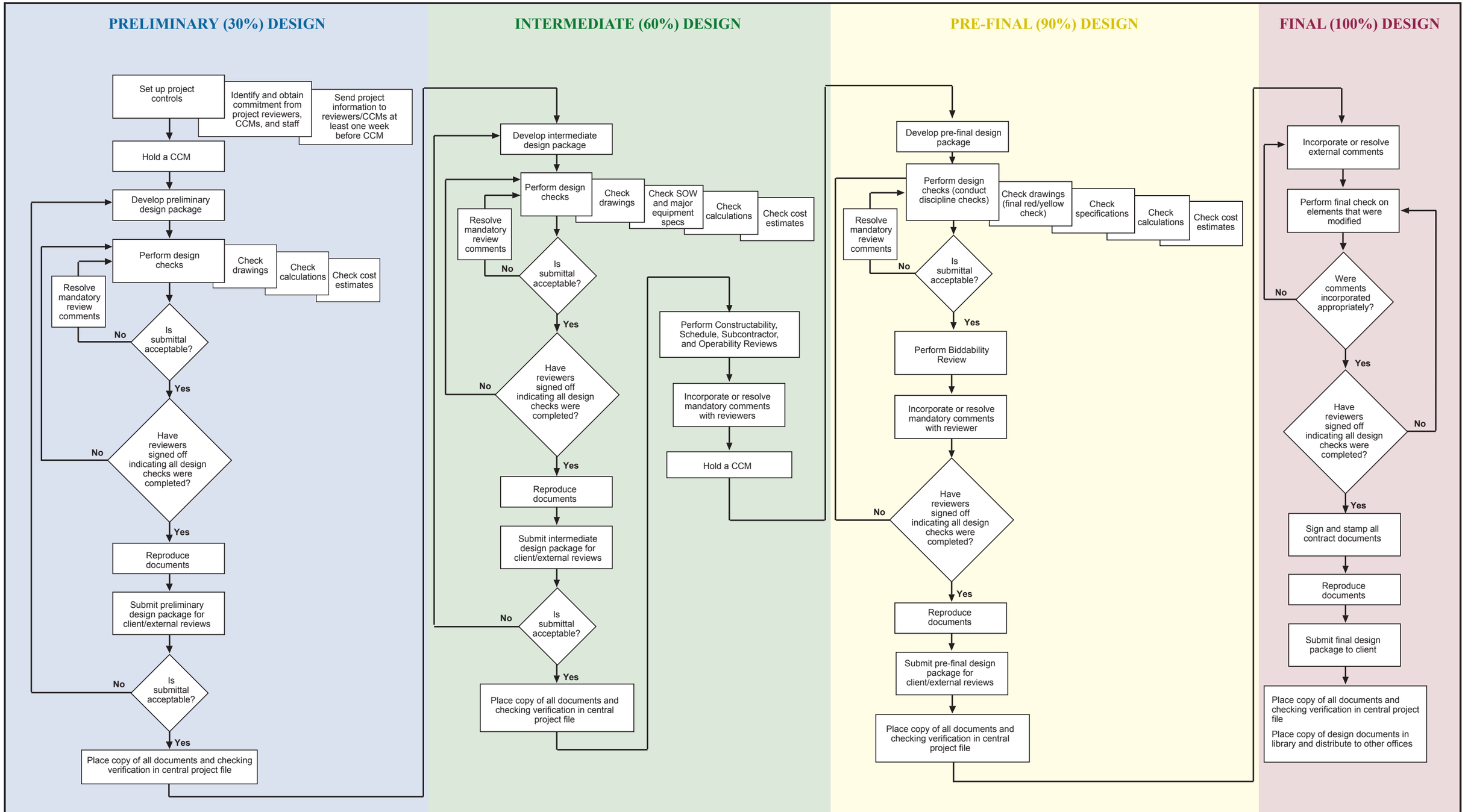


FIGURE 6-1

QA/QC
PROJECT ORGANIZATION

FILE Fig 6-1 QA_QC Project Org.ai 23 May 2012



CCM Criteria committee meeting

SOW Summary of work specifications

MWH

Midnite Mine

FIGURE 6-2

QA/QC PROCESS

FILE *Fig 6-2 QA_QC Process.ai* *19Feb2012*

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Figure 7-1a from Midnite Mine Remedial Design Work Plan, Revision 1

Region 10
1200 Sixth Ave.
Seattle, WA 98101

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Figure 7-1a from Midnite Mine Remedial Design Work Plan, Revision 1

Region 10
1200 Sixth Ave.
Seattle, WA 98101

FIGURE 7-1a DRAFT MIDNITE MINE REMEDIAL DESIGN / REMEDIAL ACTION SCHEDULE - SUMMARY

ID	Task Name	Working Days (5days/week)	Start	Finish
1	CONSENT DECREE SIGNING AND EFFECTIVE DATES THROUGH PROJECT END	5446 days	Fri 12/4/09	Fri 10/18/30
2	Signing of the Consent Decree (CD)	0 days	Fri 9/30/11	Fri 9/30/11
3	Comment Period for the CD/legal review	78 days	Fri 9/30/11	Tue 1/17/12
4	Effective Date (ED) of the CD	0 days	Tue 1/17/12	Tue 1/17/12
5				
6	REMEDIAL DESIGN WORK PLAN (draft WP due 60 days after the CD effective date)	173 days	Wed 1/18/12	Fri 9/14/12
7	Draft Remedial Design Work Plan - Rev 0	73 days	Wed 1/18/12	Fri 4/27/12
14	Draft Final Remedial Design Work Plan - Rev 1 and RTCs	50 days	Mon 4/30/12	Fri 7/6/12
21	Final Remedial Design Work Plan - Rev 2 and RTCs	50 days	Mon 7/9/12	Fri 9/14/12
28				
29	INSTITUTIONAL CONTROLS IMPLEMENTATION AND ASSURANCE PLAN (ICIAP) - (draft plan due 120 days after the CD effective date)	216 days	Wed 1/18/12	Wed 11/14/12
30	Prepare Draft ICIAP- Rev 0	116 days	Wed 1/18/12	Wed 6/27/12
35	Prepare revised Draft Final ICIAP- Rev 1 and RTCs	50 days	Thu 6/28/12	Wed 9/5/12
40	Prepare revised Final ICIAP- Rev 2 and RTCs	50 days	Thu 9/6/12	Wed 11/14/12
44				
45	PRE-DESIGN INVESTIGATION DATA NEEDS PHASE I RD/RA REPORTS/PLANS for the MIDNITE MINE REMEDY (COMPLETED)	570 days	Fri 12/4/09	Thu 2/9/12
46	Blue Creek/Blue Creek Delta Sediment Characterization Technical Memorandum	342 days	Thu 12/31/09	Mon 4/25/11
51	Interim Mechanisms - Construction Completion Report	570 days	Fri 12/4/09	Thu 2/9/12
55	Surveys and Field Reconnaissance Design Investigation Report	32 days	Fri 8/6/10	Tue 9/21/10
58	Geologic Investigation of Pits and Assessment of Pit Sediments Report	31 days	Fri 4/29/11	Mon 6/13/11
61	Surface Water Design Investigation Report - Rev 1	21 days	Mon 5/16/11	Tue 6/14/11
64	Site Access Roads Design Investigations Report - Rev 1	52 days	Mon 5/9/11	Wed 7/20/11
68	Borrow Source Investigation Report	20 days	Fri 5/6/11	Fri 6/3/11
71	Rhoads Property Investigation Work Plan	16 days	Mon 6/20/11	Tue 7/12/11
75	Rhoads Property Borrow Investigations Phase II Technical Memorandum	27 days	Wed 10/26/11	Fri 12/2/11
79	Groundwater Design Investigation Report - Midnite Mine Remedial Design	2 days	Thu 6/9/11	Mon 6/13/11
82	Submitted Midnite Mine Western Drainage Alluvial Wells Testing Plan	51 days	Fri 7/8/11	Mon 9/19/11
85	Mine Waste Investigation Report	57 days	Fri 2/11/11	Tue 5/3/11
90	Phase I RD/RA Operation, Monitoring, and Maintenance Plan (OM&M Plan) and Performance Monitoring Plan (PMP)	314 days	Tue 4/6/10	Mon 6/20/11
95				
96	ON GOING DATA NEEDS INVESTIGATIONS w/ REPORTS- 2011 and out	1576 days	Fri 12/4/09	Fri 12/18/15
97	Assessment of Interim Mechanisms Technical Memorandum	166 days	Wed 3/30/11	Thu 11/17/11
106	Evaluation of Supplemental RD Data Needs Report	597 days	Fri 12/4/09	Mon 3/19/12
116	Blue Creek and Delta Assessment Work Plan (no EPA comments)	273 days	Wed 8/10/11	Fri 8/24/12
132	Storage Pond Data Gap Investigations/Report	290 days	Wed 6/1/11	Tue 7/10/12
148	Supplemental Hillside Waste Rock Pile Data Gap Investigations/Report	402 days	Mon 6/20/11	Tue 1/1/13
171	Water Treatment Plant - Work Plan for Additional Pilot-Scale Testing of Uranium Removal using Anionic Exchange Resins (IX) and Report in 2012	298 days	Mon 11/28/11	Wed 1/16/13
196	Rockfall Hazard Technical Memo, Investigations and Reporting	698 days	Mon 10/24/11	Wed 6/25/14
214	NPDES Investigation and Permit Application Completion	1259 days	Tue 2/22/11	Fri 12/18/15
215	Current NPDES Permit Activities	458 days	Tue 2/22/11	Thu 11/22/12
224	Additional WTP Effluent Sampling	365 days	Mon 1/2/12	Fri 5/24/13
246	Prepare NPDES Permit Modification Application	730 days	Mon 3/4/13	Fri 12/18/15
257	Supplemental Pit Seep Monitoring	175 days	Mon 1/2/12	Fri 8/31/12
281				
282	REMEDIAL DESIGN PHASES- MIDNITE MINE REMEDY	560 days	Thu 6/21/12	Wed 8/13/14
283	PRELIMINARY 30% DESIGN PACKAGE - MIDNITE MINE REMEDY	130 days	Thu 6/21/12	Wed 12/19/12
284	Earthworks Design Drawings - 30% DESIGN	130 days	Thu 6/21/12	Wed 12/19/12
299	Water Treatment Plant, Effluent Pipeline, and Outfall Pipe/Diffuser Drawings - 30% DESIGN	130 days	Thu 6/21/12	Wed 12/19/12
309	Basis of Design Report - 30% DESIGN CALCULATIONS/ANALYSES	130 days	Thu 6/21/12	Wed 12/19/12
329	Other Named Plans - 30% DESIGN SUBMITTAL	130 days	Thu 6/21/12	Wed 12/19/12
338	EPA/Tribe Review of 30% Design submittal- Drawings, Plans, and Basis of Design Report	90 days	Thu 12/20/12	Wed 4/24/13
343				
344	60% DESIGN PACKAGE -MIDNITE MINE REMEDY	60 days	Thu 4/25/13	Wed 7/17/13
345	Prepare RTCs to 30% EPA Design Comments and Meeting	20 days	Thu 4/25/13	Wed 5/22/13
348	Prepare 60% Design Drawings - revisions and additions	60 days	Thu 4/25/13	Wed 7/17/13
363	Basis of Design Report - 60% CALCULATIONS/ANALYSES	60 days	Thu 4/25/13	Wed 7/17/13
369	Other Named Plans - 60% DESIGN SUBMITTAL/REVISIONS	60 days	Thu 4/25/13	Wed 7/17/13
378	Draft Site-Wide Monitoring Plan (QAPP / FSP / HSP)	60 days	Thu 4/25/13	Wed 7/17/13
383	EPA/Tribe Review of 60% Design submittal- Drawings, Plans, Basis of Design Report and Draft SMP	60 days	Thu 7/18/13	Wed 10/9/13
388				
389	PREFINAL (90%) DESIGN PACKAGE - MIDNITE MINE REMEDY	80 days	Thu 10/10/13	Wed 1/29/14
390	Prepare RTCs to 60% EPA Design Comments and Meeting	20 days	Thu 10/10/13	Wed 11/6/13
393	Prepare 90% Design Drawings - Revisions and Additions	60 days	Thu 10/10/13	Wed 1/1/14
406	Basis of Design Report - 90% CALCULATIONS/ANALYSES	60 days	Thu 10/10/13	Wed 1/1/14
412	Other Named Plans - 90% DESIGN SUBMITTAL/REVISIONS	60 days	Thu 10/10/13	Wed 1/1/14
421	Final Site-Wide Monitoring Plan (QAPP / FSP / HSP) and EPA Approval	80 days	Thu 10/10/13	Wed 1/29/14
427	EPA/Tribe Review of 90% Design submittal- Drawings, Plans, and Basis of Design Report	60 days	Thu 1/2/14	Wed 3/26/14
432				
433	FINAL (100%) DESIGN PACKAGE - MIDNITE MINE REMEDY	40 days	Thu 3/27/14	Wed 5/21/14
434	Prepare RTCs to 90% EPA Design Comments and Meeting	20 days	Thu 3/27/14	Wed 4/23/14
437	Prepare 100% Design Drawings - revisions and additions	40 days	Thu 3/27/14	Wed 5/21/14
450	Basis of Design Report - 100% CALCULATIONS/ANALYSES	40 days	Thu 3/27/14	Wed 5/21/14
456	OTHER NAMED PLANS - 100% DESIGN SUBMITTAL/REVISIONS	40 days	Thu 3/27/14	Wed 5/21/14
465	EPA/Tribe Review/Approval of 100% Design submittal- Drawings, Plans, and Basis of Design Report	60 days	Thu 5/22/14	Wed 8/13/14
470				
471	REMEDIAL ACTION WORK PLAN (RAWP) AND CONSTRUCTION QUALITY ASSURANCE PLAN (CQAP) - Starts at 90% design stage	170 days	Thu 3/27/14	Wed 11/19/14
472	Draft RAWP AND CQAP- Rev 0	40 days	Thu 3/27/14	Wed 5/21/14
477	EPA Reviews Draft RAWP and CQAP - Rev 0	30 days	Thu 5/22/14	Wed 7/2/14
480	Draft Final RAWP AND CQAP- Rev 1	30 days	Thu 7/3/14	Wed 8/13/14
485	EPA Reviews Draft Final RAWP and CQAP - Rev 1	30 days	Thu 8/14/14	Wed 9/24/14
488	Final RAWP AND CQAP- Rev 2	30 days	Thu 9/25/14	Wed 11/5/14
493	EPA Reviews and Approves Final RAWP and CQAP - Rev 2	10 days	Thu 11/6/14	Wed 11/19/14
496				
497	REMEDIAL ACTION (CONSTRUCTION) - MIDNITE MINE REMEDY	2809 days	Thu 3/27/14	Tue 12/31/24
498	PRE-CONSTRUCTION TASKS (STARTS AT 90% DESIGN)	245 days	Thu 3/27/14	Wed 3/4/15
499	Procurement Process	160 days	Thu 3/27/14	Wed 11/5/14
509	Development of Water Supply Source	245 days	Thu 3/27/14	Wed 3/4/15
512	MOBILIZATION AND STARTUP OF TASK CONSTRUCTION - YEAR 1	289 days	Thu 11/20/14	Tue 12/29/15
513	Contractor Mobilization and Setup	30 days	Thu 11/20/14	Wed 12/31/14
514	Midnite Mine Construction General Startup Tasks	45 days	Thu 1/1/15	Wed 3/4/15
518	Rhoads (Whitetail) Borrow Area Initial Development	195 days	Thu 3/5/15	Wed 12/2/15
521	Pit 4 Reclamation Startup Tasks	196 days	Wed 3/4/15	Wed 12/2/15
536	Backfilled Pits Area (BPA) Remediation Tasks	195 days	Wed 3/4/15	Tue 12/1/15
545	Site-Wide Monitoring Plan (SMP) Trip and Data Reports (assume 3 per construction season)	215 days	Wed 3/4/15	Tue 12/29/15
555	Weekly Construction Reports	240 days	Thu 1/1/15	Wed 12/2/15
557	Engineering Change Notices (as necessary)	240 days	Thu 1/1/15	Wed 12/2/15
559	Periodic Inspections	240 days	Thu 1/1/15	Wed 12/2/15
561	Monthly Reports	240 days	Thu 1/1/15	Wed 12/2/15
563	Completion of Water Treatment Plant and Pipeline/Diffuser Design (60%, 90%, 100% Submittals)	290 days	Mon 12/21/15	Fri 1/27/17
606				
607	MIDNITE MINE REMEDY CONSTRUCTION - YEAR 2	215 days	Wed 3/2/16	Tue 12/27/16
608	General Site Tasks	200 days	Wed 3/2/16	Tue 12/6/16
614	Pit 4 Reclamation Tasks (Continued)	200 days	Wed 3/2/16	Tue 12/6/16
620	SMP Trip and Data Reports (assume 3 per construction season)	215 days	Wed 3/2/16	Tue 12/27/16
630	Weekly Construction Reports	200 days	Wed 3/2/16	Tue 12/6/16
632	Engineering Change Notices (as necessary)	200 days	Wed 3/2/16	Tue 12/6/16
634	Periodic Inspections	200 days	Wed 3/2/16	Tue 12/6/16
636	Monthly Reports	200 days	Wed 3/2/16	Tue 12/6/16
638				
639	MIDNITE MINE REMEDY CONSTRUCTION - YEAR 3	215 days	Wed 3/1/17	Tue 12/26/17
640	General Site Tasks	200 days	Wed 3/1/17	Tue 12/5/17
646	Pit 4 Reclamation Tasks (Continued)	200 days	Wed 3/1/17	Tue 12/5/17
649	Construction/Startup of New Water Treatment Plant (WTP)	195 days	Wed 3/1/17	Tue 11/28/17
652	Construction of Discharge Pipeline to Lake Roosevelt	195 days	Wed 3/1/17	Tue 11/28/17
656	SMP Trip and Data Reports (assume 3 per construction season)	215 days	Wed 3/1/17	Tue 12/26/17
666	Weekly Construction Reports	195 days	Wed 3/1/17	Tue 11/28/17
668	Engineering Change Notices (as necessary)	195 days	Wed 3/1/17	Tue 11/28/17
670	Periodic Inspections	195 days	Wed 3/1/17	Tue 11/28/17
672	Monthly Reports	195 days	Wed 3/1/17	Tue 11/28/17
674	Completion of Final Design for Pit 3 (60%, 90% and Final Design) - based on lessons learned from Pit 4	260 days	Wed 11/29/17	Tue 11/27/18
716				
717	MIDNITE MINE REMEDY CONSTRUCTION - YEAR 4	263 days	Fri 3/2/18	Tue 3/5/19
718	General Site Tasks	195 days	Fri 3/2/18	Thu 11/29/18
726	Decommission/Demolition of Existing (Old) WTP	195 days	Fri 3/2/18	Thu 11/29/18
729	Pit 4 Reclamation Tasks (Completed this year)	195 days	Fri 3/2/18	Thu 11/29/18
735	Water Storage Pond Construction - Phase II South Storage Pond	195 days	Fri 3/2/18	Thu 11/29/18
740	Pit 3 Startup Tasks	68 days	Fri 11/30/18	Tue 3/5/19
743	SMP Trip and Data Reports (assume 3 per construction season)	215 days	Fri 3/2/18	Thu 12/27/18
753	Weekly Construction Reports	195 days	Fri 3/2/18	Thu 11/29/18
755	Engineering Change Notices (as necessary)	195 days	Fri 3/2/18	Thu 11/29/18
757	Periodic Inspections	195 days	Fri 3/2/18	Thu 11/29/18
759	Monthly Reports	195 days	Fri 3/2/18	Thu 11/29/18
761				
762	MIDNITE MINE REMEDY CONSTRUCTION - YEAR 5	215 days	Tue 3/5/19	Mon 12/30/19
763	General Site Tasks	195 days	Tue 3/5/19	Mon 12/2/19
769	Pit 3 Reclamation Tasks	195 days	Wed 3/6/19	Tue 12/3/19
777	SMP Trip and Data Reports (assume 3 per construction season)	215 days	Tue 3/5/19	Mon 12/30/19
787	Weekly Construction Reports	195 days	Tue 3/5/19	Mon 12/2/19
789	Engineering Change Notices (as necessary)	195 days	Tue 3/5/19	Mon 12/2/19
791	Periodic Inspections	195 days	Tue 3/5/19	Mon 12/2/19
793	Monthly Reports	195 days	Tue 3/5/19	Mon 12/2/19
795				
796	MIDNITE MINE REMEDY CONSTRUCTION - YEAR 6	215 days	Wed 3/4/20	Tue 12/29/20
797	General Site Tasks	195 days	Wed 3/4/20	Tue 12/1/20
801	Pit 3 Reclamation Tasks (Continued)	195 days	Wed 3/4/20	Tue 12/1/20
809	SMP Trip and Data Reports (assume 3 per construction season)	215 days	Wed 3/4/20	Tue 12/29/20
819	Weekly Construction Reports	195 days	Wed 3/4/20	Tue 12/1/20
821	Engineering Change Notices (as necessary)	195 days	Wed 3/4/20	Tue 12/1/20
823	Periodic Inspections	195 days	Wed 3/4/20	Tue 12/1/20
825	Monthly Reports	195 days	Wed 3/4/20	Tue 12/1/20
827				
828	MIDNITE MINE REMEDY CONSTRUCTION - YEAR 7	215 days	Thu 3/4/21	Wed 12/29/21

Project: Midnite Mine Remedial Design (
Date: Wed 3/14/12

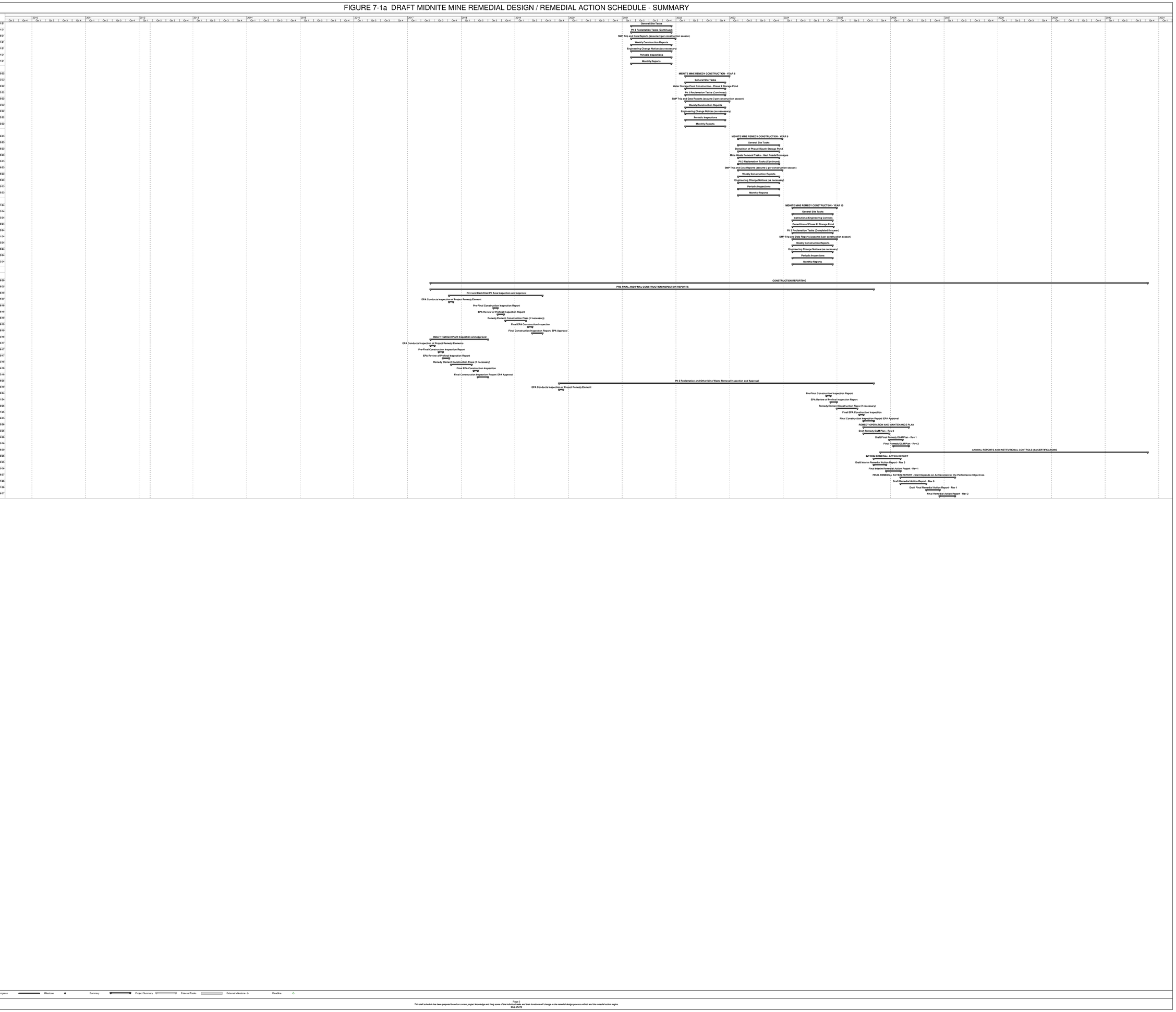
Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

This draft schedule has been prepared based on current project knowledge and likely some of the individual tasks and their durations will change as the remedial design process unfolds and the remedial action begins.

Wed 3/14/12

FIGURE 7-1a DRAFT MIDNITE MINE REMEDIAL DESIGN / REMEDIAL ACTION SCHEDULE - SUMMARY

ID	Task Name	Working Days (5days/week)	Start	Finish
829	General Site Tasks	195 days	Thu 3/4/21	Wed 12/1/21
833	Pit 3 Reclamation Tasks (Continued)	195 days	Thu 3/4/21	Wed 12/1/21
837	SMP Trip and Data Reports (assume 3 per construction season)	215 days	Thu 3/4/21	Wed 12/29/21
847	Weekly Construction Reports	195 days	Thu 3/4/21	Wed 12/1/21
849	Engineering Change Notices (as necessary)	195 days	Thu 3/4/21	Wed 12/1/21
851	Periodic Inspections	195 days	Thu 3/4/21	Wed 12/1/21
853	Monthly Reports	195 days	Thu 3/4/21	Wed 12/1/21
855				
856	MIDNITE MINE REMEDY CONSTRUCTION - YEAR 8	215 days	Mon 3/7/22	Fri 12/30/22
857	General Site Tasks	195 days	Mon 3/7/22	Fri 12/2/22
861	Water Storage Pond Construction - Phase III Storage Pond	195 days	Mon 3/7/22	Fri 12/2/22
866	Pit 3 Reclamation Tasks (Continued)	195 days	Mon 3/7/22	Fri 12/2/22
870	SMP Trip and Data Reports (assume 3 per construction season)	215 days	Mon 3/7/22	Fri 12/30/22
880	Weekly Construction Reports	195 days	Mon 3/7/22	Fri 12/2/22
882	Engineering Change Notices (as necessary)	195 days	Mon 3/7/22	Fri 12/2/22
884	Periodic Inspections	195 days	Mon 3/7/22	Fri 12/2/22
886	Monthly Reports	195 days	Mon 3/7/22	Fri 12/2/22
888				
889	MIDNITE MINE REMEDY CONSTRUCTION - YEAR 9	215 days	Wed 3/1/23	Tue 12/26/23
890	General Site Tasks	200 days	Wed 3/1/23	Tue 12/5/23
894	Demolition of Phase II South Storage Pond	200 days	Wed 3/1/23	Tue 12/5/23
897	Mine Waste Removal Tasks - Haul Roads/Drainages	200 days	Wed 3/1/23	Tue 12/5/23
900	Pit 3 Reclamation Tasks (Continued)	200 days	Wed 3/1/23	Tue 12/5/23
904	SMP Trip and Data Reports (assume 3 per construction season)	215 days	Wed 3/1/23	Tue 12/26/23
914	Weekly Construction Reports	200 days	Wed 3/1/23	Tue 12/5/23
916	Engineering Change Notices (as necessary)	200 days	Wed 3/1/23	Tue 12/5/23
918	Periodic Inspections	200 days	Wed 3/1/23	Tue 12/5/23
920	Monthly Reports	200 days	Wed 3/1/23	Tue 12/5/23
922				
923	MIDNITE MINE REMEDY CONSTRUCTION - YEAR 10	215 days	Wed 3/6/24	Tue 12/31/24
924	General Site Tasks	195 days	Wed 3/6/24	Tue 12/3/24
928	Institutional/Engineering Controls	195 days	Wed 3/6/24	Tue 12/3/24
930	Demolition of Phase III Storage Pond	200 days	Wed 3/6/24	Tue 12/10/24
933	Pit 3 Reclamation Tasks (Completed this year)	195 days	Wed 3/6/24	Tue 12/3/24
939	SMP Trip and Data Reports (assume 3 per construction season)	215 days	Wed 3/6/24	Tue 12/31/24
949	Weekly Construction Reports	195 days	Wed 3/6/24	Tue 12/3/24
951	Engineering Change Notices (as necessary)	195 days	Wed 3/6/24	Tue 12/3/24
953	Periodic Inspections	195 days	Wed 3/6/24	Tue 12/3/24
955	Monthly Reports	195 days	Wed 3/6/24	Tue 12/3/24
957				
958				
959	CONSTRUCTION REPORTING	3488 days	Wed 6/7/17	Fri 10/18/30
960	PRE-FINAL AND FINAL CONSTRUCTION INSPECTION REPORTS	2155 days	Wed 6/7/17	Tue 9/9/25
961	Pit 4 and Backfilled Pit Area Inspection and Approval	654 days	Wed 10/11/17	Mon 7/8/19
962	EPA Conducts Inspection of Project Remedy Element	20 days	Wed 10/11/17	Tue 11/7/17
965	Pre-Final Construction Inspection Report	20 days	Fri 8/10/18	Thu 9/6/18
968	EPA Review of Prefinal Inspection Report	30 days	Fri 9/7/18	Thu 10/18/18
971	Remedy Element Construction Fixes (if necessary)	100 days	Tue 10/30/18	Mon 3/18/19
974	Final EPA Construction Inspection	20 days	Mon 4/1/19	Mon 4/29/19
976	Final Construction Inspection Report/ EPA Approval	30 days	Tue 4/30/19	Mon 7/8/19
983	Water Treatment Plant Inspection and Approval	390 days	Wed 6/7/17	Tue 7/3/18
984	EPA Conducts Inspection of Project Remedy Elements	20 days	Wed 6/7/17	Tue 7/4/17
987	Pre-Final Construction Inspection Report	20 days	Wed 8/2/17	Tue 8/29/17
990	EPA Review of Prefinal Inspection Report	30 days	Wed 8/30/17	Tue 10/10/17
993	Remedy Element Construction Fixes (if necessary)	100 days	Wed 10/25/17	Tue 3/13/18
996	Final EPA Construction Inspection	20 days	Tue 3/27/18	Tue 4/24/18
1000	Final Construction Inspection Report/ EPA Approval	30 days	Wed 4/25/18	Tue 7/3/18
1003	Pit 3 Reclamation and Other Mine Waste Removal Inspection and Approval	1530 days	Wed 10/30/19	Tue 9/9/25
1006	EPA Conducts Inspection of Project Remedy Element	20 days	Wed 10/30/19	Tue 11/26/19
1009	Pre-Final Construction Inspection Report	20 days	Wed 10/23/24	Tue 11/19/24
1012	EPA Review of Prefinal Inspection Report	30 days	Wed 11/20/24	Tue 12/31/24
1015	Remedy Element Construction Fixes (if necessary)	100 days	Wed 1/1/25	Tue 5/20/25
1018	Final EPA Construction Inspection	20 days	Tue 6/3/25	Tue 7/1/25
1022	Final Construction Inspection Report/ EPA Approval	30 days	Wed 7/2/25	Tue 8/9/25
1027	REMEDY OPERATION AND MAINTENANCE PLAN	220 days	Wed 7/3/25	Tue 5/5/26
1028	Draft Remedy O&M Plan - Rev 0	125 days	Wed 7/3/25	Tue 12/23/25
1033	Draft Final Remedy O&M Plan - Rev 1	65 days	Wed 12/24/25	Tue 3/24/26
1038	Final Remedy O&M Plan - Rev 2	75 days	Wed 1/21/26	Tue 5/5/26
1043	ANNUAL REPORTS AND INSTITUTIONAL CONTROLS (IC) CERTIFICATIONS	1300 days	Fri 10/24/25	Fri 10/18/30
1050	INTERIM REMEDIAL ACTION REPORT	130 days	Wed 9/10/25	Tue 3/10/26
1051	Draft Interim Remedial Action Report - Rev 0	60 days	Wed 9/10/25	Tue 12/2/25
1056	Final Interim Remedial Action Report - Rev 1	70 days	Wed 12/3/25	Tue 3/10/26
1063	FINAL REMEDIAL ACTION REPORT - Start Depends on Achievement of the Performance Objectives	265 days	Wed 3/11/26	Tue 3/16/27
1064	Draft Remedial Action Report - Rev 0	125 days	Wed 3/11/26	Tue 9/1/26
1069	Draft Final Remedial Action Report - Rev 1	65 days	Wed 9/2/26	Tue 12/1/26
1074	Final Remedial Action Report - Rev 2	75 days	Wed 12/2/26	Tue 3/16/27



Project: Midnite Mine Remedial Design | Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline
Date: Wed 3/14/12

This draft schedule has been prepared based on current project knowledge and likely some of the individual tasks and their durations will change as the remedial design process unfolds and the remedial action begins.
Wed 3/14/12

FIGURE 7-1b DRAFT MIDNITE MINE REMEDIAL DESIGN / REMEDIAL ACTION SCHEDULE - DETAILED

ID	Task Name	Working Days (5days/week)	Start	Finish
1	**CONSENT DECREE SIGNING AND EFFECTIVE DATES THROUGH PROJECT END**	**5446 days**	**Fri 12/4/09**	**Fri 10/18/30**
2	Signing of the Consent Decree (CD)	0 days	Fri 9/30/11	Fri 9/30/11
3	Comment Period for the CD/legal review	78 days	Fri 9/30/11	Tue 1/17/12
4	Effective Date (ED) of the CD	0 days	Tue 1/17/12	Tue 1/17/12
5				
6	**REMEDIAL DESIGN WORK PLAN (draft WP due 60 days after the CD effective date)**	**173 days**	**Wed 1/18/12**	**Fri 9/14/12**
7	**Draft Remedial Design Work Plan - Rev 0**	**73 days**	**Wed 1/18/12**	**Fri 4/27/12**
8	Prepare Draft RD Work Plan	35 days	Wed 1/18/12	Tue 3/6/12
9	Submit Draft RD Work Plan for Internal Review	0 days	Tue 3/6/12	Tue 3/6/12
10	Internal Review Draft RD Work Plan	6 days	Wed 3/7/12	Fri 3/16/12
11	Submit Draft RD Work Plan to EPA	0 days	Fri 3/16/12	Fri 3/16/12
12	EPA Review Draft RD Work Plan	30 days	Mon 3/19/12	Fri 4/27/12
13	EPA Submits Comments to Newmont	0 days	Fri 4/27/12	Fri 4/27/12
14	**Draft Final Remedial Design Work Plan - Rev 1 and RTCs**	**50 days**	**Mon 4/30/12**	**Fri 7/6/12**
15	Prepare Draft Final RD Work Plan and RTCs	15 days	Mon 4/30/12	Fri 5/18/12
16	Submit Draft Final RD Work Plan and RTCs	0 days	Fri 5/18/12	Fri 5/18/12
17	Internal Review Draft Final RD Work Plan	5 days	Mon 5/21/12	Fri 5/25/12
18	Submit Draft Final RD Work Plan and RTCs to EPA	0 days	Fri 5/25/12	Fri 5/25/12
19	EPA Review Draft Final RD Work Plan and RTCs	30 days	Mon 5/28/12	Fri 7/6/12
20	EPA Submits Comments to Newmont	0 days	Fri 7/6/12	Fri 7/6/12
21	**Final Remedial Design Work Plan - Rev 2 and RTCs**	**50 days**	**Mon 7/9/12**	**Fri 9/14/12**
22	Prepare Final RD Work Plan and RTCs	15 days	Mon 7/9/12	Fri 7/27/12
23	Submit Final RD Work Plan and RTCs for Internal Review	0 days	Fri 7/27/12	Fri 7/27/12
24	Internal Review Final RD Work Plan	5 days	Mon 7/30/12	Fri 8/3/12
25	Submit Final RD Work Plan and RTCs to EPA	0 days	Fri 8/3/12	Fri 8/3/12
26	EPA Review Final RD Work Plan and RTCs	30 days	Mon 8/6/12	Fri 9/14/12
27	EPA Approval Final RD Work Plan	0 days	Fri 9/14/12	Fri 9/14/12
28				
29	**INSTITUTIONAL CONTROLS IMPLEMENTATION AND ASSURANCE PLAN (ICIAP) - (draft plan due 120 days after the CD effective date)**	**216 days**	**Wed 1/18/12**	**Wed 11/14/12**
30	**Prepare Draft ICIAP- Rev 0**	**116 days**	**Wed 1/18/12**	**Wed 6/27/12**
31	Prepare Draft ICIAP- Rev 0	86 days	Wed 1/18/12	Wed 5/16/12
32	Submit Draft ICIAP for EPA Review	0 days	Wed 5/16/12	Wed 5/16/12
33	EPA review Draft Plan	30 days	Thu 5/17/12	Wed 6/27/12
34	EPA submits comments to Newmont	0 days	Wed 6/27/12	Wed 6/27/12
35	**Prepare revised Draft Final ICIAP- Rev 1 and RTCs**	**50 days**	**Thu 6/28/12**	**Wed 9/5/12**
36	Prepare revised Draft Final ICIAP and RTCs	20 days	Thu 6/28/12	Wed 7/25/12
37	Submit Draft Final Plan- Rev 1 and RTCs	0 days	Wed 7/25/12	Wed 7/25/12
38	EPA review Draft Final Plan	30 days	Thu 7/26/12	Wed 9/5/12
39	EPA submits comments	0 days	Wed 9/5/12	Wed 9/5/12
40	**Prepare revised Final ICIAP- Rev 2 and RTCs**	**50 days**	**Thu 9/6/12**	**Wed 11/14/12**
41	Prepare revised Final ICIAP- Rev 2 and RTCs	20 days	Thu 9/6/12	Wed 10/3/12
42	EPA Reviews Final Plan	30 days	Thu 10/4/12	Wed 11/14/12
43	EPA Approves Final ICIAP- Rev 2	0 days	Wed 11/14/12	Wed 11/14/12
44				
45	**PRE-DESIGN INVESTIGATION DATA NEEDS PHASE I RD/RA REPORTS/PLANS for the MIDNITE MINE REMEDY (COMPLETED)**	**570 days**	**Fri 12/4/09**	**Thu 2/9/12**
46	**Blue Creek/Blue Creek Delta Sediment Characterization Technical Memorandum**	**342 days**	**Thu 12/31/09**	**Mon 4/25/11**
47	Submitted Draft Blue Creek/Blue Creek Delta Sediment Characterization Technical Memorandum to EPA	0 days	Thu 12/31/09	Thu 12/31/09
48	EPA provides comments on Blue Creek/ Blue Creek Delta Sediment TM	0 days	Fri 2/25/11	Fri 2/25/11
49	Submitted RTCs and a revised Blue Creek/ Blue Creek Delta Sediment TM	0 days	Thu 3/31/11	Thu 3/31/11
50	EPA approves TM for Blue Creek with conditions for the development of the Blue Creek Assessment program	0 days	Mon 4/25/11	Mon 4/25/11
51	**Interim Mechanisms - Construction Completion Report**	**570 days**	**Fri 12/4/09**	**Thu 2/9/12**
52	Conduct Interim Measures	520 days	Fri 12/4/09	Thu 12/1/11
53	Prepare Construction Complete Report	50 days	Fri 12/2/11	Thu 2/9/12
54	Submit Draft Construction Complete Report	0 days	Thu 2/9/12	Thu 2/9/12
55	**Surveys and Field Reconnaissance Design Investigation Report**	**32 days**	**Fri 8/6/10**	**Tue 9/21/10**
56	Prepared/Submitted Survey Design Investigation Report - Rev 0	0 days	Fri 8/6/10	Fri 8/6/10
57	Prepared and submitted an addendum to the original survey report	0 days	Tue 9/21/10	Tue 9/21/10
58	**Geologic Investigation of Pits and Assessment of Pit Sediments Report**	**31 days**	**Fri 4/29/11**	**Mon 6/13/11**
59	Submitted Rev 2 of this report	0 days	Fri 4/29/11	Fri 4/29/11
60	EPA Approves the report	0 days	Mon 6/13/11	Mon 6/13/11
61	**Surface Water Design Investigation Report - Rev 1**	**21 days**	**Mon 5/16/11**	**Tue 6/14/11**
62	Submit Rev 1 of this report	0 days	Mon 5/16/11	Mon 5/16/11
63	EPA Approval of report	0 days	Tue 6/14/11	Tue 6/14/11
64	**Site Access Roads Design Investigations Report - Rev 1**	**32 days**	**Mon 5/9/11**	**Wed 7/20/11**
65	Submit Site Access Roads Design Investigation Report - Rev 1	0 days	Mon 5/9/11	Mon 5/9/11
66	EPA Approves Site Access Roads Design Investigation Report	0 days	Fri 6/3/11	Fri 6/3/11
67	Tribe approval of Ligno	0 days	Wed 7/20/11	Wed 7/20/11
68	**Borrow Source Investigation Report**	**20 days**	**Fri 5/6/11**	**Fri 6/3/11**
69	Submitted Borrow Source Design Investigation Report - Rev 2	0 days	Fri 5/6/11	Fri 5/6/11
70	EPA Approves this report	0 days	Fri 6/3/11	Fri 6/3/11
71	**Rhoads Property Investigation Work Plan**	**16 days**	**Mon 6/20/11**	**Tue 7/12/11**
72	Submitted Phase II Investigation WP for Rhoads Property	0 days	Mon 6/20/11	Mon 6/20/11
73	Submitted a revised work plan (Rev 1) based on EPA comments	0 days	Fri 7/8/11	Fri 7/8/11
74	EPA Approves the phase II investigation WP for the Rhoads Property	0 days	Tue 7/12/11	Tue 7/12/11
75	**Rhoads Property Borrow Investigations Phase II Technical Memorandum**	**27 days**	**Wed 10/26/11**	**Fri 12/2/11**
76	Submitted Rhoads Property Borrow Investigations Phase II Technical Memorandum - Rev 0	0 days	Wed 10/26/11	Wed 10/26/11
77	EPA provides comments on Rev 0 Memorandum	0 days	Wed 11/2/11	Wed 11/2/11
78	Submitted RTCs and Rhoads Property Borrow Investigations Phase II Technical Memorandum - Rev 1	0 days	Fri 12/2/11	Fri 12/2/11
79	**Groundwater Design Investigation Report - Midnite Mine Remedial Design**	**2 days**	**Thu 6/9/11**	**Mon 6/13/11**
80	Submitted GW Investigation Report - Rev 2	0 days	Thu 6/9/11	Thu 6/9/11
81	EPA Approval of GW Investigation Report - Rev 2	0 days	Mon 6/13/11	Mon 6/13/11
82	**Submitted Midnite Mine Western Drainage Alluvial Wells Testing Plan**	**51 days**	**Fri 7/8/11**	**Mon 9/19/11**
83	EPA Approval	0 days	Fri 7/8/11	Fri 7/8/11
84	Installation of Larger Pumps begins	0 days	Mon 9/19/11	Mon 9/19/11
85	**Mine Waste Investigation Report**	**57 days**	**Fri 2/11/11**	**Tue 5/3/11**
86	Submitted Mine Waste Investigations Report - Rev 0	0 days	Fri 2/11/11	Fri 2/11/11
87	EPA provided comments on the Draft Report	0 days	Mon 4/11/11	Mon 4/11/11
88	Submitted RTCs and Mine Waste Investigation Report - Rev 1	0 days	Mon 5/2/11	Mon 5/2/11
89	Note: Hillside Waste Rock Pile supplemental investigations are depicted below under on-going investigations	0 days	Tue 5/3/11	Tue 5/3/11
90	**Phase I RD/RA Operation, Monitoring, and Maintenance Plan (OM&M Plan) and Performance Monitoring Plan (PMP)**	**314 days**	**Tue 4/6/10**	**Mon 6/20/11**
91	Received EPA Comments on OM&M Plan	0 days	Tue 4/6/10	Tue 4/6/10
92	Submitted RTCs and a Revised OM&M Plan	0 days	Tue 5/4/10	Tue 5/4/10
93	Submitted an Addendum which includes inspection and maintenance of the interim controls	0 days	Fri 12/31/10	Fri 12/31/10
94	Submitted a Revised PMP and QAPP	0 days	Mon 6/20/11	Mon 6/20/11
95				
96	**ON GOING DATA NEEDS INVESTIGATIONS w/ REPORTS- 2011 and out**	**1576 days**	**Fri 12/4/09**	**Fri 12/18/15**
97	**Assessment of Interim Mechanisms Technical Memorandum**	**166 days**	**Wed 3/30/11**	**Thu 11/17/11**
98	Pre-Final Remedial Action Work Plan for the Backfilled Pit Area Drainage Improvements (RAWP)	0 days	Wed 3/30/11	Wed 3/30/11
99	EPA Comments on work plan	0 days	Wed 5/4/11	Wed 5/4/11
100	Submitted revised Pre-Final RAWP for the Backfilled Pit Area Drainage Improvements and RTCs	0 days	Wed 5/18/11	Wed 5/18/11
101	Submitted additional revision to the WP	0 days	Mon 6/6/11	Mon 6/6/11
102	EPA approval of WP	0 days	Thu 6/9/11	Thu 6/9/11
103	Engineer Change Notice	0 days	Mon 7/25/11	Mon 7/25/11
104	Construction - period	37 days	Mon 9/12/11	Tue 11/1/11
105	EPA conducted pre-final inspection	0 days	Thu 11/17/11	Thu 11/17/11
106	**Evaluation of Supplemental RD Data Needs Report**	**597 days**	**Fri 12/4/09**	**Mon 3/19/12**
107	Submit the Evaluation of Supplemental RD Data Needs Report - Draft- Rev 0	0 days	Mon 10/3/11	Mon 10/3/11
108	EPA reviews report	21 days	Mon 10/3/11	Mon 10/31/11
109	EPA submits comments on report	0 days	Mon 10/31/11	Mon 10/31/11
110	Prepare RTCs and Draft Final Supplemental RD Data Needs Report- Rev 1	15 days	Tue 11/1/11	Mon 11/21/11
111	Submit RTCs and Draft Final Supplemental RD Data Needs Report -Rev 1	0 days	Mon 11/21/11	Mon 11/21/11
112	EPA reviews and submits comments on Draft Final Supplemental RD Data Needs Report	21 days	Tue 11/22/11	Tue 12/20/11
113	Prepare RTCs and Draft Final Supplemental RD Data Needs Report- Rev 2	29 days	Wed 12/21/11	Mon 1/30/12
114	Submit RTCs and Final Supplemental RD Data Needs Report - Rev 2	0 days	Fri 12/4/09	Fri 12/4/09
115	EPA reviews Final Supplemental RD Data Needs Report - Rev 2	35 days	Tue 1/31/12	Mon 3/19/12
116	**Blue Creek and Delta Assessment Work Plan (no EPA comments)**	**273 days**	**Wed 8/10/11**	**Fri 8/24/12**
117	Prepare Draft Blue Creek and Delta Assessment Work Plan	30 days	Wed 8/10/11	Tue 9/20/11
118	Internal Review	5 days	Wed 9/21/11	Tue 9/27/11
119	Submit Draft Blue Creek and Delta Assessment Work Plan to EPA - Rev 0	0 days	Mon 10/3/11	Mon 10/3/11
120	EPA Review of Draft Blue Creek and Delta Assessment Work Plan	140 days	Mon 10/3/11	Fri 4/13/12
121	EPA submits comments to Newmont	0 days	Fri 4/13/12	Fri 4/13/12
122	Prepare Draft Final Blue Creek and Delta Assessment Work Plan/ Prepare Responses to Comments	15 days	Mon 4/16/12	Fri 5/4/12
123	Internal Review	5 days	Mon 5/7/12	Fri 5/11/12
124	Submit Draft Final Blue Creek and Delta Assessment Work Plan - Rev 1 and RTCs to EPA	0 days	Fri 5/11/12	Fri 5/11/12
125	EPA Review of Draft Final Blue Creek and Delta Assessment Work Plan	30 days	Mon 5/14/12	Fri 6/22/12
126	EPA reviews/submits comments	0 days	Fri 6/22/12	Fri 6/22/12
127	Prepare Final Blue Creek and Delta Assessment Work Plan - Rev 2 / Prepare Responses to Comments	10 days	Mon 6/25/12	Fri 7/6/12
128	Internal Review	5 days	Mon 7/9/12	Fri 7/13/12
129	Submit Final Blue Creek and Delta Assessment Work Plan and RTCs to EPA	0 days	Fri 7/13/12	Fri 7/13/12
130	EPA Review of Final Blue Creek and Delta Assessment Work Plan	30 days	Mon 7/16/12	Fri 8/24/12
131	EPA Approves Blue Creek and Delta Assessment Work Plan	0 days	Fri 8/24/12	Fri 8/24/12
132	**Storage Pond Data Gap Investigations Report**	**290 days**	**Wed 6/1/11**	**Tue 7/18/12**
133	Submit Draft WP for Storage Pond Site Investigations-Rev 0	0 days	Wed 6/1/11	Wed 6/1/11
134	Received Comments from EPA	0 days	Fri 6/17/11	Fri 6/17/11
135	Submit Revised Storage Pond Site Investigation WP- Rev1 and RTCs	0 days	Wed 7/20/11	Wed 7/20/11
136	Received additional comments from EPA on Rev 1 Storage Pond Investigation WP	0 days	Mon 8/1/11	Mon 8/1/11
137	Submitted Work Plan for the Storage Pond Site Investigations - Rev 2 and RTCs	0 days	Mon 8/8/11	Mon 8/8/11
138	Conduct Storage Pond Field Work	70 days	Mon 8/8/11	Fri 11/11/11
139	Prepare Draft Storage Pond Report (plus wait for triaxial geotechnical analyses)	72 days	Mon 12/12/11	Tue 3/20/12
140	Submit Draft Storage Pond Report to EPA	0 days	Tue 3/20/12	Tue 3/20/12
141	EPA reviews draft report and submits comments to Newmont	20 days	Wed 3/21/12	Tue 4/17/12
142	Prepare/Submit responses to EPA comments (RTCs) and D. Final Storage Pond report	10 days	Wed 4/18/12	Tue 5/1/12
143	EPA Reviews RTCs and D.Final Report	20 days	Wed 5/2/12	Tue 5/29/12
144	EPA submits comments on the D.Final Report	0 days	Tue 5/29/12	Tue 5/29/12
145	Prepare/Submit RTCs and Final Storage Pond Investigation Report	10 days	Wed 5/30/12	Tue 6/12/12
146	EPA reviews the Final Storage Pond Report	20 days	Wed 6/13/12	Tue 7/10/12
147	EPA approval - Storage Pond Investigation Data Gap Report	0 days	Tue 7/10/12	Tue 7/10/12
148	**Supplemental Hillside Waste Rock Pile Data Gap Investigations Report**	**402 days**	**Mon 6/20/11**	**Tue 1/1/13**
149	Prepared/Submitted a Supplement to the Work Plan for Mine Waste Investigations - Additional Hillside Waste Rock Investigations	0 days	Mon 6/20/11	Mon 6/20/11
150	EPA submitted comments on the supplemental Hillside Waste Rock File Investigations	0 days	Wed 6/29/11	Wed 6/29/11
151	Prepare/Submitted a revised supplemental Work Plan for the Hillside Waste Rock File	0 days	Fri 7/8/11	Fri 7/8/11
152	EPA Approval of Final Supplemental HWR Test Pit Excavations	0 days	Tue 7/12/11	Tue 7/12/11

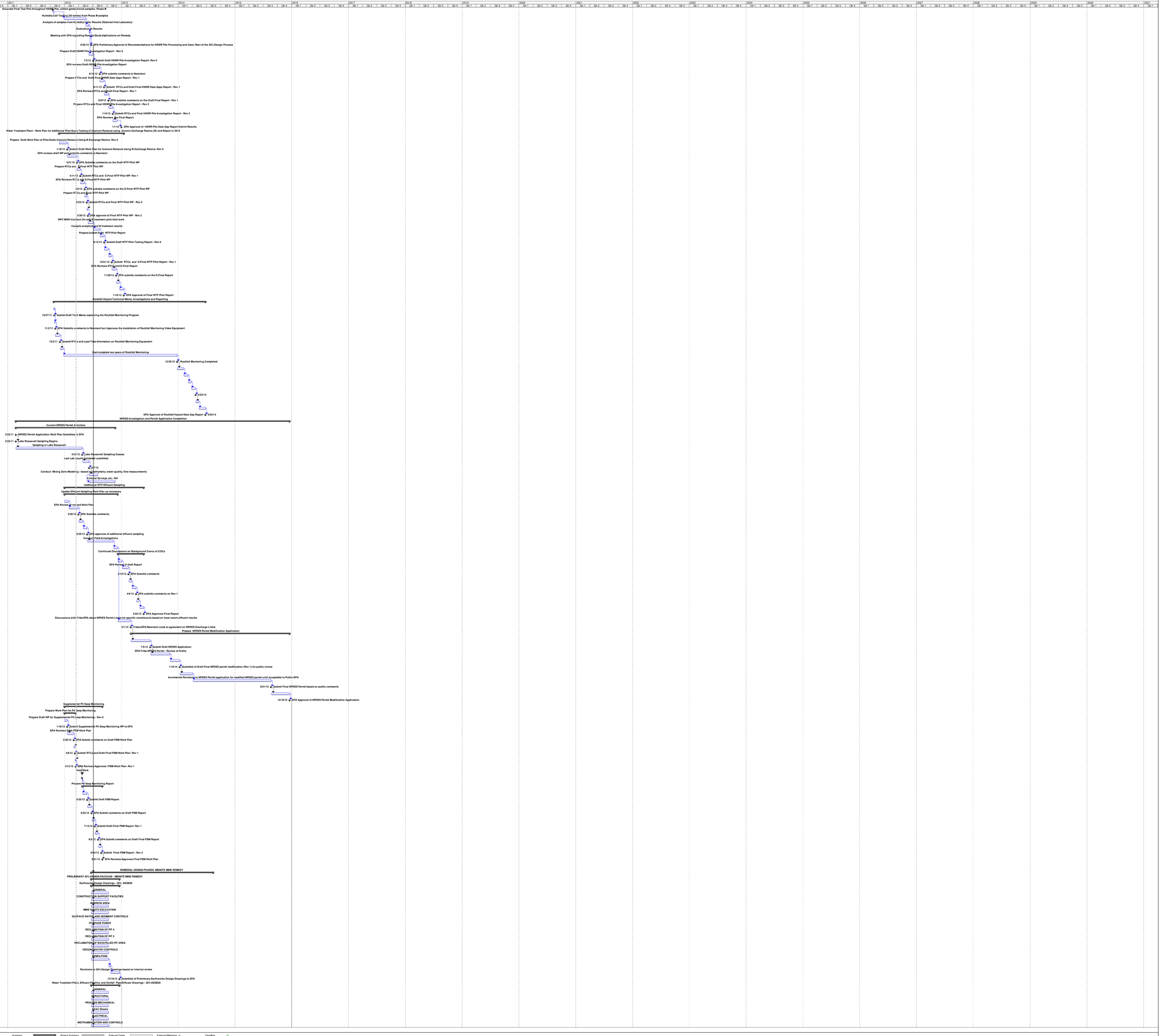
Project: Midnite Mine Remedial Design | Date: Wed 3/14/12

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

This draft schedule has been prepared based on current project knowledge and likely some of the individual tasks and their durations will change as the remedial design process unfolds and the remedial action begins.
Wed 3/14/12

FIGURE 7-1b DRAFT MIDNITE MINE REMEDIAL DESIGN / REMEDIAL ACTION SCHEDULE - DETAILED

ID	Task Name	Working Days (5days/week)	Start	Finish
153	Excavate Final Test Pits throughout HSWR Pile, collect geotechnical samples- Phase III	6 days	Tue 1/18/11	Tue 12/25/11
154	Humidity Cell Testing (20 weeks) from Phase III samples	100 days	Wed 12/28/11	Tue 5/15/12
155	Analysis of samples from Humidity Cells/ Results Obtained from Laboratory	15 days	Wed 5/16/12	Tue 6/5/12
156	Evaluation of Results	5 days	Wed 6/6/12	Tue 6/12/12
157	Meeting with EPA regarding Results/Study Implications on Remedy	1 day	Wed 6/13/12	Wed 6/13/12
158	**EPA Preliminary Approval of Recommendations for HSWR Pile Processing and Uses: Start of the 30% Design Process**	0 days	Wed 6/20/12	Wed 6/20/12
159	Prepare Draft HSWR Pile Investigation Report - Rev 0	20 days	Wed 6/6/12	Tue 7/3/12
160	Submit Draft HSWR Pile Investigation Report- Rev 0	0 days	Tue 7/3/12	Tue 7/3/12
161	EPA reviews Draft HSWR Pile Investigation Report	30 days	Wed 7/4/12	Tue 8/14/12
162	EPA submits comments to Newmont	0 days	Tue 8/14/12	Tue 8/14/12
163	Prepare RTCs and Draft Final HWSR Data Gaps Report - Rev 1	20 days	Wed 8/15/12	Tue 9/11/12
164	Submit RTCs and Draft Final HWSR Data Gaps Report - Rev 1	0 days	Tue 9/11/12	Tue 9/11/12
165	EPA Reviews RTCs and Draft Final Report - Rev 1	20 days	Wed 9/12/12	Tue 10/9/12
166	EPA submits comments on the Draft Final Report - Rev 1	0 days	Tue 10/9/12	Tue 10/9/12
167	Prepare RTCs and Final HSWR Pile Investigation Report - Rev 2	20 days	Wed 10/10/12	Tue 11/6/12
168	Submit RTCs and Final HSWR Pile Investigation Report - Rev 2	0 days	Tue 11/6/12	Tue 11/6/12
169	EPA Reviews the Final Report	20 days	Wed 11/7/12	Tue 12/4/12
170	EPA Approval of HSWR Pile Data Gap Report Interim Results	0 days	Tue 1/1/13	Tue 1/1/13
171	**Water Treatment Plant - Work Plan for Additional Pilot-Scale Testing of Uranium Removal using Amionic Exchange Resins (IX) and Report in 2012**	**250 days**	**Mon 11/28/11**	**Wed 1/16/13**
172	Prepare Draft Work Plan of Pilot-Scale Uranium Removal Using IX Exchange Resins- Rev 0	36 days	Mon 11/28/11	Wed 1/18/12
173	Submit Draft Work Plan for Uranium Removal Using IX Exchange Resins- Rev 0	0 days	Wed 1/18/12	Wed 1/18/12
174	EPA reviews draft WP and submits comments to Newmont	45 days	Thu 1/19/12	Wed 3/21/12
175	EPA Submits comments on the Draft WTP Pilot WP	0 days	Wed 3/21/12	Wed 3/21/12
176	Prepare RTCs and D.Final WTP Pilot WP	15 days	Thu 3/22/12	Wed 4/11/12
177	Submit RTCs and D.Final WTP Pilot WP- Rev 1	0 days	Wed 4/11/12	Wed 4/11/12
178	EPA Reviews RTCs and D.Final WTP Pilot WP	20 days	Thu 4/12/12	Wed 5/9/12
179	EPA submits comments on the D.Final WTP Pilot WP	0 days	Wed 5/9/12	Wed 5/9/12
180	Prepare RTCs and Final WTP Pilot WP	10 days	Thu 5/10/12	Wed 5/23/12
181	Submit RTCs and Final WTP Pilot WP - Rev 2	0 days	Wed 5/23/12	Wed 5/23/12
182	EPA Reviews the Final WTP Pilot WP	5 days	Thu 5/24/12	Wed 5/30/12
183	EPA approval of Final WTP Pilot WP - Rev 2	0 days	Wed 5/30/12	Wed 5/30/12
184	WRT/MNH Conduct On-site IX treatment pilot field work	25 days	Thu 5/31/12	Wed 7/4/12
185	Compile analytical and IX treatment results	30 days	Thu 7/5/12	Wed 8/15/12
186	Prepare/submit Draft WTP Pilot Report	20 days	Thu 8/16/12	Wed 9/12/12
187	Submit Draft WTP Pilot Testing Report - Rev 0	0 days	Wed 9/12/12	Wed 9/12/12
188	EPA reviews draft report and submits comments to Newmont	20 days	Thu 9/13/12	Wed 10/10/12
189	Prepare RTCs and D.Final WTP Pilot Report	15 days	Thu 10/11/12	Wed 10/31/12
190	Submit RTCs and D.Final WTP Pilot Report - Rev 1	0 days	Wed 10/31/12	Wed 10/31/12
191	EPA Reviews RTCs and D.Final Report	20 days	Thu 11/1/12	Wed 11/28/12
192	EPA submits comments on the D.Final Report	0 days	Wed 11/28/12	Wed 11/28/12
193	Prepare/Submit RTCs and Final WTP Pilot Report	15 days	Thu 11/29/12	Wed 12/19/12
194	EPA Reviews the Final Report	20 days	Thu 12/20/12	Wed 1/16/13
195	EPA Approval of Final WTP Pilot Report	0 days	Wed 1/16/13	Wed 1/16/13
196	**Rocklatt Hazard Technical Memo, Investigations and Reporting**	**698 days**	**Mon 10/24/11**	**Wed 6/25/14**
197	Prepare Draft Tech Memo explaining the Rocklatt Monitoring Program	4 days	Mon 10/24/11	Thu 10/27/11
198	Submit Draft Tech Memo explaining the Rocklatt Monitoring Program	0 days	Thu 10/27/11	Thu 10/27/11
199	EPA reviews Rocklatt Hazard Investigation Tech memo	4 days	Fri 10/28/11	Wed 11/2/11
200	EPA Submits comments to Newmont but Approves the Installation of Rocklatt Monitoring Video Equipment	0 days	Wed 11/2/11	Wed 11/2/11
201	Prepare RTCs and outline lead time for monitoring equipment	22 days	Thu 11/3/11	Fri 12/2/11
202	Submit RTCs and Lead Time Information on Rocklatt Monitoring Equipment	0 days	Fri 12/2/11	Fri 12/2/11
203	Time Required for Rocklatt Video Equipment Delivery and Equipment Installation	15 days	Mon 12/5/11	Fri 12/23/11
204	Start/complete two years of Rocklatt Monitoring	523 days	Mon 12/26/11	Wed 12/25/13
205	Rocklatt Monitoring Completed	0 days	Wed 12/25/13	Wed 12/25/13
206	Prepare/submit Draft Rocklatt Hazard Investigation Report	30 days	Thu 12/26/13	Wed 2/5/14
207	EPA reviews draft report and submits comments to Newmont	20 days	Thu 2/6/14	Wed 3/5/14
208	Prepare/submit RTCs and D.Final Rocklatt Hazard Data Gaps report	15 days	Thu 3/6/14	Wed 3/26/14
209	EPA Reviews RTCs and D.Final Report	20 days	Thu 3/27/14	Wed 4/23/14
210	EPA submits comments on the D.Final Report	0 days	Wed 4/23/14	Wed 4/23/14
211	Prepare/Submit RTCs and Final Rocklatt Hazard Investigation Report	15 days	Thu 4/24/14	Wed 5/14/14
212	EPA Reviews the Final Report	30 days	Thu 5/15/14	Wed 6/25/14
213	EPA Approval of Rocklatt Hazard Data Gap Report	0 days	Wed 6/25/14	Wed 6/25/14
214	**NPDES Investigation and Permit Application Completion**	**1359 days**	**Tue 2/23/11**	**Fri 12/18/15**
215	**Current NPDES Permit Activities**	**408 days**	**Tue 2/23/11**	**Thu 11/28/13**
216	NPDES Permit Application Work Plan Submitted to EPA	0 days	Tue 2/23/11	Tue 2/22/11
217	Lake Roosevelt Sampling Begins	0 days	Tue 2/22/11	Tue 2/22/11
218	Sampling in Lake Roosevelt	305 days	Tue 2/22/11	Mon 4/23/12
219	Lake Roosevelt Sampling Ceases	0 days	Tue 4/24/12	Tue 4/24/12
220	Last Lab results validated/ submitted	30 days	Fri 4/27/12	Thu 6/7/12
221	Continued transfer of electronic data for upload to WQX	0 days	Thu 6/7/12	Thu 6/7/12
222	Conduct Mixing Zone Modeling - based on bathymetry, water quality, flow measurements	2 mons	Fri 6/8/12	Thu 8/3/12
223	Cultural Surveys, etc.- NA	6 mons	Fri 6/8/12	Thu 11/22/12
224	**Additional WTP Effluent Sampling**	**365 days**	**Mon 1/2/12**	**Fri 5/24/13**
225	**Update Effluent Sampling Work Plan as necessary**	**245 days**	**Mon 1/2/12**	**Fri 12/7/12**
226	Prepare Update of current effluent sampling plan-Rev 0 for EPA review	20 days	Mon 1/2/12	Fri 1/27/12
227	EPA Review of revised Work Plan	45 days	Mon 1/30/12	Fri 3/30/12
228	EPA Submits comments	0 days	Fri 3/30/12	Fri 3/30/12
229	Prepare RTCs and Final Revised Effluent Sampling Plan	20 days	Mon 4/2/12	Fri 4/27/12
230	Submit RTCs and Final Revised Effluent Sampling Plan for EPA/Tribe review	20 days	Mon 4/30/12	Fri 5/25/12
231	EPA approves of additional effluent sampling	0 days	Fri 5/25/12	Fri 5/25/12
232	Conduct Field Investigations	6 mons	Mon 5/28/12	Fri 11/9/12
233	Wait for Final Laboratory analyses	20 days	Mon 11/12/12	Fri 12/7/12
234	**Continued Discussions on Background Concs of COCs**	**120 days**	**Mon 12/10/12**	**Fri 5/24/13**
235	Prepare Draft Report - Rev 0	20 days	Mon 12/10/12	Fri 1/4/13
236	EPA Review of draft Report	30 days	Mon 1/7/13	Fri 2/15/13
237	EPA Submits comments	0 days	Fri 2/15/13	Fri 2/15/13
238	Prepare RTCs and Draft Final Report - Rev 1	15 days	Mon 2/18/13	Fri 3/8/13
239	EPA Reviews Rev 1 of WP	20 days	Mon 3/11/13	Fri 4/5/13
240	EPA submits comments on Rev 1	0 days	Fri 4/5/13	Fri 4/5/13
241	Prepare RTCs and Final Report - Rev 2	15 days	Mon 4/8/13	Fri 4/26/13
242	EPA reviews Final Report	20 days	Mon 4/29/13	Fri 5/24/13
243	EPA Approves Final Report	0 days	Fri 5/24/13	Fri 5/24/13
244	Discussions with Tribe/EPA about NPDES Permit Limits for specific constituents based on most recent effluent	60 days	Mon 12/10/12	Fri 3/1/13
245	Tribes/EPA/Newmont come to agreement on NPDES Discharge Limits	0 days	Fri 3/1/13	Fri 3/1/13
246	**Prepare NPDES Permit Modification Application**	**730 days**	**Mon 3/4/13**	**Fri 12/18/15**
247	Prepare Draft NPDES Permit Modification Application	90 days	Mon 3/4/13	Fri 7/5/13
248	Submit Draft NPDES Application	0 days	Fri 7/5/13	Fri 7/5/13
249	EPA/Tribe NPDES Permit - Review of Drafts	90 days	Mon 7/8/13	Fri 11/8/13
250	Revise NPDES Permit Application	45 days	Mon 11/11/13	Fri 1/10/14
251	Submittal of Draft Final NPDES permit modification (Rev 1) for public review	0 days	Fri 1/10/14	Fri 1/10/14
252	Public review of Draft Final Permit (90 days)	3 mons	Mon 1/13/14	Fri 4/4/14
253	Incremental Revisions to NPDES Permit application for modified NPDES permit until acceptable to Public/EPA	18 mons	Mon 4/7/14	Fri 8/21/15
254	Submit Final NPDES Permit based on public comments	0 days	Fri 8/21/15	Fri 8/21/15
255	Final EPA review	85 days	Mon 8/24/15	Fri 12/18/15
256	EPA Approval of NPDES Permit Modification Application	0 days	Fri 12/18/15	Fri 12/18/15
257	**Supplemental Pit Seep Monitoring**	**175 days**	**Mon 1/2/12**	**Fri 8/31/12**
258	**Prepare Work Plan for Pit Seep Monitoring**	**51 days**	**Mon 1/2/12**	**Mon 3/12/12**
259	Prepare Draft WP for Supplemental Pit Seep Monitoring - Rev 0	13 days	Mon 1/2/12	Wed 1/18/12
260	Submit Supplemental Pit Seep Monitoring WP to EPA	0 days	Wed 1/18/12	Wed 1/18/12
261	EPA Reviews Draft PSM Work Plan	30 days	Thu 1/19/12	Wed 2/29/12
262	EPA Submit comments on Draft PSM Work Plan	0 days	Wed 2/29/12	Wed 2/29/12
263	Prepare RTC document and revise Draft PSM Work Plan	6 days	Thu 3/1/12	Thu 3/8/12
264	Submit RTCs and Draft Final PSM Work Plan- Rev 1	0 days	Thu 3/8/12	Thu 3/8/12
265	EPA Reviews Draft Final PSM Work Plan	2 days	Fri 3/9/12	Mon 3/12/12
266	EPA Reviews/Approves I PSM Work Plan- Rev 1	0 days	Mon 3/12/12	Mon 3/12/12
267	**Field Work**	**3 days**	**Mon 4/23/12**	**Wed 4/25/12**
268	Conduct field work	3 days	Mon 4/23/12	Wed 4/25/12
269	**Prepare Pit Seep Monitoring Report**	**92 days**	**Thu 4/26/12**	**Fri 8/31/12**
270	Prepare Draft Pit Seep Monitoring Report - Rev 0	22 days	Thu 4/26/12	Fri 5/25/12
271	Submit Draft PSM Report	0 days	Fri 5/25/12	Fri 5/25/12
272	EPA Reviews Draft PSM report	20 days	Mon 5/28/12	Fri 6/22/12
273	EPA Submit comments on Draft PSM Report	0 days	Fri 6/22/12	Fri 6/22/12
274	Prepare RTC document and revise Draft PSM Report	15 days	Mon 6/25/12	Fri 7/13/12
275	Submit Draft Final PSM Report- Rev 1	0 days	Fri 7/13/12	Fri 7/13/12
276	EPA Reviews Draft Final PSM Report	15 days	Mon 7/16/12	Fri 8/3/12
277	EPA Submit comments on Draft Final PSM Report	0 days	Fri 8/3/12	Fri 8/3/12
278	Prepare RTC document and revise Draft Final PSM Report	15 days	Mon 8/6/12	Fri 8/24/12
279	Submit Final PSM Report - Rev 2	0 days	Fri 8/24/12	Fri 8/24/12
280	EPA Reviews/Approves Final PSM Work Plan	0 days	Fri 8/31/12	Fri 8/31/12
281				
282	**REMEDIAL DESIGN PHASES- MIDNITE MINE REMEDY**	**560 days**	**Thu 6/21/12**	**Wed 8/13/14**
283	**PRELIMINARY 30% DESIGN PACKAGE - MIDNITE MINE REMEDY**	**130 days**	**Thu 6/21/12**	**Wed 12/19/12**
284	**Earthworks Design Drawings - 30% DESIGN**	**130 days**	**Thu 6/21/12**	**Wed 12/19/12**
285	GENERAL	80 days	Thu 6/21/12	Wed 10/10/12
286	CONSTRUCTION SUPPORT FACILITIES	80 days	Thu 6/21/12	Wed 10/10/12
287	BORROW AREA	80 days	Thu 6/21/12	Wed 10/10/12
288	MINE WASTE EXCAVATION	80 days	Thu 6/21/12	Wed 10/10/12
289	SURFACE WATER AND SEDIMENT CONTROLS	80 days	Thu 6/21/12	Wed 10/10/12
290	STORAGE PONDS	80 days	Thu 6/21/12	Wed 10/10/12
291	RECLAMATION OF PIT 4	80 days	Thu 6/21/12	Wed 10/10/12
292	RECLAMATION OF PIT 3	80 days	Thu 6/21/12	Wed 10/10/12
293	RECLAMATION OF BACKFILLED PIT AREA	80 days	Thu 6/21/12	Wed 10/10/12
294	GROUNDWATER CONTROLS	80 days	Thu 6/21/12	Wed 10/10/12
295	DEMOLITION	80 days	Thu 6/21/12	Wed 10/10/12
296	Internal Review of 30% Design	10 days	Thu 10/11/12	Wed 10/24/12
297	Revisions to 30% Design Drawings based on internal review	40 days	Thu 10/25/12	Wed 12/19/12
298	Submittal of Preliminary Earthworks Design Drawings to EPA	0 days	Wed 12/19/12	Wed 12/19/12
299	**Water Treatment Plant, Effluent Pipeline, and Outfall Pipe/Diffuser Drawings - 30% DESIGN**	**130 days**	**Thu 6/21/12**	**Wed 12/19/12**
300	GENERAL	80 days	Thu 6/21/12	Wed 10/10/12
301	STRUCTURAL	80 days	Thu 6/21/12	Wed 10/10/12
302	PROCESS MECHANICAL	80 days	Thu 6/21/12	Wed 10/10/12
303	HVAC Sheets	80 days	Thu 6/21/12	Wed 10/10/12
304	ELECTRICAL	80 days	Thu 6/21/12	Wed 10/10/12
305	INSTRUMENTATION AND CONTROLS	80 days	Thu 6/21/12	Wed 10/10/12



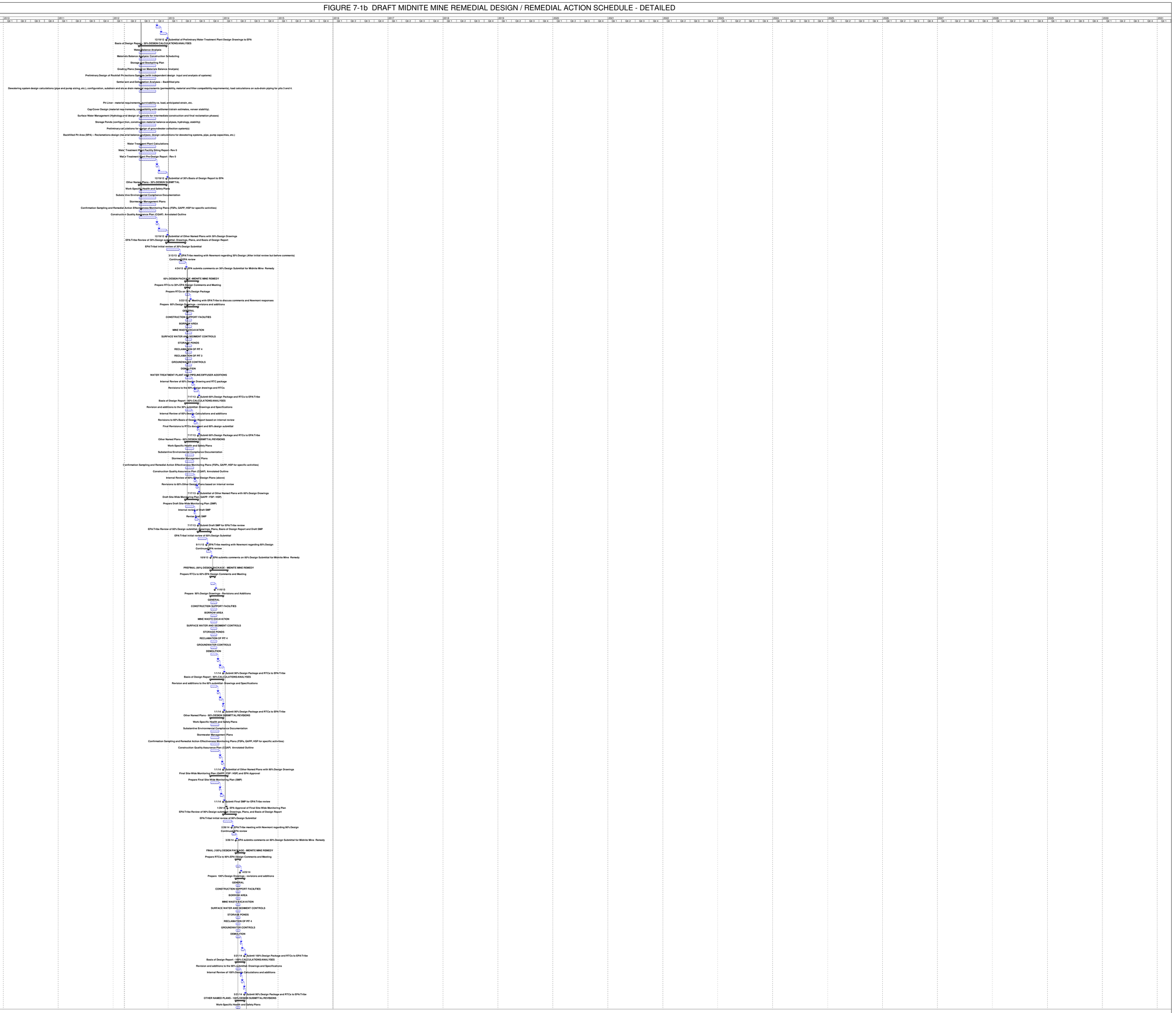
Project: Midnite Mine Remedial Design
Date: Wed 3/14/12

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

This draft schedule has been prepared based on current project knowledge and likely some of the individual tasks and their durations will change as the remedial design process unfolds and the remedial action begins.
Wed 3/14/12

FIGURE 7-1b DRAFT MIDNITE MINE REMEDIAL DESIGN / REMEDIAL ACTION SCHEDULE - DETAILED

ID	Task Name	Working Days (5days/week)	Start	Finish
306	Internal Review of 30% Design	20 days	Thu 11/1/12	Wed 11/7/12
307	Revisions to 30% Design Drawings based on internal review	20 days	Thu 11/8/12	Wed 12/19/12
308	Submittal of Preliminary Water Treatment Plant Design Drawings to EPA	0 days	Wed 12/19/12	Wed 12/19/12
309	**Basis of Design Report - 30% DESIGN CALCULATIONS/ANALYSES**	**130 days**	**Thu 6/21/12**	**Wed 12/19/12**
310	Water Balance Analysis	80 days	Thu 6/21/12	Wed 10/10/12
311	Materials Balance Analysis/ Construction Scheduling	80 days	Thu 6/21/12	Wed 10/10/12
312	Storage and Stockpiling Plan	80 days	Thu 6/21/12	Wed 10/10/12
313	Grading Plans (based on Materials Balance Analysis)	80 days	Thu 6/21/12	Wed 10/10/12
314	Preliminary Design of Rockfall Protections Systems (with independent design input and analysis of systems)	80 days	Thu 6/21/12	Wed 10/10/12
315	Settlement and Deformation Analysis – Backfilled pits	80 days	Thu 6/21/12	Wed 10/10/12
316	Dewatering system design calculations (pipe and pump sizing, etc.), configuration, subdrain and slope drain material requirements (permeability, material and filter compatibility requirements), load calculations on sub-drain piping for pits 3 and 4.	80 days	Thu 6/21/12	Wed 10/10/12
317	Pit Liner - material requirements, survivability vs. load, anticipated strain, etc.	80 days	Thu 6/21/12	Wed 10/10/12
318	Cap/Cover Design (material requirements, compatibility with settlement/strain estimates, veneer stability).	80 days	Thu 6/21/12	Wed 10/10/12
319	Surface Water Management (Hydrology and design of controls for intermediate construction and final reclamation phases)	80 days	Thu 6/21/12	Wed 10/10/12
320	Storage Ponds (configuration, construction material balance analyses, hydrology, stability)	80 days	Thu 6/21/12	Wed 10/10/12
321	Preliminary calculations for design of groundwater collection system(s)	80 days	Thu 6/21/12	Wed 10/10/12
322	Backfilled Pit Area (BPA) – Reclamations design (material balance analyses; design calculations for dewatering systems, pipe, pump capacities, etc.)	80 days	Thu 6/21/12	Wed 10/10/12
323	Water Treatment Plant Calculations	80 days	Thu 6/21/12	Wed 10/10/12
324	Water Treatment Plant Facility Siting Report- Rev 0	80 days	Thu 6/21/12	Wed 10/10/12
325	Water Treatment Plant Pre-Design Report - Rev 0	80 days	Thu 6/21/12	Wed 10/10/12
326	Internal Review of 30% Design Calculations and Report	10 days	Thu 10/11/12	Wed 10/24/12
327	Revisions to 30% the Basis of Design Report	40 days	Thu 10/25/12	Wed 12/19/12
328	Submittal of 30% Basis of Design Report to EPA	0 days	Wed 12/19/12	Wed 12/19/12
329	**Other Named Plans - 30% DESIGN SUBMITTAL**	**130 days**	**Thu 6/21/12**	**Wed 12/19/12**
330	Work-Specific Health and Safety Plans	80 days	Thu 6/21/12	Wed 10/10/12
331	Substantive Environmental Compliance Documentation	80 days	Thu 6/21/12	Wed 10/10/12
332	Stormwater Management Plans	80 days	Thu 6/21/12	Wed 10/10/12
333	Confirmation Sampling and Remedial Action Effectiveness Monitoring Plans (FSPs, QAPP, HSP for specific activities)	80 days	Thu 6/21/12	Wed 10/10/12
334	Construction Quality Assurance Plan (CQAP) Annotated Outline	80 days	Thu 6/21/12	Wed 10/10/12
335	Internal Review of 30% Other Design Plans (above)	10 days	Thu 10/11/12	Wed 10/24/12
336	Revisions to 30% Other Design Plans based on internal review	40 days	Thu 10/25/12	Wed 12/19/12
337	Submittal of Other Named Plans with 30% Design Drawings	0 days	Wed 12/19/12	Wed 12/19/12
338	**EPA/Tribe Review of 30%Design submittal- Drawings, Plans, and Basis of Design Report**	**90 days**	**Thu 12/20/12**	**Wed 4/24/13**
339	EPA/Tribal initial review of 30% Design Submittal	60 days	Thu 12/20/12	Wed 3/13/13
340	EPA/Tribe meeting with Newmont regarding 30% Design (After initial review but before comments)	0 days	Wed 3/13/13	Wed 3/13/13
341	Continued EPA review	30 days	Thu 3/14/13	Wed 4/24/13
342	EPA submits comments on 30% Design Submittal for Midnite Mine Remedy	0 days	Wed 4/24/13	Wed 4/24/13
343				
344	**60%-DESIGN PACKAGE -MIDNITE MINE REMEDY**	**90 days**	**Thu 4/25/13**	**Wed 7/17/13**
345	**Prepare RTCs to 30% EPA Design Comments and Meeting**	**20 days**	**Thu 4/25/13**	**Wed 5/22/13**
346	Prepare RTCs on 30% Design Package	20 days	Thu 4/25/13	Wed 5/22/13
347	Meeting with EPA/Tribe to discuss comments and Newmont responses	0 days	Wed 5/22/13	Wed 5/22/13
348	**Prepare 60% Design Drawings - revisions and additions**	**60 days**	**Thu 4/25/13**	**Wed 7/17/13**
349	GENERAL	30 days	Thu 4/25/13	Wed 6/5/13
350	CONSTRUCTION SUPPORT FACILITIES	30 days	Thu 4/25/13	Wed 6/5/13
351	BORROW AREA	30 days	Thu 4/25/13	Wed 6/5/13
352	MINE WASTE EXCAVATION	30 days	Thu 4/25/13	Wed 6/5/13
353	SURFACE WATER AND SEDIMENT CONTROLS	30 days	Thu 4/25/13	Wed 6/5/13
354	STORAGE PONDS	30 days	Thu 4/25/13	Wed 6/5/13
355	RECLAMATION OF PIT 4	30 days	Thu 4/25/13	Wed 6/5/13
356	RECLAMATION OF PIT 3	30 days	Thu 4/25/13	Wed 6/5/13
357	GROUNDWATER CONTROLS	30 days	Thu 4/25/13	Wed 6/5/13
358	DEMOLITION	30 days	Thu 4/25/13	Wed 6/5/13
359	WATER TREATMENT PLANT AND PIPELINE/DIFFUSER ADDITIONS	30 days	Thu 4/25/13	Wed 6/5/13
360	Internal Review of 60% Design Drawing and RTC package	10 days	Thu 6/6/13	Wed 6/19/13
361	Revisions to the 60% design drawings and RTCs	20 days	Thu 6/20/13	Wed 7/17/13
362	Submit 60% Design Package and RTCs to EPA/Tribe	0 days	Wed 7/17/13	Wed 7/17/13
363	**Basis of Design Report - 60% CALCULATIONS/ANALYSES**	**60 days**	**Thu 4/25/13**	**Wed 7/17/13**
364	Revision and additions to the 30% submittal- Drawings and Specifications	30 days	Thu 4/25/13	Wed 6/5/13
365	Internal Review of 60% Design Calculations and additions	10 days	Thu 6/6/13	Wed 6/19/13
366	Revisions to 60% Basis of Design Report based on internal review	15 days	Thu 6/20/13	Wed 7/10/13
367	Final Revisions to RTCs document and 60% design submittal	5 days	Thu 7/11/13	Wed 7/17/13
368	Submit 60% Design Package and RTCs to EPA/Tribe	0 days	Wed 7/17/13	Wed 7/17/13
369	**Other Named Plans - 60% DESIGN SUBMITTAL/REVISIONS**	**60 days**	**Thu 4/25/13**	**Wed 7/17/13**
370	Work-Specific Health and Safety Plans	40 days	Thu 4/25/13	Wed 6/19/13
371	Substantive Environmental Compliance Documentation	40 days	Thu 4/25/13	Wed 6/19/13
372	Stormwater Management Plans	40 days	Thu 4/25/13	Wed 6/19/13
373	Confirmation Sampling and Remedial Action Effectiveness Monitoring Plans (FSPs, QAPP, HSP for specific activities)	40 days	Thu 4/25/13	Wed 6/19/13
374	Construction Quality Assurance Plan (CQAP) Annotated Outline	40 days	Thu 4/25/13	Wed 6/19/13
375	Internal Review of 60% Other Design Plans (above)	10 days	Thu 6/20/13	Wed 7/3/13
376	Revisions to 60% Other Design Plans based on internal review	10 days	Thu 7/4/13	Wed 7/17/13
377	Submittal of Other Named Plans with 60% Design Drawings	0 days	Wed 7/17/13	Wed 7/17/13
378	**Draft Site-Wide Monitoring Plan (QAPP / FSP / HSP)**	**60 days**	**Thu 4/25/13**	**Wed 7/17/13**
379	Prepare Draft Site-Wide Monitoring Plan (SMP)	40 days	Thu 4/25/13	Wed 6/19/13
380	Internal review of Draft SMP	5 days	Thu 6/20/13	Wed 6/26/13
381	Revise Draft SMP	15 days	Thu 6/27/13	Wed 7/17/13
382	Submit Draft SMP for EPA/Tribe review	0 days	Wed 7/17/13	Wed 7/17/13
383	**EPA/Tribe Review of 60%Design submittal- Drawings, Plans, Basis of Design Report and Draft SMP**	**60 days**	**Thu 7/18/13**	**Wed 10/9/13**
384	EPA/Tribal initial review of 60% Design Submittal	40 days	Thu 7/18/13	Wed 9/11/13
385	EPA/Tribe meeting with Newmont regarding 60% Design	0 days	Wed 9/11/13	Wed 9/11/13
386	Continued EPA review	20 days	Thu 9/12/13	Wed 10/9/13
387	EPA submits comments on 60% Design Submittal for Midnite Mine Remedy	0 days	Wed 10/9/13	Wed 10/9/13
388				
389	**PREFINAL (90%) DESIGN PACKAGE - MIDNITE MINE REMEDY**	**80 days**	**Thu 10/10/13**	**Wed 1/29/14**
390	**Prepare RTCs to 60% EPA Design Comments and Meeting**	**20 days**	**Thu 10/10/13**	**Wed 11/6/13**
391	Prepare RTCs on 60% Design Package	20 days	Thu 10/10/13	Wed 11/6/13
392	Meeting with EPA/Tribe to discuss comments and Newmont responses	0 days	Wed 11/6/13	Wed 11/6/13
393	**Prepare 90% Design Drawings - Revisions and Additions**	**60 days**	**Thu 10/10/13**	**Wed 1/1/14**
394	GENERAL	30 days	Thu 10/10/13	Wed 11/20/13
395	CONSTRUCTION SUPPORT FACILITIES	30 days	Thu 10/10/13	Wed 11/20/13
396	BORROW AREA	30 days	Thu 10/10/13	Wed 11/20/13
397	MINE WASTE EXCAVATION	30 days	Thu 10/10/13	Wed 11/20/13
398	SURFACE WATER AND SEDIMENT CONTROLS	30 days	Thu 10/10/13	Wed 11/20/13
399	STORAGE PONDS	30 days	Thu 10/10/13	Wed 11/20/13
400	RECLAMATION OF PIT 4	30 days	Thu 10/10/13	Wed 11/20/13
401	GROUNDWATER CONTROLS	30 days	Thu 10/10/13	Wed 11/20/13
402	DEMOLITION	30 days	Thu 10/10/13	Wed 11/20/13
403	Internal Review of 90% Design Drawing and RTC package	10 days	Thu 11/21/13	Wed 12/4/13
404	Revisions to the 90% Design Drawings and RTCs	20 days	Thu 12/5/13	Wed 1/1/14
405	Submit 90% Design Package and RTCs to EPA/Tribe	0 days	Wed 1/1/14	Wed 1/1/14
406	**Basis of Design Report - 90% CALCULATIONS/ANALYSES**	**60 days**	**Thu 10/10/13**	**Wed 1/1/14**
407	Revision and additions to the 60% submittal- Drawings and Specifications	30 days	Thu 10/10/13	Wed 11/20/13
408	Internal Review of 90% Design Calculations and additions	10 days	Thu 11/21/13	Wed 12/4/13
409	Revisions to 90% Basis of Design Report based on internal review	15 days	Thu 12/5/13	Wed 12/25/13
410	Final Revisions to RTCs document and 90% design submittal	5 days	Thu 12/26/13	Wed 1/1/14
411	Submit 90% Design Package and RTCs to EPA/Tribe	0 days	Wed 1/1/14	Wed 1/1/14
412	**Other Named Plans - 90% DESIGN SUBMITTAL/REVISIONS**	**60 days**	**Thu 10/10/13**	**Wed 1/1/14**
413	Work-Specific Health and Safety Plans	40 days	Thu 10/10/13	Wed 12/4/13
414	Substantive Environmental Compliance Documentation	40 days	Thu 10/10/13	Wed 12/4/13
415	Stormwater Management Plans	40 days	Thu 10/10/13	Wed 12/4/13
416	Confirmation Sampling and Remedial Action Effectiveness Monitoring Plans (FSPs, QAPP, HSP for specific activities)	40 days	Thu 10/10/13	Wed 12/4/13
417	Construction Quality Assurance Plan (CQAP) Annotated Outline	40 days	Thu 10/10/13	Wed 12/4/13
418	Internal Review of 90% Other Design Plans (above)	10 days	Thu 12/5/13	Wed 12/18/13
419	Revisions to 90% Other Design Plans based on internal review	10 days	Thu 12/19/13	Wed 1/1/14
420	Submittal of Other Named Plans with 90% Design Drawings	0 days	Wed 1/1/14	Wed 1/1/14
421	**Final Site-Wide Monitoring Plan (QAPP / FSP / HSP) and EPA Approval**	**60 days**	**Thu 10/10/13**	**Wed 1/29/14**
422	Prepare Final Site-Wide Monitoring Plan (SMP)	40 days	Thu 10/10/13	Wed 12/4/13
423	Internal review of Final SMP	5 days	Thu 12/5/13	Wed 12/11/13
424	Revise Final SMP	15 days	Thu 12/12/13	Wed 1/1/14
425	Submit Final SMP for EPA/Tribe review	0 days	Wed 1/1/14	Wed 1/1/14
426	EPA Approval of Final Site-Wide Monitoring Plan	0 days	Wed 1/29/14	Wed 1/29/14
427	**EPA/Tribe Review of 90%Design submittal- Drawings, Plans, and Basis of Design Report**	**60 days**	**Thu 1/2/14**	**Wed 3/26/14**
428	EPA/Tribal initial review of 90% Design Submittal	40 days	Thu 1/2/14	Wed 2/26/14
429	EPA/Tribe meeting with Newmont regarding 90% Design	0 days	Wed 2/26/14	Wed 2/26/14
430	Continued EPA review	20 days	Thu 2/27/14	Wed 3/26/14
431	EPA submits comments on 90% Design Submittal for Midnite Mine Remedy	0 days	Wed 3/26/14	Wed 3/26/14
432				
433	**FINAL (100%) DESIGN PACKAGE - MIDNITE MINE REMEDY**	**40 days**	**Thu 3/27/14**	**Wed 5/21/14**
434	**Prepare RTCs to 90% EPA Design Comments and Meeting**	**20 days**	**Thu 3/27/14**	**Wed 4/23/14**
435	Prepare RTCs on 90% Design Package	20 days	Thu 3/27/14	Wed 4/23/14
436	Meeting with EPA/Tribe to discuss comments and Newmont responses	0 days	Wed 4/23/14	Wed 4/23/14
437	**Prepare 100%Design Drawings - revisions and additions**	**40 days**	**Thu 3/27/14**	**Wed 5/21/14**
438	GENERAL	20 days	Thu 3/27/14	Wed 4/23/14
439	CONSTRUCTION SUPPORT FACILITIES	20 days	Thu 3/27/14	Wed 4/23/14
440	BORROW AREA	20 days	Thu 3/27/14	Wed 4/23/14
441	MINE WASTE EXCAVATION	20 days	Thu 3/27/14	Wed 4/23/14
442	SURFACE WATER AND SEDIMENT CONTROLS	20 days	Thu 3/27/14	Wed 4/23/14
443	STORAGE PONDS	20 days	Thu 3/27/14	Wed 4/23/14
444	RECLAMATION OF PIT 4	20 days	Thu 3/27/14	Wed 4/23/14
445	GROUNDWATER CONTROLS	20 days	Thu 3/27/14	Wed 4/23/14
446	DEMOLITION	20 days	Thu 3/27/14	Wed 4/23/14
447	Internal Review of 100% Design Drawing and RTC package	5 days	Thu 4/24/14	Wed 4/30/14
448	Revisions to the 100% design drawings and RTCs	15 days	Thu 5/1/14	Wed 5/21/14
449	Submit 100% Design Package and RTCs to EPA/Tribe	0 days	Wed 5/21/14	Wed 5/21/14
450	**Basis of Design Report - 100% CALCULATIONS/ANALYSES**	**40 days**	**Thu 3/27/14**	**Wed 5/21/14**
451	Revision and additions to the 90% submittal- Drawings and Specifications	20 days	Thu 3/27/14	Wed 4/23/14
452	Internal Review of 100% Design Calculations and additions	5 days	Thu 4/24/14	Wed 4/30/14
453	Revisions to 100% Basis of Design Report based on internal review	10 days	Thu 5/1/14	Wed 5/14/14
454	Final Revisions to RTCs document and 100% design submittal	5 days	Thu 5/15/14	Wed 5/21/14
455	Submit 90% Design Package and RTCs to EPA/Tribe	0 days	Wed 5/21/14	Wed 5/21/14
456	**OTHER NAMED PLANS - 100% DESIGN SUBMITTAL/REVISIONS**	**40 days**	**Thu 3/27/14**	**Wed 5/21/14**
457	Work-Specific Health and Safety Plans	20 days	Thu 3/27/14	Wed 4/23/14



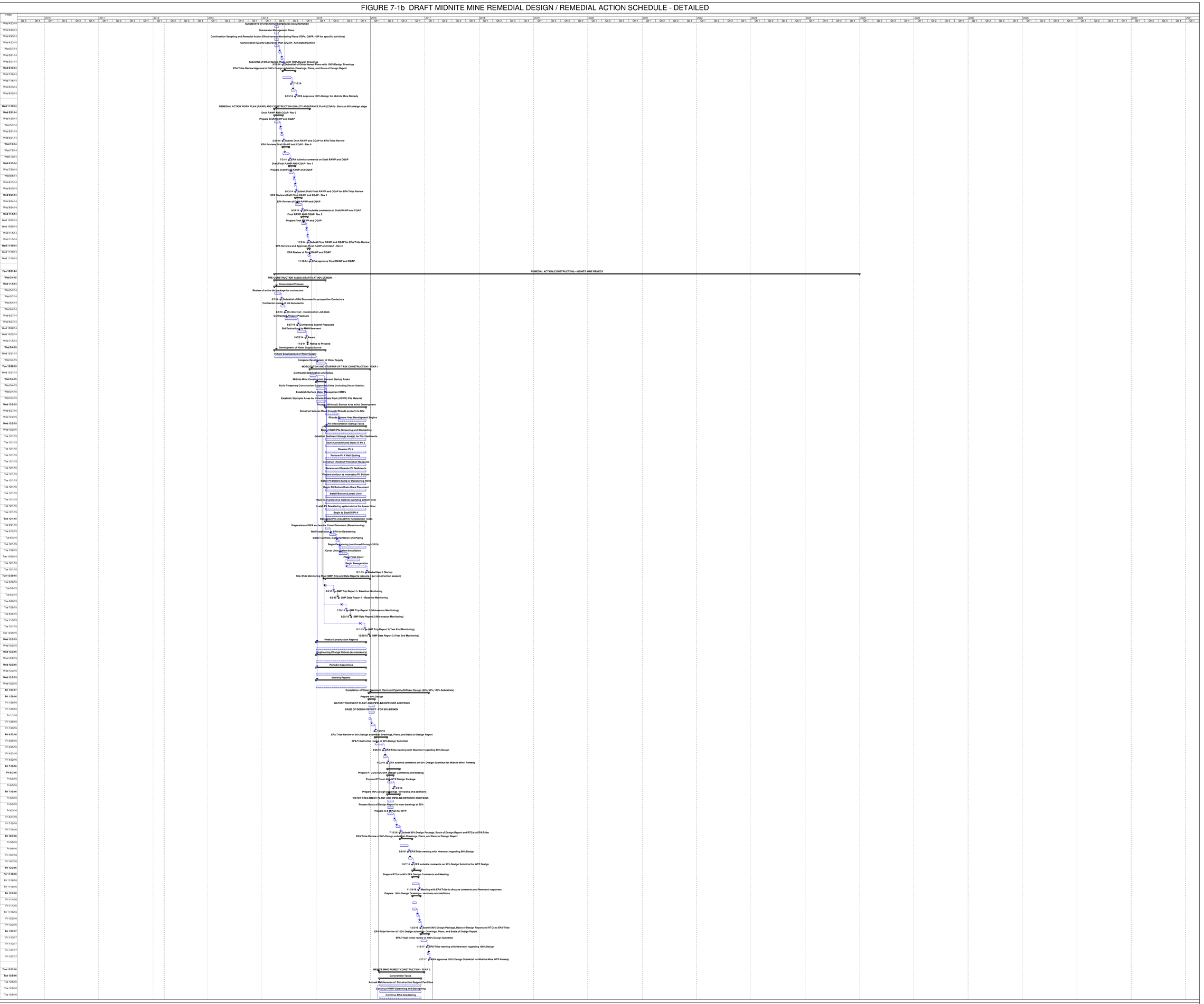
Project: Midnite Mine Remedial Design
Date: Wed 3/14/12

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

This draft schedule has been prepared based on current project knowledge and likely some of the individual tasks and their durations will change as the remedial design process unfolds and the remedial action begins.
Wed 3/14/12

FIGURE 7-1b DRAFT MIDNITE MINE REMEDIAL DESIGN / REMEDIAL ACTION SCHEDULE - DETAILED

ID	Task Name	Working Days (5days/week)	Start	Finish
458	Substantive Environmental Compliance Documentation	20 days	Thu 3/27/14	Wed 4/23/14
459	Stormwater Management Plans	20 days	Thu 3/27/14	Wed 4/23/14
460	Confirmation Sampling and Remedial Action Effectiveness Monitoring Plans (FSPs, QAPP, HSP for specific activities)	20 days	Thu 3/27/14	Wed 4/23/14
461	Construction Quality Assurance Plan (CQAP) Annotated Outline	20 days	Thu 3/27/14	Wed 4/23/14
462	Internal Review of 100% Other Design Plans (above)	10 days	Thu 4/24/14	Wed 5/7/14
463	Revisions to 100% Other Design Plans based on internal review	5 days	Thu 5/8/14	Wed 5/21/14
464	Submittal of Other Named Plans with 100% Design Drawings	0 days	Wed 5/21/14	Wed 5/21/14
465	**EPA/Tribe Review Approval of 100% Design submittal- Drawings, Plans, and Basis of Design Report**	**60 days**	**Thu 5/22/14**	**Wed 8/13/14**
466	EPA/Tribal initial review of 90% Design Submittal	40 days	Thu 5/22/14	Wed 7/16/14
467	EPA/Tribe meeting with Newmont regarding 100% Design	0 days	Wed 7/16/14	Wed 7/16/14
468	Continued EPA review before approval	20 days	Thu 7/17/14	Wed 8/13/14
469	EPA Approves 100% Design for Midnite Mine Remedy	0 days	Wed 8/13/14	Wed 8/13/14
470				
471	**REMEDIAL ACTION WORK PLAN (RAWP) AND CONSTRUCTION QUALITY ASSURANCE PLAN (CQAP) - Starts at 90%design stage**	**170 days**	**Thu 3/27/14**	**Wed 11/19/14**
472	**Draft RAWP AND CQAP- Rev 0**	**40 days**	**Thu 3/27/14**	**Wed 5/21/14**
473	Prepare Draft RAWP and CQAP	25 days	Thu 3/27/14	Wed 4/30/14
474	Internal review of RAWP and CQAP	5 days	Thu 5/1/14	Wed 5/7/14
475	Revise the Draft RAWP and CQAP based on internal comments	10 days	Thu 5/8/14	Wed 5/21/14
476	Submit Draft RAWP and CQAP for EPA/Tribe Review	0 days	Wed 5/21/14	Wed 5/21/14
477	**EPA Reviews Draft RAWP and CQAP - Rev 0**	**30 days**	**Thu 5/22/14**	**Wed 7/2/14**
478	EPA Review of Draft RAWP and CQAP	30 days	Thu 5/22/14	Wed 7/2/14
479	EPA submits comments on Draft RAWP and CQAP	0 days	Wed 7/2/14	Wed 7/2/14
480	**Draft Final RAWP AND CQAP- Rev 1**	**30 days**	**Thu 7/3/14**	**Wed 8/13/14**
481	Prepare Draft Final RAWP and CQAP	20 days	Thu 7/3/14	Wed 7/30/14
482	Internal review of Draft Final RAWP and CQAP	5 days	Thu 7/31/14	Wed 8/6/14
483	Revise the Draft Final RAWP and CQAP based on internal comments	5 days	Thu 8/7/14	Wed 8/13/14
484	Submit Draft Final RAWP and CQAP for EPA/Tribe Review	0 days	Wed 8/13/14	Wed 8/13/14
485	**EPA Reviews Draft Final RAWP and CQAP - Rev 1**	**30 days**	**Thu 8/14/14**	**Wed 9/24/14**
486	EPA Review of Draft RAWP and CQAP	30 days	Thu 8/14/14	Wed 9/24/14
487	EPA submits comments on Draft RAWP and CQAP	0 days	Wed 9/24/14	Wed 9/24/14
488	**Final RAWP AND CQAP- Rev 2**	**30 days**	**Thu 9/25/14**	**Wed 11/5/14**
489	Prepare Final RAWP and CQAP	20 days	Thu 9/25/14	Wed 10/22/14
490	Internal review of Final RAWP and CQAP	5 days	Thu 10/23/14	Wed 10/29/14
491	Revise the Final RAWP and CQAP based on internal comments	5 days	Thu 10/30/14	Wed 11/5/14
492	Submit Final RAWP and CQAP for EPA/Tribe Review	0 days	Wed 11/5/14	Wed 11/5/14
493	**EPA Reviews and Approves Final RAWP and CQAP - Rev 2**	**10 days**	**Thu 11/6/14**	**Wed 11/19/14**
494	EPA Review of Final RAWP and CQAP	10 days	Thu 11/6/14	Wed 11/19/14
495	EPA approves Final RAWP and CQAP	0 days	Wed 11/19/14	Wed 11/19/14
496				
497	**REMEDIAL ACTION (CONSTRUCTION) - MIDNITE MINE REMEDY**	**2809 days**	**Thu 3/27/14**	**Tue 12/31/24**
498	**PRE-CONSTRUCTION TASKS (STARTS AT 90%DESIGN)**	**245 days**	**Thu 3/27/14**	**Wed 3/4/15**
499	**Procurement Process**	**160 days**	**Thu 3/27/14**	**Wed 11/5/14**
500	Review of entire bid package for contractors	30 days	Thu 3/27/14	Wed 5/7/14
501	Submittal of Bid Document to prospective Contactors	0 days	Wed 5/7/14	Wed 5/7/14
502	Contractor review of bid documents	20 days	Thu 5/8/14	Wed 6/4/14
503	On-Site visit - Construction Job Walk	0 days	Wed 6/4/14	Wed 6/4/14
504	Contractors Prepare Proposals	60 days	Thu 6/5/14	Wed 8/27/14
505	Contractors Submit Proposals	0 days	Wed 8/27/14	Wed 8/27/14
506	Bid Evaluations by MWH/Newmont	40 days	Thu 8/28/14	Wed 10/22/14
507	Award	0 days	Wed 10/22/14	Wed 10/22/14
508	Notice to Proceed	0 days	Wed 11/5/14	Wed 11/5/14
509	**Development of Water Supply Source**	**245 days**	**Thu 3/27/14**	**Wed 3/4/15**
510	Initiate Development of Water Supply	200 days	Thu 3/27/14	Wed 12/31/14
511	Complete Development of Water Supply	45 days	Thu 1/1/15	Wed 3/4/15
512	**MOBILIZATION AND STARTUP OF TASK CONSTRUCTION - YEAR 1**	**289 days**	**Thu 11/20/14**	**Tue 12/29/15**
513	Contractor Mobilization and Setup	30 days	Thu 11/20/14	Wed 12/31/14
514	**Midnite Mine Construction General Startup Tasks**	**45 days**	**Thu 1/1/15**	**Wed 3/4/15**
515	Build Temporary Construction Support facilities (including Decon Station)	45 days	Thu 1/1/15	Wed 3/4/15
516	Establish Surface Water Management BMPs	45 days	Thu 1/1/15	Wed 3/4/15
517	Establish Stockpile Areas for Hillside Waste Rock (HSWR) Pile Material	45 days	Thu 1/1/15	Wed 3/4/15
518	**Rhoads (Whitetail) Borrow Area Initial Development**	**195 days**	**Thu 3/5/15**	**Wed 12/2/15**
519	Construct Access Road through Rhoads property to Site	60 days	Thu 3/5/15	Wed 5/27/15
520	Rhoads Borrow Area Development Begins	135 days	Thu 5/28/15	Wed 12/2/15
521	**Pit 4 Reclamation Startup Tasks**	**196 days**	**Wed 3/4/15**	**Wed 12/2/15**
522	Begin HSWR Pile Screening and Stockpiling	195 days	Wed 3/4/15	Wed 12/2/15
523	Establish Sediment Storage Area(s) for Pit 4 Sediments	195 days	Wed 3/4/15	Tue 12/1/15
524	Store Contaminated Water in Pit 3	195 days	Wed 3/4/15	Tue 12/1/15
525	Dewater Pit 4	195 days	Wed 3/4/15	Tue 12/1/15
526	Perform Pit 4 Wall Scaling	195 days	Wed 3/4/15	Tue 12/1/15
527	Construct Rockfall Protection Measures	195 days	Wed 3/4/15	Tue 12/1/15
528	Remove and Dewater Pit Sediments	195 days	Wed 3/4/15	Tue 12/1/15
529	Prepare/contour as necessary Pit Bottom	195 days	Wed 3/4/15	Tue 12/1/15
530	Install Pit Bottom Sump or Dewatering Wells	195 days	Wed 3/4/15	Tue 12/1/15
531	Begin Pit Bottom Drain Rock Placement	195 days	Wed 3/4/15	Tue 12/1/15
532	Install Bottom (Lower) Liner	195 days	Wed 3/4/15	Tue 12/1/15
533	Place liner protective material overlying bottom liner	195 days	Wed 3/4/15	Tue 12/1/15
534	Install Pit Dewatering system above the Lower Liner	195 days	Wed 3/4/15	Tue 12/1/15
535	Begin to Backfill Pit 4	195 days	Wed 3/4/15	Tue 12/1/15
536	**Backfilled Pits Area (BPA) Remediation Tasks**	**195 days**	**Wed 3/4/15**	**Tue 12/1/15**
537	Preparation of BPA surface for Cover Placement (Recontouring)	20 days	Wed 3/4/15	Tue 3/31/15
538	Well Installation in BPA for Dewatering	30 days	Wed 4/1/15	Tue 5/12/15
539	Install Controls, Instrumentation and Piping	15 days	Wed 5/13/15	Tue 6/2/15
540	Begin Dewatering (continued through 2019)	130 days	Wed 6/3/15	Tue 12/1/15
541	Cover Liner System Installation	40 days	Wed 6/3/15	Tue 7/28/15
542	Place Final Cover	60 days	Wed 7/29/15	Tue 10/20/15
543	Begin Revegetation	90 days	Wed 7/29/15	Tue 12/1/15
544	End of Year 1 Startup	0 days	Tue 12/1/15	Tue 12/1/15
545	**Site-Wide Monitoring Plan (SMP) Trip and Data Reports (assume 3 per construction season)**	**215 days**	**Wed 3/4/15**	**Tue 12/29/15**
546	SMP Beginning or Baseline Monitoring	5 days	Wed 3/4/15	Tue 3/10/15
547	SMP Trip Report 1- Baseline Monitoring	0 days	Tue 5/5/15	Tue 5/5/15
548	SMP Data Report 1 - Baseline Monitoring	0 days	Tue 6/2/15	Tue 6/2/15
549	SMP Mid Construction Season Monitoring	5 days	Wed 6/24/15	Tue 6/30/15
550	SMP Trip Report 2 (Mid-season Monitoring)	0 days	Tue 7/28/15	Tue 7/28/15
551	SMP Data Report 2 (Mid-season Monitoring)	0 days	Tue 8/25/15	Tue 8/25/15
552	SMP End Construction Season Monitoring	5 days	Wed 10/28/15	Tue 11/3/15
553	SMP Trip Report 3 (Year End Monitoring)	0 days	Tue 12/1/15	Tue 12/1/15
554	SMP Data Report 3 (Year End Monitoring)	0 days	Tue 12/29/15	Tue 12/29/15
555	**Weekly Construction Reports**	**240 days**	**Thu 1/1/15**	**Wed 12/2/15**
556	Weekly Construction Reports	240 days	Thu 1/1/15	Wed 12/2/15
557	**Engineering Change Notices (as necessary)**	**240 days**	**Thu 1/1/15**	**Wed 12/2/15**
558	Engineering Change Notices	240 days	Thu 1/1/15	Wed 12/2/15
559	**Periodic Inspections**	**240 days**	**Thu 1/1/15**	**Wed 12/2/15**
560	Periodic Inspections	240 days	Thu 1/1/15	Wed 12/2/15
561	**Monthly Reports**	**240 days**	**Thu 1/1/15**	**Wed 12/2/15**
562	Monthly Reports	240 days	Thu 1/1/15	Wed 12/2/15
563	**Completion of Water Treatment Plant and Pipeline/Diffuser Design (60%, 90%, 100% Submittals)**	**290 days**	**Mon 12/21/15**	**Fri 1/27/17**
564	**Prepare 60% Design**	**30 days**	**Mon 12/21/15**	**Fri 1/29/16**
565	WATER TREATMENT PLANT AND PIPELINE/DIFFUSER ADDITIONS	30 days	Mon 12/21/15	Fri 1/29/16
566	BASIS OF DESIGN REPORT - FOR 60% DESIGN	30 days	Mon 12/21/15	Fri 1/29/16
567	Internal Review of 60% Design Drawing and Basis of Design Report	10 days	Mon 12/21/15	Fri 1/1/16
568	Revisions to the 60% design drawings	20 days	Mon 1/4/16	Fri 1/29/16
569	Submit revisions to the 60% design drawings	0 days	Fri 1/29/16	Fri 1/29/16
570	**EPA/Tribe Review of 60% Design submittal- Drawings, Plans, and Basis of Design Report**	**60 days**	**Mon 2/1/16**	**Fri 4/22/16**
571	EPA/Tribal initial review of 60% Design Submittal	40 days	Mon 2/1/16	Fri 3/25/16
572	EPA/Tribe meeting with Newmont regarding 60% Design	0 days	Fri 3/25/16	Fri 3/25/16
573	Continued EPA review	20 days	Mon 3/28/16	Fri 4/22/16
574	EPA submits comments on 60% Design Submittal for Midnite Mine Remedy	0 days	Fri 4/22/16	Fri 4/22/16
575	**Prepare 90% Design**	**60 days**	**Mon 4/25/16**	**Fri 7/15/16**
576	**Prepare RTCs to 60% EPA Design Comments and Meeting**	**30 days**	**Mon 4/25/16**	**Fri 6/3/16**
577	Prepare RTCs on 60% WTP Design Package	30 days	Mon 4/25/16	Fri 6/3/16
578	Meeting with EPA/Tribe to discuss comments and Newmont responses	0 days	Fri 6/3/16	Fri 6/3/16
579	**Prepare 90% Design Drawings - revisions and additions**	**60 days**	**Mon 4/25/16**	**Fri 7/15/16**
580	WATER TREATMENT PLANT AND PIPELINE/DIFFUSER ADDITIONS	30 days	Mon 4/25/16	Fri 6/3/16
581	Prepare Basis of Design Report for new drawings at 90%	30 days	Mon 4/25/16	Fri 6/3/16
582	Prepare O & M Plan for WTP	30 days	Mon 4/25/16	Fri 6/3/16
583	Internal Review of 90% Design Drawing and RTC package	10 days	Mon 6/6/16	Fri 6/17/16
584	Revisions to the 90% design drawings and RTCs	20 days	Mon 6/20/16	Fri 7/15/16
585	Submit 90% Design Package, Basis of Design Report and RTCs to EPA/Tribe	0 days	Fri 7/15/16	Fri 7/15/16
586	**EPA/Tribe Review of 90% Design submittal- Drawings, Plans, and Basis of Design Report**	**60 days**	**Mon 7/18/16**	**Fri 10/7/16**
587	EPA/Tribal initial review of 90% Design Submittal	40 days	Mon 7/18/16	Fri 9/9/16
588	EPA/Tribe meeting with Newmont regarding 90% Design	0 days	Fri 9/9/16	Fri 9/9/16
589	Continued EPA review	20 days	Mon 9/12/16	Fri 10/7/16
590	EPA submits comments on 90% Design Submittal for WTP Design	0 days	Fri 10/7/16	Fri 10/7/16
591	**Prepare 100% Design**	**40 days**	**Mon 10/10/16**	**Fri 12/2/16**
592	**Prepare RTCs to 90% EPA Design Comments and Meeting**	**30 days**	**Mon 10/10/16**	**Fri 11/18/16**
593	Prepare RTCs on 90% WTP Design Package	30 days	Mon 10/10/16	Fri 11/18/16
594	Meeting with EPA/Tribe to discuss comments and Newmont responses	0 days	Fri 11/18/16	Fri 11/18/16
595	**Prepare 100% Design Drawings - revisions and additions**	**40 days**	**Mon 10/10/16**	**Fri 12/2/16**
596	WATER TREATMENT PLANT AND PIPELINE/DIFFUSER ADDITIONS	20 days	Mon 10/10/16	Fri 11/14/16
597	Prepare Basis of Design Report for any final changes or additions	20 days	Mon 10/10/16	Fri 11/14/16
598	Internal Review of 100% Design Drawing and RTC package	10 days	Mon 11/17/16	Fri 11/18/16
599	Revisions to the 100% design drawings and RTCs	10 days	Mon 11/21/16	Fri 12/2/16
600	Submit 90% Design Package, Basis of Design Report and RTCs to EPA/Tribe	0 days	Fri 12/2/16	Fri 12/2/16
601	**EPA/Tribe Review of 100% Design submittal- Drawings, Plans, and Basis of Design Report**	**40 days**	**Mon 12/5/16**	**Fri 1/27/17**
602	EPA/Tribal initial review of 100% Design Submittal	30 days	Mon 12/5/16	Fri 1/13/17
603	EPA/Tribe meeting with Newmont regarding 100% Design	0 days	Fri 1/13/17	Fri 1/13/17
604	Continued EPA review prior to approval	10 days	Mon 1/16/17	Fri 1/27/17
605	EPA approves 100% Design Submittal for Midnite Mine WTP Remedy	0 days	Fri 1/27/17	Fri 1/27/17
606				
607	**MIDNITE MINE REMEDY CONSTRUCTION - YEAR 2**	**215 days**	**Wed 3/2/16**	**Tue 12/27/16**
608	**General Site Tasks**	**200 days**	**Wed 3/2/16**	**Tue 12/6/16**
609	Annual Maintenance of Construction Support Facilities	200 days	Wed 3/2/16	Tue 12/6/16
610	Continue HWRP Screening and Stockpiling	200 days	Wed 3/2/16	Tue 12/6/16
611	Continue BPA Dewatering	200 days	Wed 3/2/16	Tue 12/6/16



Project: Midnite Mine Remedial Design
Date: Wed 3/14/12

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

This draft schedule has been prepared based on current project knowledge and likely some of the individual tasks and their durations will change as the remedial design process unfolds and the remedial action begins.
Wed 3/14/12

FIGURE 7-1b DRAFT MIDNITE MINE REMEDIAL DESIGN / REMEDIAL ACTION SCHEDULE - DETAILED

ID	Task Name	Working Days (5days/week)	Start	Finish
612	Continue to Store Site Water in Pit 3	200 days	Wed 3/2/16	Tue 12/6/16
613	Update Surface Water Management BMPs	200 days	Wed 3/2/16	Tue 12/6/16
614	**Pit 4 Reclamation Tasks (Continued)**	**200 days**	**Wed 3/2/16**	**Tue 12/6/16**
615	Continue Placing Drainage Rock in Pit 4	200 days	Wed 3/2/16	Tue 12/6/16
616	Continue Backfilling of Pit 4 with Waste Rock	200 days	Wed 3/2/16	Tue 12/6/16
617	Begin Protore Placement in Pit 4	200 days	Wed 3/2/16	Tue 12/6/16
618	As Necessary, excavate waste that may be associated with new WTP location. Verify location is clean	200 days	Wed 3/2/16	Tue 12/6/16
619	End of Year 2 Midnite Mine Remedy Construction	0 days	Tue 12/6/16	Tue 12/6/16
620	**SMP Trip and Data Reports (assume 3 per construction season)**	**215 days**	**Wed 3/2/16**	**Tue 12/27/16**
621	SMP Beginning or Baseline Monitoring	5 days	Wed 3/2/16	Tue 3/8/16
622	SMP Trip Report 1- Baseline Monitoring	0 days	Tue 4/5/16	Tue 4/5/16
623	SMP Data Report 1 - Baseline Monitoring	0 days	Tue 5/3/16	Tue 5/3/16
624	SMP Mid-Construction Season Monitoring	5 days	Wed 6/22/16	Tue 6/28/16
625	SMP Trip Report 2 (Mid-season Monitoring)	0 days	Tue 7/26/16	Tue 7/26/16
626	SMP Data Report 2 (Mid-season Monitoring)	0 days	Tue 8/23/16	Tue 8/23/16
627	SMP End Construction Season Monitoring	5 days	Wed 10/26/16	Tue 11/1/16
628	SMP Trip Report 3 (Year End Monitoring)	0 days	Tue 11/29/16	Tue 11/29/16
629	SMP Data Report 3 (Year End Monitoring)	0 days	Tue 12/27/16	Tue 12/27/16
630	**Weekly Construction Reports**	**200 days**	**Wed 3/2/16**	**Tue 12/6/16**
631	Weekly Construction Reports	200 days	Wed 3/2/16	Tue 12/6/16
632	**Engineering Change Notices (as necessary)**	**200 days**	**Wed 3/2/16**	**Tue 12/6/16**
633	Engineering Change Notices	200 days	Wed 3/2/16	Tue 12/6/16
634	**Periodic Inspections**	**200 days**	**Wed 3/2/16**	**Tue 12/6/16**
635	Periodic Inspections	200 days	Wed 3/2/16	Tue 12/6/16
636	**Monthly Reports**	**200 days**	**Wed 3/2/16**	**Tue 12/6/16**
637	Monthly Reports	200 days	Wed 3/2/16	Tue 12/6/16
638				
639	**MIDNITE MINE REMEDY CONSTRUCTION - YEAR 3**	**215 days**	**Wed 3/1/17**	**Tue 12/26/17**
640	**General Site Tasks**	**200 days**	**Wed 3/1/17**	**Tue 12/5/17**
641	Annual Facilities Maintenance	200 days	Wed 3/1/17	Tue 12/5/17
642	Continue HWRP Screening and Stockpiling	200 days	Wed 3/1/17	Tue 12/5/17
643	Continue BPA Dewatering	200 days	Wed 3/1/17	Tue 12/5/17
644	Continue to Store Site Water in Pit 3	200 days	Wed 3/1/17	Tue 12/5/17
645	Update Surface Water Management BMPs	200 days	Wed 3/1/17	Tue 12/5/17
646	**Pit 4 Reclamation Tasks (Continued)**	**200 days**	**Wed 3/1/17**	**Tue 12/5/17**
647	Continue Placing Drain Rock in Pit 4	200 days	Wed 3/1/17	Tue 12/5/17
648	Continue Backfilling of Pit 4 with Waste Rock	200 days	Wed 3/1/17	Tue 12/5/17
649	**Construction/Startup of New Water Treatment Plant (WTP)**	**195 days**	**Wed 3/1/17**	**Tue 11/28/17**
650	Mobilization of Plant Construction Contractor	20 days	Wed 3/1/17	Tue 3/28/17
651	Corestruction and Startup of New WTP	175 days	Wed 3/29/17	Tue 11/28/17
652	**Construction of Discharge Pipeline to Lake Roosevelt**	**195 days**	**Wed 3/1/17**	**Tue 11/28/17**
653	Install Discharge Pipeline to Lake Roosevelt	195 days	Wed 3/1/17	Tue 11/28/17
654	Install Diffuser in Lake	195 days	Wed 3/1/17	Tue 11/28/17
655	End of Year 3 Midnite Mine Remedy Construction	0 days	Tue 11/28/17	Tue 11/28/17
656	**SMP Trip and Data Reports (assume 3 per construction season)**	**215 days**	**Wed 3/1/17**	**Tue 12/26/17**
657	SMP Beginning or Baseline Monitoring	5 days	Wed 3/1/17	Tue 3/7/17
658	SMP Trip Report 1- Baseline Monitoring	0 days	Tue 4/4/17	Tue 4/4/17
659	SMP Data Report 1 - Baseline Monitoring	0 days	Tue 5/2/17	Tue 5/2/17
660	SMP Mid-Construction Season Monitoring	5 days	Wed 6/21/17	Tue 6/27/17
661	SMP Trip Report 2 (Mid-season Monitoring)	0 days	Tue 7/25/17	Tue 7/25/17
662	SMP Data Report 2 (Mid-season Monitoring)	0 days	Tue 8/22/17	Tue 8/22/17
663	SMP End Construction Season Monitoring	5 days	Wed 10/25/17	Tue 10/31/17
664	SMP Trip Report 3 (Year End Monitoring)	0 days	Tue 11/28/17	Tue 11/28/17
665	SMP Data Report 3 (Year End Monitoring)	0 days	Tue 12/26/17	Tue 12/26/17
666	**Weekly Construction Reports**	**195 days**	**Wed 3/1/17**	**Tue 11/28/17**
667	Weekly Construction Reports	195 days	Wed 3/1/17	Tue 11/28/17
668	**Engineering Change Notices (as necessary)**	**195 days**	**Wed 3/1/17**	**Tue 11/28/17**
669	Engineering Change Notices	195 days	Wed 3/1/17	Tue 11/28/17
670	**Periodic Inspections**	**195 days**	**Wed 3/1/17**	**Tue 11/28/17**
671	Periodic Inspections	195 days	Wed 3/1/17	Tue 11/28/17
672	**Monthly Reports**	**195 days**	**Wed 3/1/17**	**Tue 11/28/17**
673	Monthly Reports	195 days	Wed 3/1/17	Tue 11/28/17
674	**Completion of Final Design for Pit 3 - based on lessons learned from Pit 4**	**260 days**	**Wed 11/29/17**	**Tue 11/27/18**
716				
717	**MIDNITE MINE REMEDY CONSTRUCTION - YEAR 4**	**263 days**	**Fri 3/2/18**	**Tue 3/5/19**
718	**General Site Tasks**	**195 days**	**Fri 3/2/18**	**Thu 11/29/18**
719	Annual Facilities Maintenance	195 days	Fri 3/2/18	Thu 11/29/18
720	Continue HWRP Screening and Stockpiling	195 days	Fri 3/2/18	Thu 11/29/18
721	Continue BPA Dewatering	195 days	Fri 3/2/18	Thu 11/29/18
722	Continue to Store Site Water in Pit 3	195 days	Fri 3/2/18	Thu 11/29/18
723	Begin water treatment using new WTP	195 days	Fri 3/2/18	Thu 11/29/18
724	Update Surface Water Management BMPs	195 days	Fri 3/2/18	Thu 11/29/18
725	Preparation of Borrow Area for Use (Rhoads Property)	195 days	Fri 3/2/18	Thu 11/29/18
726	**Decommission/Demolition of Existing (Old) WTP**	**195 days**	**Fri 3/2/18**	**Thu 11/29/18**
727	Mobilization of Demolition Contractor	20 days	Fri 3/2/18	Thu 3/29/18
728	Demolition of Old WTP and remove underlying wastes	175 days	Fri 3/30/18	Thu 11/29/18
729	**Pit 4 Reclamation Tasks (Completed this year)**	**195 days**	**Fri 3/2/18**	**Thu 11/29/18**
730	Final Drain Rock Placement (if necessary)	80 days	Fri 3/2/18	Thu 6/21/18
731	Continued Backfilling of Pit with Waste Rock	80 days	Fri 3/2/18	Thu 6/21/18
732	Install Cover Liner	35 days	Fri 6/22/18	Thu 8/9/18
733	Place Cover	48 days	Fri 8/10/18	Tue 10/16/18
734	Begin Revegetation	80 days	Fri 8/10/18	Thu 11/29/18
735	**Water Storage Pond Construction - Phase 8 South Storage Pond**	**195 days**	**Fri 3/2/18**	**Thu 11/29/18**
736	Excavation of South Storage Pond	125 days	Fri 3/2/18	Thu 8/23/18
737	Installation of South Pond Liner	50 days	Fri 8/24/18	Thu 11/1/18
738	Installation of Control and Instrumentation	20 days	Fri 11/2/18	Thu 11/29/18
739	End of Year 4 Midnite Mine Remedy Construction	0 days	Thu 11/29/18	Thu 11/29/18
740	**Pit 5 Startup Tasks**	**68 days**	**Fri 11/30/18**	**Tue 3/5/19**
741	Begin Dewatering of Pit 3 (using new WTP)	68 days	Fri 11/30/18	Tue 3/5/19
742	Establish Sediment Storage Areas	68 days	Fri 11/30/18	Tue 3/5/19
743	**SMP Trip and Data Reports (assume 3 per construction season)**	**215 days**	**Fri 3/2/18**	**Thu 12/27/18**
744	SMP Beginning or Baseline Monitoring	5 days	Fri 3/2/18	Thu 3/8/18
745	SMP Trip Report 1- Baseline Monitoring	0 days	Thu 4/5/18	Thu 4/5/18
746	SMP Data Report 1 - Baseline Monitoring	0 days	Thu 5/3/18	Thu 5/3/18
747	SMP Mid-Construction Season Monitoring	5 days	Fri 6/22/18	Thu 6/28/18
748	SMP Trip Report 2 (Mid-season Monitoring)	0 days	Thu 7/26/18	Thu 7/26/18
749	SMP Data Report 2 (Mid-season Monitoring)	0 days	Thu 8/23/18	Thu 8/23/18
750	SMP End Construction Season Monitoring	5 days	Fri 10/26/18	Thu 11/1/18
751	SMP Trip Report 3 (Year End Monitoring)	0 days	Thu 11/29/18	Thu 11/29/18
752	SMP Data Report 3 (Year End Monitoring)	0 days	Thu 12/27/18	Thu 12/27/18
753	**Weekly Construction Reports**	**195 days**	**Fri 3/2/18**	**Thu 11/29/18**
754	Weekly Construction Reports	195 days	Fri 3/2/18	Thu 11/29/18
755	**Engineering Change Notices (as necessary)**	**195 days**	**Fri 3/2/18**	**Thu 11/29/18**
756	Engineering Change Notices	195 days	Fri 3/2/18	Thu 11/29/18
757	**Periodic Inspections**	**195 days**	**Fri 3/2/18**	**Thu 11/29/18**
758	Periodic Inspections	195 days	Fri 3/2/18	Thu 11/29/18
759	**Monthly Reports**	**195 days**	**Fri 3/2/18**	**Thu 11/29/18**
760	Monthly Reports	195 days	Fri 3/2/18	Thu 11/29/18
761				
762	**MIDNITE MINE REMEDY CONSTRUCTION - YEAR 5**	**215 days**	**Tue 3/5/19**	**Mon 12/30/19**
763	**General Site Tasks**	**195 days**	**Tue 3/5/19**	**Mon 12/2/19**
764	Annual Facilities Maintenance	195 days	Tue 3/5/19	Mon 12/2/19
765	Continue HWRP Screening and Stockpiling	195 days	Tue 3/5/19	Mon 12/2/19
766	Continue BPA Dewatering (Finished at the end of year)	195 days	Tue 3/5/19	Mon 12/2/19
767	Begin Storing Site Water in the Phase 8 South Pond	195 days	Tue 3/5/19	Mon 12/2/19
768	Update Surface Water Management BMPs	195 days	Tue 3/5/19	Mon 12/2/19
769	**Pit 3 Reclamation Tasks**	**195 days**	**Wed 3/6/19**	**Tue 12/3/19**
770	Continue Complete Dewatering of Pit 3	20 days	Wed 3/6/19	Tue 4/2/19
771	Perform Pit 3 Wall Scaling and Construct Rockfall Protection Controls	60 days	Wed 4/3/19	Tue 6/25/19
772	Remove and Dewater Pit Sediments	30 days	Wed 6/26/19	Tue 8/6/19
773	Prepare/Contour Pit Bottom, as necessary	30 days	Wed 8/7/19	Tue 9/17/19
774	Install Pit Bottom Sump or Dewatering Wells	30 days	Wed 9/18/19	Tue 10/29/19
775	Begin Pit Bottom Drain Rock Placement	25 days	Wed 10/30/19	Tue 12/3/19
776	End of Year 5 Midnite Mine Remedy Construction	0 days	Tue 12/3/19	Tue 12/3/19
777	**SMP Trip and Data Reports (assume 3 per construction season)**	**215 days**	**Tue 3/5/19**	**Mon 12/30/19**
778	SMP Beginning or Baseline Monitoring	5 days	Tue 3/5/19	Mon 3/11/19
779	SMP Trip Report 1- Baseline Monitoring	0 days	Mon 4/8/19	Mon 4/8/19
780	SMP Data Report 1 - Baseline Monitoring	0 days	Mon 5/6/19	Mon 5/6/19
781	SMP Mid-Construction Season Monitoring	5 days	Tue 6/25/19	Mon 7/1/19
782	SMP Trip Report 2 (Mid-season Monitoring)	0 days	Mon 7/29/19	Mon 7/29/19
783	SMP Data Report 2 (Mid-season Monitoring)	0 days	Mon 8/26/19	Mon 8/26/19
784	SMP End Construction Season Monitoring	5 days	Tue 10/29/19	Mon 11/4/19
785	SMP Trip Report 3 (Year End Monitoring)	0 days	Mon 12/2/19	Mon 12/2/19
786	SMP Data Report 3 (Year End Monitoring)	0 days	Mon 12/30/19	Mon 12/30/19
787	**Weekly Construction Reports**	**195 days**	**Tue 3/5/19**	**Mon 12/2/19**
788	Weekly Construction Reports	195 days	Tue 3/5/19	Mon 12/2/19
789	**Engineering Change Notices (as necessary)**	**195 days**	**Tue 3/5/19**	**Mon 12/2/19**
790	Engineering Change Notices	195 days	Tue 3/5/19	Mon 12/2/19
791	**Periodic Inspections**	**195 days**	**Tue 3/5/19**	**Mon 12/2/19**
792	Periodic Inspections	195 days	Tue 3/5/19	Mon 12/2/19
793	**Monthly Reports**	**195 days**	**Tue 3/5/19**	**Mon 12/2/19**
794	Monthly Reports	195 days	Tue 3/5/19	Mon 12/2/19
795				
796	**MIDNITE MINE REMEDY CONSTRUCTION - YEAR 6**	**215 days**	**Wed 3/4/20**	**Tue 12/29/20**
797	**General Site Tasks**	**195 days**	**Wed 3/4/20**	**Tue 12/1/20**
798	Annual Facilities Maintenance	195 days	Wed 3/4/20	Tue 12/1/20
799	Update Surface Water Management BMPs	195 days	Wed 3/4/20	Tue 12/1/20
800	Continue to Store Site Water in the Phase 8 South Pond	195 days	Wed 3/4/20	Tue 12/1/20
801	**Pit 3 Reclamation Tasks (Continued)**	**195 days**	**Wed 3/4/20**	**Tue 12/1/20**
802	Install Bottom Liner	195 days	Wed 3/4/20	Tue 12/1/20
803	Place liner protective material (overlying liner)	195 days	Wed 3/4/20	Tue 12/1/20
804	Install Pit Dewatering system above the Lower Liner	195 days	Wed 3/4/20	Tue 12/1/20
805	Begin to Backfill Pit 3	195 days	Wed 3/4/20	Tue 12/1/20
806	Continued Backfilling of Pit with Waste Rock	195 days	Wed 3/4/20	Tue 12/1/20

Project: Midnite Mine Remedial Design | Date: Wed 3/14/12

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

This draft schedule has been prepared based on current project knowledge and likely some of the individual tasks and their durations will change as the remedial design process unfolds and the remedial action begins.
Wed 3/14/12

FIGURE 7-1b DRAFT MIDNITE MINE REMEDIAL DESIGN / REMEDIAL ACTION SCHEDULE - DETAILED

ID	Task Name	Working Days (5days/week)	Start	Finish
807	Continued Drain Rock Placement	195 days	Wed 3/4/20	Tue 12/1/20
808	End of Year 6 Midnite Mine Remedy Construction	0 days	Tue 12/1/20	Tue 12/1/20
809	**SMP Trip and Data Reports (assume 3 per construction season)**	**215 days**	**Wed 3/4/20**	**Tue 12/29/20**
810	SMP Beginning-or Baseline Monitoring	5 days	Wed 3/4/20	Tue 3/10/20
811	SMP Trip Report 1- Baseline Monitoring	0 days	Tue 4/7/20	Tue 4/7/20
812	SMP Data Report 1 - Baseline Monitoring	0 days	Tue 5/5/20	Tue 5/5/20
813	SMP Mid-Construction Season Monitoring	5 days	Wed 6/24/20	Tue 6/30/20
814	SMP Trip Report 2 (Mid-season Monitoring)	0 days	Tue 7/28/20	Tue 7/28/20
815	SMP Data Report 2 (Mid-season Monitoring)	0 days	Tue 8/25/20	Tue 8/25/20
816	SMP End Construction Season Monitoring	5 days	Wed 10/28/20	Tue 11/3/20
817	SMP Trip Report 3 (Year End Monitoring)	0 days	Tue 12/1/20	Tue 12/1/20
818	SMP Data Report 3 (Year End Monitoring)	0 days	Tue 12/29/20	Tue 12/29/20
819	**Weekly Construction Reports**	**195 days**	**Wed 3/4/20**	**Tue 12/1/20**
820	Weekly Construction Reports	195 days	Wed 3/4/20	Tue 12/1/20
821	**Engineering Change Notices (as necessary)**	**195 days**	**Wed 3/4/20**	**Tue 12/1/20**
822	Engineering Change Notices	195 days	Wed 3/4/20	Tue 12/1/20
823	**Periodic Inspections**	**195 days**	**Wed 3/4/20**	**Tue 12/1/20**
824	Periodic Inspections	195 days	Wed 3/4/20	Tue 12/1/20
825	**Monthly Reports**	**195 days**	**Wed 3/4/20**	**Tue 12/1/20**
826	Monthly Reports	195 days	Wed 3/4/20	Tue 12/1/20
827				
828	**MIDNITE MINE REMEDY CONSTRUCTION - YEAR 7**	**215 days**	**Thu 3/4/21**	**Wed 12/29/21**
829	**General Site Tasks**	**195 days**	**Thu 3/4/21**	**Wed 12/1/21**
830	Annual Facilities Maintenance	195 days	Thu 3/4/21	Wed 12/1/21
831	Update Surface Water Management BMPs	195 days	Thu 3/4/21	Wed 12/1/21
832	Continue to Store Site Water in the Phase II South Pond	195 days	Thu 3/4/21	Wed 12/1/21
833	**Pit 3 Reclamation Tasks (Continued)**	**195 days**	**Thu 3/4/21**	**Wed 12/1/21**
834	Continued Backfilling of Pit with Waste Rock	195 days	Thu 3/4/21	Wed 12/1/21
835	Continued Drain Rock Placement	195 days	Thu 3/4/21	Wed 12/1/21
836	End of Year 7 Midnite Mine Remedy Construction	0 days	Wed 12/1/21	Wed 12/1/21
837	**SMP Trip and Data Reports (assume 3 per construction season)**	**215 days**	**Thu 3/4/21**	**Wed 12/29/21**
838	SMP Beginning-or Baseline Monitoring	5 days	Thu 3/4/21	Wed 3/10/21
839	SMP Trip Report 1- Baseline Monitoring	0 days	Wed 4/7/21	Wed 4/7/21
840	SMP Data Report 1 - Baseline Monitoring	0 days	Wed 5/5/21	Wed 5/5/21
841	SMP Mid-Construction Season Monitoring	5 days	Thu 6/24/21	Wed 6/30/21
842	SMP Trip Report 2 (Mid-season Monitoring)	0 days	Wed 7/28/21	Wed 7/28/21
843	SMP Data Report 2 (Mid-season Monitoring)	0 days	Wed 8/25/21	Wed 8/25/21
844	SMP End Construction Season Monitoring	5 days	Thu 10/28/21	Wed 11/3/21
845	SMP Trip Report 3 (Year End Monitoring)	0 days	Wed 12/1/21	Wed 12/1/21
846	SMP Data Report 3 (Year End Monitoring)	0 days	Wed 12/29/21	Wed 12/29/21
847	**Weekly Construction Reports**	**195 days**	**Thu 3/4/21**	**Wed 12/1/21**
848	Weekly Construction Reports	195 days	Thu 3/4/21	Wed 12/1/21
849	**Engineering Change Notices (as necessary)**	**195 days**	**Thu 3/4/21**	**Wed 12/1/21**
850	Engineering Change Notices	195 days	Thu 3/4/21	Wed 12/1/21
851	**Periodic Inspections**	**195 days**	**Thu 3/4/21**	**Wed 12/1/21**
852	Periodic Inspections	195 days	Thu 3/4/21	Wed 12/1/21
853	**Monthly Reports**	**195 days**	**Thu 3/4/21**	**Wed 12/1/21**
854	Monthly Reports	195 days	Thu 3/4/21	Wed 12/1/21
855				
856	**MIDNITE MINE REMEDY CONSTRUCTION - YEAR 8**	**215 days**	**Mon 3/7/22**	**Fri 12/30/22**
857	**General Site Tasks**	**195 days**	**Mon 3/7/22**	**Fri 12/2/22**
858	Annual Facilities Maintenance	195 days	Mon 3/7/22	Fri 12/2/22
859	Update Surface Water Management BMPs	195 days	Mon 3/7/22	Fri 12/2/22
860	Continue to Store Contaminated Water in the Phase II South Pond until Phase III Pond is completed	195 days	Mon 3/7/22	Fri 12/2/22
861	**Water Storage Pond Construction - Phase III Storage Pond**	**195 days**	**Mon 3/7/22**	**Fri 12/2/22**
862	Embankment Construction	125 days	Mon 3/7/22	Fri 8/26/22
863	Installation of pond liner	50 days	Mon 8/29/22	Fri 11/4/22
864	Installation of Control and Instrumentation	20 days	Mon 11/7/22	Fri 12/2/22
865	Phase III pond construction complete	0 days	Fri 12/2/22	Fri 12/2/22
866	**Pit 3 Reclamation Tasks (Continued)**	**195 days**	**Mon 3/7/22**	**Fri 12/2/22**
867	Continued Backfilling of Pit with Waste Rock	195 days	Mon 3/7/22	Fri 12/2/22
868	Continued Drain Rock Placement	195 days	Mon 3/7/22	Fri 12/2/22
869	End of Year 8 Midnite Mine Remedy Construction	0 days	Fri 12/2/22	Fri 12/2/22
870	**SMP Trip and Data Reports (assume 3 per construction season)**	**215 days**	**Mon 3/7/22**	**Fri 12/30/22**
871	SMP Beginning-or Baseline Monitoring	5 days	Mon 3/7/22	Fri 3/11/22
872	SMP Trip Report 1- Baseline Monitoring	0 days	Fri 4/8/22	Fri 4/8/22
873	SMP Data Report 1 - Baseline Monitoring	0 days	Fri 5/6/22	Fri 5/6/22
874	SMP Mid-Construction Season Monitoring	5 days	Mon 6/27/22	Fri 7/1/22
875	SMP Trip Report 2 (Mid-season Monitoring)	0 days	Fri 7/29/22	Fri 7/29/22
876	SMP Data Report 2 (Mid-season Monitoring)	0 days	Fri 8/26/22	Fri 8/26/22
877	SMP End Construction Season Monitoring	5 days	Mon 10/31/22	Fri 11/4/22
878	SMP Trip Report 3 (Year End Monitoring)	0 days	Fri 12/2/22	Fri 12/2/22
879	SMP Data Report 3 (Year End Monitoring)	0 days	Fri 12/30/22	Fri 12/30/22
880	**Weekly Construction Reports**	**195 days**	**Mon 3/7/22**	**Fri 12/2/22**
881	Weekly Construction Reports	195 days	Mon 3/7/22	Fri 12/2/22
882	**Engineering Change Notices (as necessary)**	**195 days**	**Mon 3/7/22**	**Fri 12/2/22**
883	Engineering Change Notices	195 days	Mon 3/7/22	Fri 12/2/22
884	**Periodic Inspections**	**195 days**	**Mon 3/7/22**	**Fri 12/2/22**
885	Periodic Inspections	195 days	Mon 3/7/22	Fri 12/2/22
886	**Monthly Reports**	**195 days**	**Mon 3/7/22**	**Fri 12/2/22**
887	Monthly Reports	195 days	Mon 3/7/22	Fri 12/2/22
888				
889	**MIDNITE MINE REMEDY CONSTRUCTION - YEAR 9**	**215 days**	**Wed 3/1/23**	**Tue 12/26/23**
890	**General Site Tasks**	**200 days**	**Wed 3/1/23**	**Tue 12/5/23**
891	Annual Facilities Maintenance	200 days	Wed 3/1/23	Tue 12/5/23
892	Update Surface Water Management BMPs	200 days	Wed 3/1/23	Tue 12/5/23
893	Begin Storing Site Water in the Phase III Storage Pond	200 days	Wed 3/1/23	Tue 12/5/23
894	**Demolition of Phase II South Storage Pond**	**200 days**	**Wed 3/1/23**	**Tue 12/5/23**
895	Demolition of the Phase II South Pond (located on the South Waste Rock Pile)	200 days	Wed 3/1/23	Tue 12/5/23
896	Cover and Revegetate Area when Verified as Clean	200 days	Wed 3/1/23	Tue 12/5/23
897	**Mine Waste Removal Tasks - Haul Roads/Drainages**	**200 days**	**Wed 3/1/23**	**Tue 12/5/23**
898	Remove Wastes in Haul Road; Verify cleanup	200 days	Wed 3/1/23	Tue 12/5/23
899	Remove Sediments in Drainages; Verify cleanup	200 days	Wed 3/1/23	Tue 12/5/23
900	**Pit 3 Reclamation Tasks (Continued)**	**200 days**	**Wed 3/1/23**	**Tue 12/5/23**
901	Continued Backfilling of Pit 3 with Waste Rock	200 days	Wed 3/1/23	Tue 12/5/23
902	Continued Drain Rock Placement (if necessary)	200 days	Wed 3/1/23	Tue 12/5/23
903	End of Year 9 Midnite Mine Remedy Construction	0 days	Tue 12/5/23	Tue 12/5/23
904	**SMP Trip and Data Reports (assume 3 per construction season)**	**215 days**	**Wed 3/1/23**	**Tue 12/26/23**
905	SMP Beginning-or Baseline Monitoring	5 days	Wed 3/1/23	Tue 3/7/23
906	SMP Trip Report 1- Baseline Monitoring	0 days	Tue 4/4/23	Tue 4/4/23
907	SMP Data Report 1 - Baseline Monitoring	0 days	Tue 5/2/23	Tue 5/2/23
908	SMP Mid-Construction Season Monitoring	5 days	Wed 6/21/23	Tue 6/27/23
909	SMP Trip Report 2 (Mid-season Monitoring)	0 days	Tue 7/25/23	Tue 7/25/23
910	SMP Data Report 2 (Mid-season Monitoring)	0 days	Tue 8/22/23	Tue 8/22/23
911	SMP End Construction Season Monitoring	5 days	Wed 10/25/23	Tue 10/31/23
912	SMP Trip Report 3 (Year End Monitoring)	0 days	Tue 11/28/23	Tue 11/28/23
913	SMP Data Report 3 (Year End Monitoring)	0 days	Tue 12/26/23	Tue 12/26/23
914	**Weekly Construction Reports**	**200 days**	**Wed 3/1/23**	**Tue 12/5/23**
915	Weekly Construction Reports	200 days	Wed 3/1/23	Tue 12/5/23
916	**Engineering Change Notices (as necessary)**	**200 days**	**Wed 3/1/23**	**Tue 12/5/23**
917	Engineering Change Notices	200 days	Wed 3/1/23	Tue 12/5/23
918	**Periodic Inspections**	**200 days**	**Wed 3/1/23**	**Tue 12/5/23**
919	Periodic Inspections	200 days	Wed 3/1/23	Tue 12/5/23
920	**Monthly Reports**	**200 days**	**Wed 3/1/23**	**Tue 12/5/23**
921	Monthly Reports	200 days	Wed 3/1/23	Tue 12/5/23
922				
923	**MIDNITE MINE REMEDY CONSTRUCTION - YEAR 10**	**215 days**	**Wed 3/6/24**	**Tue 12/31/24**
924	**General Site Tasks**	**195 days**	**Wed 3/6/24**	**Tue 12/3/24**
925	Annual Facilities Maintenance (as necessary)	195 days	Wed 3/6/24	Tue 12/3/24
926	Begin Final Disturbed Areas Revegetation/Reclamation	195 days	Wed 3/6/24	Tue 12/3/24
927	Transition from use of Phase III Storage Pond to direct pumping from extraction systems in pits 3, 4, and BIPA and direct treatment (without ancillary storage)	195 days	Wed 3/6/24	Tue 12/3/24
928	**Institutional/Engineering Controls**	**195 days**	**Wed 3/6/24**	**Tue 12/3/24**
929	Install engineering controls (primarily to limit and discourage site access)	195 days	Wed 3/6/24	Tue 12/3/24
930	**Demolition of Phase III Storage Pond**	**200 days**	**Wed 3/6/24**	**Tue 12/10/24**
931	Demolition of the Phase III Pond	200 days	Wed 3/6/24	Tue 12/10/24
932	Cover and Revegetate Area when Verified as Clean	200 days	Wed 3/6/24	Tue 12/10/24
933	**Pit 3 Reclamation Tasks (Completed this year)**	**195 days**	**Wed 3/6/24**	**Tue 12/3/24**
934	Finish Backfilling of Pit 3 (including Phase III pond Impoundments)	50 days	Wed 3/6/24	Tue 5/14/24
935	Install Cover Liner	45 days	Wed 5/15/24	Tue 7/16/24
936	Place Cover	70 days	Wed 7/17/24	Tue 10/22/24
937	Begin Revegetation	100 days	Wed 7/17/24	Tue 12/3/24
938	End of Year 10 Midnite Mine Remedy Construction - Construction is Complete	0 days	Tue 12/3/24	Tue 12/3/24
939	**SMP Trip and Data Reports (assume 3 per construction season)**	**215 days**	**Wed 3/6/24**	**Tue 12/31/24**
940	SMP Beginning-or Baseline Monitoring	5 days	Wed 3/6/24	Tue 3/12/24
941	SMP Trip Report 1- Baseline Monitoring	0 days	Tue 4/9/24	Tue 4/9/24
942	SMP Data Report 1 - Baseline Monitoring	0 days	Tue 5/7/24	Tue 5/7/24
943	SMP Mid-Construction Season Monitoring	5 days	Wed 6/26/24	Tue 7/2/24
944	SMP Trip Report 2 (Mid-season Monitoring)	0 days	Tue 7/30/24	Tue 7/30/24
945	SMP Data Report 2 (Mid-season Monitoring)	0 days	Tue 8/27/24	Tue 8/27/24
946	SMP End Construction Season Monitoring	5 days	Wed 10/30/24	Tue 11/5/24
947	SMP Trip Report 3 (Year End Monitoring)	0 days	Tue 12/3/24	Tue 12/3/24
948	SMP Data Report 3 (Year End Monitoring)	0 days	Tue 12/31/24	Tue 12/31/24
949	**Weekly Construction Reports**	**195 days**	**Wed 3/6/24**	**Tue 12/3/24**
950	Weekly Construction Reports	195 days	Wed 3/6/24	Tue 12/3/24
951	**Engineering Change Notices (as necessary)**	**195 days**	**Wed 3/6/24**	**Tue 12/3/24**
952	Engineering Change Notices	195 days	Wed 3/6/24	Tue 12/3/24
953	**Periodic Inspections**	**195 days**	**Wed 3/6/24**	**Tue 12/3/24**
954	Periodic Inspections	195 days	Wed 3/6/24	Tue 12/3/24
955	**Monthly Reports**	**195 days**	**Wed 3/6/24**	**Tue 12/3/24**
956	Monthly Reports	195 days	Wed 3/6/24	Tue 12/3/24
957				
958				
959	**CONSTRUCTION REPORTING**	**3488 days**	**Wed 6/7/17**	**Fri 10/18/30**
960	**PRE-FINAL AND FINAL CONSTRUCTION INSPECTION REPORTS**	**2155 days**	**Wed 6/7/17**	**Tue 9/9/25**

Project: Midnite Mine Remedial Design | Date: Wed 3/14/12

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

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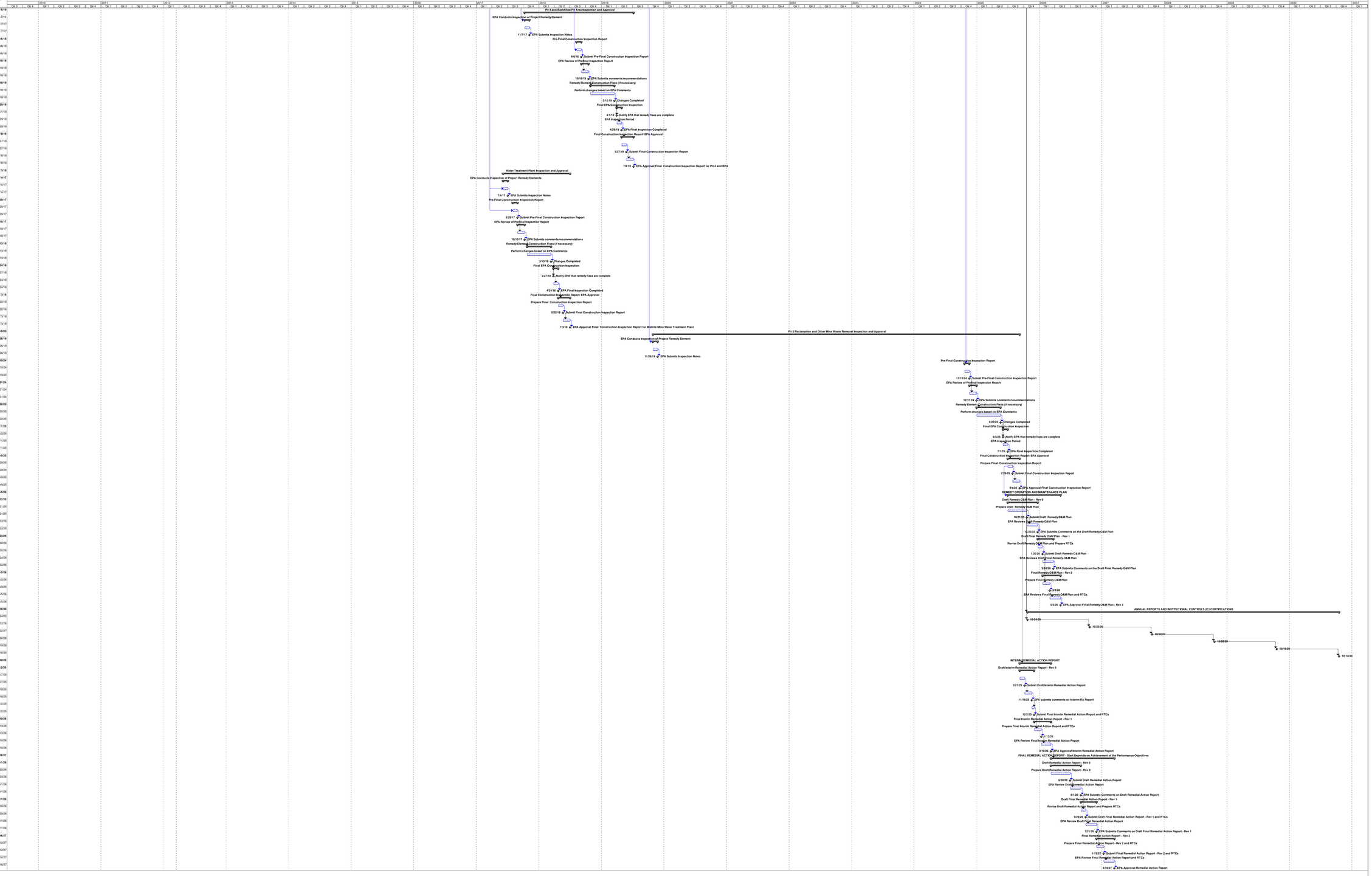
Wed 3/14/12

FIGURE 7-1b DRAFT MIDNITE MINE REMEDIAL DESIGN / REMEDIAL ACTION SCHEDULE - DETAILED

ID	Task Name	Working Days (5days/week)	Start	Finish
861	**Pit 4 and Backfilled Pit Area Inspection and Approval**	**454 days**	**Wed 10/11/17**	**Mon 7/8/19**
862	**EPA Conducts Inspection of Project Remedy Element**	**20 days**	**Wed 10/11/17**	**Tue 11/7/17**
863	EPA Conducts Site Visit in this time period	20 days	Wed 10/11/17	Tue 11/7/17
864	EPA Submits Inspection Notes	0 days	Tue 11/7/17	Tue 11/7/17
865	**Pre-Final Construction Inspection Report**	**20 days**	**Fri 8/10/18**	**Thu 9/6/18**
866	Prepare Pre-Final Construction Inspection Report	20 days	Fri 8/10/18	Thu 9/6/18
867	Submit Pre-Final Construction Inspection Report	0 days	Thu 9/6/18	Thu 9/6/18
868	**EPA Review of Prefinal Inspection Report**	**30 days**	**Fri 9/7/18**	**Thu 10/18/18**
869	EPA reviews document	30 days	Fri 9/7/18	Thu 10/18/18
870	EPA Submits comments/recommendations	0 days	Thu 10/18/18	Thu 10/18/18
871	**Remedy Element Construction Fixes (if necessary)**	**100 days**	**Tue 10/30/18**	**Mon 3/18/19**
872	Perform changes based on EPA Comments	100 days	Tue 10/30/18	Mon 3/18/19
873	Changes Completed	0 days	Mon 3/18/19	Mon 3/18/19
874	**Final EPA Construction Inspection**	**20 days**	**Mon 4/1/19**	**Mon 4/29/19**
875	Notify EPA that remedy fixes are complete	0 days	Mon 4/1/19	Mon 4/1/19
876	EPA Inspection Period	20 days	Tue 4/2/19	Mon 4/29/19
877	EPA Final Inspection Completed	0 days	Mon 4/29/19	Mon 4/29/19
878	**Final Construction Inspection Report: EPA Approval**	**50 days**	**Tue 4/30/19**	**Mon 7/8/19**
879	Prepare Final Construction Inspection Report	20 days	Tue 4/30/19	Mon 5/27/19
880	Submit Final Construction Inspection Report	0 days	Mon 5/27/19	Mon 5/27/19
881	EPA Review Final Construction Inspection Report	30 days	Tue 5/28/19	Mon 7/8/19
882	EPA Approval Final Construction Inspection Report for Pit 4 and BFA	0 days	Mon 7/8/19	Mon 7/8/19
883	**Water Treatment Plant Inspection and Approval**	**380 days**	**Wed 6/7/17**	**Tue 7/3/18**
884	**EPA Conducts Inspection of Project Remedy Elements**	**20 days**	**Wed 6/7/17**	**Tue 7/4/17**
885	EPA Conducts Site Visit in this time period	20 days	Wed 6/7/17	Tue 7/4/17
886	EPA Submits Inspection Notes	0 days	Tue 7/4/17	Tue 7/4/17
887	**Pre-Final Construction Inspection Report**	**20 days**	**Wed 8/2/17**	**Tue 8/29/17**
888	Prepare Pre-Final Construction Inspection Report	20 days	Wed 8/2/17	Tue 8/29/17
889	Submit Pre-Final Construction Inspection Report	0 days	Tue 8/29/17	Tue 8/29/17
890	**EPA Review of Prefinal Inspection Report**	**30 days**	**Wed 8/30/17**	**Tue 10/10/17**
891	EPA reviews document	30 days	Wed 8/30/17	Tue 10/10/17
892	EPA Submits comments/recommendations	0 days	Tue 10/10/17	Tue 10/10/17
893	**Remedy Element Construction Fixes (if necessary)**	**100 days**	**Wed 10/25/17**	**Tue 3/13/18**
894	Perform changes based on EPA Comments	100 days	Wed 10/25/17	Tue 3/13/18
895	Changes Completed	0 days	Tue 3/13/18	Tue 3/13/18
896	**Final EPA Construction Inspection**	**20 days**	**Tue 3/27/18**	**Tue 4/24/18**
897	Notify EPA that remedy fixes are complete	0 days	Tue 3/27/18	Tue 3/27/18
898	EPA Inspection Period	20 days	Wed 3/28/18	Tue 4/24/18
899	EPA Final Inspection Completed	0 days	Tue 4/24/18	Tue 4/24/18
1000	**Final Construction Inspection Report: EPA Approval**	**50 days**	**Wed 4/25/18**	**Tue 7/3/18**
1001	Prepare Final Construction Inspection Report	20 days	Wed 4/25/18	Tue 5/22/18
1002	Submit Final Construction Inspection Report	0 days	Tue 5/22/18	Tue 5/22/18
1003	EPA Review Final Construction Inspection Report	30 days	Wed 5/23/18	Tue 7/3/18
1004	EPA Approval Final Construction Inspection Report for Midnite Mine Water Treatment Plant	0 days	Tue 7/3/18	Tue 7/3/18
1005	**Pit 3 Reclamation and Other Mine Waste Removal Inspection and Approval**	**1530 days**	**Wed 10/30/19**	**Tue 9/9/25**
1006	**EPA Conducts Inspection of Project Remedy Element**	**20 days**	**Wed 10/30/19**	**Tue 11/26/19**
1007	EPA Conducts Site Visit in this time period	20 days	Wed 10/30/19	Tue 11/26/19
1008	EPA Submits Inspection Notes	0 days	Tue 11/26/19	Tue 11/26/19
1009	**Pre-Final Construction Inspection Report**	**20 days**	**Wed 10/23/24**	**Tue 11/19/24**
1010	Prepare Pre-Final Construction Inspection Report	20 days	Wed 10/23/24	Tue 11/19/24
1011	Submit Pre-Final Construction Inspection Report	0 days	Tue 11/19/24	Tue 11/19/24
1012	**EPA Review of Prefinal Inspection Report**	**30 days**	**Wed 11/20/24**	**Tue 12/31/24**
1013	EPA reviews document	30 days	Wed 11/20/24	Tue 12/31/24
1014	EPA Submits comments/recommendations	0 days	Tue 12/31/24	Tue 12/31/24
1015	**Remedy Element Construction Fixes (if necessary)**	**100 days**	**Wed 1/1/25**	**Tue 5/20/25**
1016	Perform changes based on EPA Comments	100 days	Wed 1/1/25	Tue 5/20/25
1017	Changes Completed	0 days	Tue 5/20/25	Tue 5/20/25
1018	**Final EPA Construction Inspection**	**20 days**	**Tue 6/3/25**	**Tue 7/1/25**
1019	Notify EPA that remedy fixes are complete	0 days	Tue 6/3/25	Tue 6/3/25
1020	EPA Inspection Period	20 days	Wed 6/4/25	Tue 7/1/25
1021	EPA Final Inspection Completed	0 days	Tue 7/1/25	Tue 7/1/25
1022	**Final Construction Inspection Report: EPA Approval**	**50 days**	**Wed 7/2/25**	**Tue 9/9/25**
1023	Prepare Final Construction Inspection Report	20 days	Wed 7/2/25	Tue 7/29/25
1024	Submit Final Construction Inspection Report	0 days	Tue 7/29/25	Tue 7/29/25
1025	EPA Review Final Construction Inspection Report	30 days	Wed 7/30/25	Tue 9/9/25
1026	EPA Approval Final Construction Inspection Report	0 days	Tue 9/9/25	Tue 9/9/25
1027	**REMEDY OPERATION AND MAINTENANCE PLAN**	**220 days**	**Wed 7/2/25**	**Tue 5/5/26**
1028	**Draft Remedy O&M Plan - Rev 0**	**125 days**	**Wed 7/2/25**	**Tue 12/23/25**
1029	Prepare Draft Remedy O&M Plan	80 days	Wed 7/2/25	Tue 10/21/25
1030	Submit Draft Remedy O&M Plan	0 days	Tue 10/21/25	Tue 10/21/25
1031	EPA Reviews Draft Remedy O&M Plan	45 days	Wed 10/22/25	Tue 12/23/25
1032	EPA Submits Comments on the Draft Remedy O&M Plan	0 days	Tue 12/23/25	Tue 12/23/25
1033	**Draft Final Remedy O&M Plan - Rev 1**	**65 days**	**Wed 12/24/25**	**Tue 3/24/26**
1034	Revise Draft Remedy O&M Plan and Prepare RTCs	20 days	Wed 12/24/25	Tue 1/20/26
1035	Submit Draft Remedy O&M Plan	0 days	Tue 1/20/26	Tue 1/20/26
1036	EPA Reviews Draft Final Remedy O&M Plan	45 days	Wed 1/21/26	Tue 3/24/26
1037	EPA Submits Comments on the Draft Final Remedy O&M Plan	0 days	Tue 3/24/26	Tue 3/24/26
1038	**Final Remedy O&M Plan - Rev 2**	**75 days**	**Wed 1/21/26**	**Tue 5/5/26**
1039	Prepare Final Remedy O&M Plan	30 days	Wed 1/21/26	Tue 3/3/26
1040	Submit Final Remedy O&M Plan and RTCs	0 days	Tue 3/3/26	Tue 3/3/26
1041	EPA Reviews Final Remedy O&M Plan and RTCs	45 days	Wed 3/4/26	Tue 5/5/26
1042	EPA Approval Final Remedy O&M Plan - Rev 2	0 days	Tue 5/5/26	Tue 5/5/26
1043	**ANNUAL REPORTS AND INSTITUTIONAL CONTROLS (IC) CERTIFICATIONS**	**1300 days**	**Fri 10/24/25**	**Fri 10/18/30**
1044	Year 1 - Final Remedy in Place	0 days	Fri 10/24/25	Fri 10/24/25
1045	Year 2 - Second Year Remedy in Place	0 days	Fri 10/23/26	Fri 10/23/26
1046	Year 3 - Second Year Remedy in Place	0 days	Fri 10/22/27	Fri 10/22/27
1047	Year 4 - Second Year Remedy in Place	0 days	Fri 10/20/28	Fri 10/20/28
1048	Year 5 - Second Year Remedy in Place	0 days	Fri 10/19/29	Fri 10/19/29
1049	ETC	0 days	Fri 10/18/30	Fri 10/18/30
1050	**INTERIM REMEDIAL ACTION REPORT**	**130 days**	**Wed 9/10/25**	**Tue 3/10/26**
1051	**Draft Interim Remedial Action Report - Rev 0**	**65 days**	**Wed 9/10/25**	**Tue 12/2/25**
1052	Prepare Draft Interim Remedial Action Report	20 days	Wed 9/10/25	Tue 10/7/25
1053	Submit Draft Interim Remedial Action Report	0 days	Tue 10/7/25	Tue 10/7/25
1054	EPA Review Draft Interim Remedial Action Report	30 days	Wed 10/8/25	Tue 11/18/25
1055	EPA submits comments on Interim RA Report	0 days	Tue 11/18/25	Tue 11/18/25
1056	Revise Draft Interim Remedial Action Report and Prepare RTCs	10 days	Wed 11/19/25	Tue 12/2/25
1057	Submit Final Interim Remedial Action Report and RTCs	0 days	Tue 12/2/25	Tue 12/2/25
1058	**Final Interim Remedial Action Report - Rev 1**	**70 days**	**Wed 12/3/25**	**Tue 3/10/26**
1059	Prepare Final Interim Remedial Action Report and RTCs	30 days	Wed 12/3/25	Tue 1/13/26
1060	Submit Final Interim Remedial Action Report and RTCs	0 days	Tue 1/13/26	Tue 1/13/26
1061	EPA Review Final Interim Remedial Action Report	40 days	Wed 1/14/26	Tue 3/10/26
1062	EPA Approval Interim Remedial Action Report	0 days	Tue 3/10/26	Tue 3/10/26
1063	**FINAL REMEDIAL ACTION REPORT - Start Depends on Achievement of the Performance Objectives**	**265 days**	**Wed 3/11/26**	**Tue 3/16/27**
1064	**Draft Remedial Action Report - Rev 0**	**125 days**	**Wed 3/11/26**	**Tue 9/1/26**
1065	Prepare Draft Remedial Action Report - Rev 0	80 days	Wed 3/11/26	Tue 6/30/26
1066	Submit Draft Remedial Action Report	0 days	Tue 6/30/26	Tue 6/30/26
1067	EPA Review Draft Remedial Action Report	45 days	Wed 7/1/26	Tue 9/1/26
1068	EPA Submits Comments on Draft Remedial Action Report	0 days	Tue 9/1/26	Tue 9/1/26
1069	**Draft Final Remedial Action Report - Rev 1**	**65 days**	**Wed 9/2/26**	**Tue 12/1/26**
1070	Revise Draft Remedial Action Report and Prepare RTCs	20 days	Wed 9/2/26	Tue 9/29/26
1071	Submit Draft Final Remedial Action Report - Rev 1 and RTCs	0 days	Tue 9/29/26	Tue 9/29/26
1072	EPA Review Draft Final Remedial Action Report	45 days	Wed 9/30/26	Tue 12/1/26
1073	EPA Submits Comments on Draft Final Remedial Action Report - Rev 1	0 days	Tue 12/1/26	Tue 12/1/26
1074	**Final Remedial Action Report - Rev 2**	**75 days**	**Wed 12/2/26**	**Tue 3/16/27**
1075	Prepare Final Remedial Action Report - Rev 2 and RTCs	30 days	Wed 12/2/26	Tue 1/12/27
1076	Submit Final Remedial Action Report - Rev 2 and RTCs	0 days	Tue 1/12/27	Tue 1/12/27
1077	EPA Review Final Remedial Action Report and RTCs	45 days	Wed 1/13/27	Tue 3/16/27
1078	EPA Approval Remedial Action Report	0 days	Tue 3/16/27	Tue 3/16/27



Project: Midnite Mine Remedial Design | Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline
Date: Wed 3/14/12

This draft schedule has been prepared based on current project knowledge and likely some of the individual tasks and their durations will change as the remedial design process unfolds and the remedial action begins.
Wed 2/14/12

APPENDIX A
MWH PROJECT TEAM RESUMES

MWH

BUILDING A BETTER WORLD

VANCE DRAIN, P.G.
PRINCIPAL HYDROGEOLOGIST

EDUCATION:

B.A., Geology, University of Montana, 1979
M.S., Earth Sciences, Montana State University, 1986 (emphasis in hydrogeology/ geomorphology)

REGISTRATIONS:

Professional Geologist – Texas, Utah, Wyoming

SUMMARY:

Mr. Drain has over 26 years of hazardous waste experience throughout the western US for commercial clients, federal agencies, and diverse PRP groups. Mr. Drain is a senior member of MWH America's staff in Salt Lake City, Utah. His professional experience includes a wide variety of field investigations, interim actions, and large-scale remedial/corrective action projects under the CERCLA and RCRA programs. Currently, Mr. Drain is focused on CERCLA and RCRA investigation (RI/FS/, RFI/CMS) and remediation design and implementation issues (RD) for major mining and manufacturing industrial clients in EPA Region 10. Mr. Drain has led large multi-disciplined teams in completing the necessary documents to implement investigations, as well as, pilot studies and remedial designs/actions. Mr. Drain has often integrated and managed the appropriate personnel from multiple MWH offices to facilitate successful completion of these projects.

SELECTED EXPERIENCE:

Senior Manager, Remedial Investigation/Feasibility Study, Confidential Client, Soda Springs, Idaho
Led the preparation of the Draft RI/FS Work Plan for this Site and guides project staff in responding to Agencies/Tribe (A/Ts) comments and revisions of the Work Plan. During the summer of 2010, Mr. Drain's field teams conducted several investigations of inorganic elements including selenium and arsenic in waste rock dumps, seeps, surface water/ groundwater at the Site and performed pilot testing of biological systems for removal of Se in groundwater at the Site. All of these activities required preparation of work plans (i.e., SAP, QAPP, FSP, HASP, TSWP) for EPA Region 10 and other A/T approval. Because of his extensive background in CERCLA investigations and remediation, he provides front-end planning/negotiations and senior QC review of all major deliverables. Mr. Drain and the client are negotiating with the A/Ts the appropriate supplemental "background area" to be sampled, data to be collected (including uranium and specific metals), and how these data will be summarized and used in the risk assessments/ RI/ FS Report(s). The A/Ts include: EPA Region 10, the Idaho Department of Environmental Quality, the local Shoban Tribes and BLM.

FS Leader, Supplemental Remedial Investigation/Feasibility Study, Confidential Client, Pocatello, Idaho
Provided CERCLA strategy consultation for a large ongoing supplemental RI (SRI) because of his extensive background in CERCLA investigation and remediations. Provided senior QC review of all major deliverables including the SRI and SRI Addendum reports. Managed the multidisciplinary MWH team

that prepared the FS for this large phosphorus manufacturer based on the SRI/SRI Addendum results. Also assisted with a time-critical remedial response action involving phosphine gas under the facility RCRA program. All of this work involved preparation and regulatory approval of CERCLA and RCRA-related schedules and work plans for investigations, interim actions, and remedial activities. The work included communications/negotiations with EPA Region 10, the Idaho Department of Environmental Quality, the local Shoban Tribes (because a portion of the site is located on the Shoban reservation), and State/US Fish and Wildlife Service (groundwater discharges to the Portneuf River which drains through the reservation) on behalf of this large commercial client.

Project Manager, Remedial Investigation, Risk Assessment, Feasibility Study, Remedial Design and Site Closure, Utah Air National Guard, Salt Lake City, Utah

Managed the RI, preparation of decision documents including the FS/proposed plan(PP)/ and records of decisions (RODs), and the remedial action documents (RA Work Plan, remedial design, schedule, etc.) for closure of two contaminated sites at the active Utah Air National Guard (UANG) base in Salt Lake City, Utah. The UANG site had 10 individual sites and contaminants ranging from chlorinated solvents and fuels to RCRA metals. A combination of interim actions, transfer of some sites to other programs with less stringent requirements, and critical risk evaluations allowed Mr. Drain and his team to winnow the number of sites down to two which required the preparation of focused feasibility study reports (FFS), proposed plans (PPs), and records of decisions (RODs) and the associated remedial action documents (as listed above) for two groundwater plumes at the UANG. Currently, there are successful ongoing remediation efforts at the Site.

MWH Utah Program Manager, Pre-Placed Remedial Action Contract (PRAC), Sacramento Corps of Engineers

As the program manager, Mr. Drain provided coordination and technical oversight of all task orders, led negotiations, and selected/mentored technical staff during the execution of CERCLA and RCRA design and remediation projects at government facilities throughout Utah. These CERCLA and RCRA projects required a wide variety of project management skills for the preparation of work plans and reports, implementation of investigations (including fast track data gap studies), interim measures, corrective measures, HWMU closures, remedial actions, and negotiations.

- Tooele Army Depot. His staff investigated and prepared design work plans, design drawings, to cap and close a 125 acres landfill (SWMU 12). In addition, he directed the preparation of Corrective Measures Implementation (CMI) Work Plans at several other SWMUs where corrective measures were necessary.
- Dugway Proving Grounds. Directed the capping of a hazardous waste landfill (HWMU 39). Prepared CMI Work Plans and removed and disposed of vats that were used for evaporation of CWA neutralization fluids and the concrete pads underlying the vats (a F999 waste).
- Defense Distribution Depot Hill, Utah. Projects led included the 1) preparation of a Safety Submission; field oversight of excavation activities, waste sampling, manifesting, and disposal of soil and debris from Burial Site #1, and preparation of a remedial action report, 2) preparation of a remedial action work plan then removal, manifesting, and proper disposal of a source area at OU2, and 3) preparation of a corrective measures implementation plan then removal, manifesting, and disposal of soil at SWMU 13.

MWH

BUILDING A BETTER WORLD

CLINTON L. STRACHAN, P.E.
PRINCIPAL GEOTECHNICAL ENGINEER

EDUCATION:

MS, Civil Engineering, Colorado State University, Colorado
BS, Agricultural Engineering, Colorado State University, Colorado

REGISTRATIONS:

Professional Engineer – Colorado, Arizona, Idaho, Montana, Nevada, New Mexico, Oklahoma, Texas, Washington, Wyoming

SUMMARY:

Mr. Strachan is a registered professional (civil) engineer with a technical specialty in geotechnical engineering. Mr. Strachan has over 30 years of experience with the development, design, permitting, construction, operation, and reclamation of mine facilities. Project experience has included tailings impoundments, heap leach facilities, water storage dams, sedimentation dams, and storage ponds. Projects have been worldwide. Work experience has included site selection, site evaluation and investigation, analysis and design, waste material characterization, project permitting, construction quality assurance and quality control, and expert witness work.

SELECTED EXPERIENCE:

Dawn Uranium Mill Site, Dawn Mining Company, Washington
Engineer responsible for closure planning, surety estimate preparation, site and tailings characterization, evaporation pond design and construction quality assurance, evaporation pond performance monitoring, and assistance with licensing issues at uranium mill site in northeastern Washington.

Midnite Mine, Dawn Mining Company, Washington
Engineer responsible for preparation of geotechnical aspects of mine closure plan in 1996, as well as engineer responsible for slope monitoring prior to listing of site on NPL. Served as expert witness in cost allocation litigation in 2006 and 2007.

Panna Maria Uranium Mill Site, Rio Grande Resources Corporation, Texas
Engineer responsible for tailings characterization, site investigation, closure plan design and permitting, construction quality control and quality assurance, and post-closure monitoring for reclamation of uranium mill tailings impoundment in south Texas.

Sequoyah Fuels Facility, Sequoyah Fuels Corporation, Oklahoma
Engineer responsible for decommissioning plan preparation, disposal cell design, and reclamation permitting for uranium refinement processing plant. Also responsible for construction drawing preparation and construction quality assurance review during disposal cell construction.

Conquista Uranium Mill Site, Conoco, Texas
Engineer responsible for tailings characterization, site and borrow material investigation, closure plan design and permitting, and construction quality control and quality assurance for uranium mill tailings impoundment in south Texas.

Ray Point (Felder) Uranium Mill Site, Exxon and ExxonMobil, Texas
Engineer responsible for construction quality assurance testing for tailings impoundment reclamation in south Texas. Was also the senior engineer for design and permitting of site soil cleanup and on-site disposal program.

Highland Reclamation Project, Exxon and ExxonMobil, Wyoming
Engineer responsible for reclamation plan permitting, construction quality assurance testing, post-closure monitoring, and construction documentation for the tailings impoundment and backfilled mine site at uranium mine and mill site in central Wyoming.

Grants Uranium Mill Site, Homestake Mining Company, New Mexico
Engineer responsible for reclamation plan review, permitting, and cover performance monitoring for reclamation of uranium mill tailings impoundment.

Cotter Uranium Mill, Cotter Corporation, Colorado
Engineer responsible for mill decommissioning plan and tailings impoundment reclamation plan preparation, and regulatory agency interaction.

Various Precious-metal Reclamation Projects, Various Clients, Various Locations
Work has included evaluation of tailings covering, tailings cover design and performance at sites including the Kinross DeLamar Mine in Idaho, the Coeur Golden Cross Mine in New Zealand, and the Anamax Twin Buttes Mine in Arizona.

PRESENTATIONS AND COMMITTEE ASSIGNMENTS:

Member of organizing committee for *Tailings and Mine Waste, 2010*, and *Tailings and Mine Waste, 2008*, held in Vail, Colorado, with proceedings published by Balkema.

Chairman, Tailings Dam Committee, United States Society on Dams (USSD) 1996-2004.

Member of organizing committee for *Tailing Dams 2000* and *Tailing Dams 2002*, held in Las Vegas, Nevada, with proceedings published by ASDSO.

Invited member of special committee for National Research Council, preparing *Coal Waste Impoundments, Risks, Reponses, and Alternatives,* published by National Academy Press, 2001.

Instructor on tailings covering and reclamation, Short Course on Mine Closure Design, *Mine Design, Operations and Closure Conference*, 1998 and 1999, Polson, Montana.

Instructor in tailings covering issues, short course on Technical Considerations in Tailings Covers, *Tailings and Mine Waste '98*, Colorado State University, January 25, 1998, Fort Collins, Colorado.

Instructor on geotechnical engineering issues, short courses on *Heap Leach Facilities Design*, sponsored by SME, 1985–1987; held in Albuquerque, New Mexico; Las Vegas, Nevada; Reno, Nevada; Denver, Colorado; San Francisco, California.

DANIEL P. DUPON, P.E.
SUPERVISING ENGINEER

EDUCATION:

MS, Civil Engineering, Colorado State University, Colorado
BS, Environment Science, Taylor University, Indiana

REGISTRATIONS:

Professional Engineer – Colorado

SUMMARY:

Mr. Dupon is based in MWH's Fort Collins, Colorado, office. He has performed treatability test work and prepared designs for mine water treatment systems throughout the western U.S., including Arizona, Colorado, Idaho, Montana, Nevada, Utah, Washington, and Wyoming. Mr. Dupon has also provided water treatment technical services at a number of CERCLA sites, including the California Gulch and Summitville sites in Colorado and the Coeur d'Alene district in Idaho.

Mr. Dupon is experienced with the treatment of mining-impacted waters, their inherent chemical complexity, and the broadening field of advanced treatment technologies. Mr. Dupon offers a unique ability to define solutions for a vast array of water-quality challenges. During his 15 years of experience in the industry, he has been dedicated to developing and implementing treatment investigations that range from conceptual process development and bench-scale tests to full-scale design and operation. The range of technologies that Mr. Dupon has direct experience with is extensive, including membrane separation, lime softening, enhanced coagulation, ion exchange, and biological reduction. His primary focus has been the evaluation and recommendation of treatment processes for mine wastewaters, as part of reclamation planning and water management. In addition, many of these projects have involved assessing the technical feasibility of passive and innovative technologies, with the objective of developing costs to support the selection of appropriate long-term, remediation alternatives.

SELECTED EXPERIENCE:

Intalco Holden Mine, Rio Tinto, Lake Chelan, Washington
Conducting pilot-scale test work of the proposed low-energy alkaline treatment process at the Holden Mine site for waters associated with the underground workings and tailings piles. The phased project is comprised of two separate treatment campaigns. The pilot testing will produce data to assess feasible process parameters with respect to meeting potential surface water discharge criteria as well as the subsequent development of full-scale design criteria and associated conceptual-level costs.

Mule Canyon Mine, Newmont Gold Company, Nevada
Oversaw the design, material procurement, construction, start-up, operation, and decommissioning of two temporary water treatment plants for the discharge of pit lake solution at the remote Mule Canyon Mine site. The system, utilizing cold lime/soda ash softening, media filtration, and high-recovery membrane separation to remove a broad suite of dissolved metals and sulfate from the lake water, was operated in freezing conditions and powered completely by portable generation equipment.

Cyprus Tohono Mine Water Treatment, Phelps Dodge Cyprus Tohono Corporation, Arizona
Prepared the design of a 900-gpm water treatment process for the management of pit lake solution containing high levels of sulfate, metals, and acidity. Extensive technical support was provided for the project and included preliminary screening of potential treatment technologies and laboratory-scale test work. Engineering work for the system encompassed design of a pit lake submersible pump station, booster pump stations, chemical feed units, lined treatment ponds, media filtration units, reverse osmosis units, and an enhanced spray evaporation system.

Idaho Cobalt Mine Water Treatment, Formation Capital Corporation, Idaho
Developed the feasibility design for a zero-liquid waste, membrane separation water treatment process to discharge mine water under an NPDES permit. The system design incorporated multiple reverse osmosis membrane systems operating in standard and innovative configurations to achieve a net process recovery of 99.5 percent.

Platoro Mine Water Treatment, Union Gold, Inc., Colorado
Conducted process bench-scale test work to optimize the water treatment plant operation at the Platoro Mine. The optimization work was conducted to improve plant performance for the removal of arsenic, copper, manganese, and zinc in response to new CDPS discharge standards imposed at the mine site. Other work completed on this projected included design and construction of an in-situ underground mine water treatment system, feasibility evaluation and design of a treatment pond sludge removal system, and field-scale biological test system for the removal of manganese.

Lone Tree Mine Water Treatment Evaluation, Newmont Gold Company, Nevada
Conducted a comprehensive evaluation of potential treatment technologies for a 35,000-gpm dewatering stream at the Lone Tree Mine. Technologies evaluated included pilot testing of activated alumina for fluoride; enhanced coagulation for arsenic, molybdenum, and antimony; and nitrification methods for ammonia. The scope of the evaluation involved on-site testing to determine operational and performance parameters to support the development of a conceptual design and associated costs to be assessed against other water management alternatives.

Battle Mountain Mine Water Treatment Optimization, Battle Mountain Resources, Inc., Colorado
Provided senior review and developed an interim membrane separation process in addition to pilot-scale test work for optimizing the performance and operation of the permanent treatment system. Evaluated numerous pretreatment alternatives to improve the recovery and operational cycle of the reverse osmosis membrane process. This work also involved process test work for wetland and in-situ treatment of groundwater containing sulfate and manganese.

Battle Mountain Mine Water Treatment, Battle Mountain Resources, Inc., Colorado
Designed and performed pilot testing of activated alumina and bone charcoal adsorption media for the removal of fluoride from backfilled pit water. The testing included process sensitivity testing to define process operational parameters for minimizing waste stream volumes while optimizing performance and capacity of the existing treatment facility. The results of the test work were utilized to support the design of a plant upgrade.

MICHAEL GRONSETH, P.E., P.G.
PRINCIPAL GEOTECHNICAL ENGINEER

EDUCATION:

BS, Geological Engineering

REGISTRATIONS:

Professional Engineer/MN, UT (Civil)
Professional Geologist/MN, UT
Construction Quality Management for Contractors/USACE

SUMMARY:

Mr. Gronseth has 25 years of experience in geotechnical engineering and environmental hydrogeology with 20 years of experience managing projects. He has provided reports, conducted studies and analyses, and provided documentation for a variety of environmental site assessments. He has performed geotechnical site evaluations for heavy civil construction projects, slope stability analysis, construction inspections and monitoring, and forensic engineering. Mr. Gronseth is also experienced in laboratory and in-situ field soil testing, shallow and deep foundation design, tunnel support design, and geophysical investigations. Experience preparing CERCAL and RCRA decision documents, NEPA and engineering documents, performing geotechnical investigations, risk assessment, site characterization, and remedial design development and implementation.

For the past 8 years Mr. Gronseth has served as the quality assurance/quality control manager for the MWH's Federal Operations. In this capacity, Mr. Gronseth has been involved with the development of Corporate QA/QC policies and is responsible for the implementation of contract and corporate QA/QC programs. He is also responsible for the review and approval of project quality control plans for task orders under AFCEE and USACE contracts.

USACE Sacramento District PRAC. Mr. Gronseth provides technical engineering support and senior QA/QC reviews for multiple task orders associated with environmental RCRA corrective action construction at Tooele Army Depot and Dugway Proving Ground, Utah. In this role he was responsible for the development and review of Quality Assurance Project Plans and Contractor Quality Control Plans. In addition, he was responsible for MWH's implementation of the USACE 3-phase Quality Control program including conducting preparatory, initial and follow-up meetings/inspections and review of daily quality control reports.

AFCEE WERC – DESC Fuels. Mr. Gronseth is currently responsible for technical and QC review of Quality Project Plans (QPPs) associated with defense fuels projects at Burlington Air National Guard Base, Vermont, Mountain Home AFB, Idaho, Volk Field Air National Guard Base, Wisconsin, and Savannah Air National Guard Base, Georgia. In addition, Mr. Gronseth is responsible for design of load pads, secondary containment systems and fuel island canopies and the technical review of contractor submittals.

A/E Services Hill AFB, Utah. Mr. Gronseth provided technical engineering support and senior QA/QC reviews for the design and construction of groundwater pump and treat systems at CERCAL sites associated with Operable Units 8 and 12 at Hill AFB, Utah. In this role, Mr. Gronseth also evaluated the technical effectiveness of the groundwater remediation systems. Mr. Gronseth also provided project management and QA/QC reviews for three task orders related to munitions and explosives of concern (MEC). In this role, he was responsible for the preparation of QPPs; QA/QC review of OE Disposal Action Reports, and range debris removal database submittals.

MWH

BUILDING A BETTER WORLD

EDWIN T. CRYER, V.P.
PRINCIPAL ENGINEER/SCIENTIST

EDUCATION:

MS/MSc, Environmental Biology, California State University (Hayward), 1971
MS/MSc, Civil Engineering, San Jose State University, 1972
BS/BSc, Biology, California State University (Hayward), 1965

SUMMARY:

Mr. Cryer has over 40 years of experience in water quality and environmental studies, water resources, aquaculture and industrial/mine water and wastewater planning, and engineering projects. His experience includes the preparation of planning studies, contract documents, and designs for municipal and industrial water and wastewater systems and industrial, water resources and mining processing and pollution control facilities. He is experienced in planning, design and construction management of a variety of hatchery projects; the preparation of facilities planning reports for state and federal grants, and representing clients in the procurement of permits and grant funding; environmental resource studies and impact statements, assessments and related NEPA documents for agriculture, aquaculture, mining, resource recovery, municipal infrastructure projects, and water and wastewater facility evaluations; the development of resource information and reports; evaluation of nonpoint pollution sources from mining, silvicultural, and agricultural sources; study and design of groundwater pollution and industrial resource recovery and contamination projects; and eutrophication studies and water quality management programs for municipal water supplies including reservoirs, lakes, and streams. Mr. Cryer has been involved in over 50 industrial, municipal and governmental projects involving NEPA or State environmental review and permitting requirements. Representative projects included in several categories are presented below.

SELECTED EXPERIENCE:

Project Manager, Kinross Gold – Buckhorn Mine Water Treatment, Washington
The Buckhorn Mine is an operating gold mine located in north central Washington. Acid rock drainage (ARD) from historic mine adits on the site drain into a local stream, adversely affecting surface water quality. The Washington Department of Ecology has issued a water quality compliance order to Kinross for treatment and control of the ARD. Mr. Cryer is Project Manager for design and construction management of a reverse osmosis treatment system to operate in conjunction with an ion exchange circuit. The reverse osmosis treatment system is being designed to treat 300 gpm influent ARD containing arsenic, ammonia, and nitrate. The two-pass reverse osmosis treated water will be recycled as mill feed water and the brine will be transported to a local hazardous waste disposal facility.

Project Manager, Homestake Grants Uranium Mill, New Mexico
Managed the planning, design, equipment procurement, and construction management of a new water treatment plant for the Homestake (now Barrick) Grants Uranium Mill groundwater restoration project. Work included design of an 800 gpm lime softening, two-stage reverse osmosis (RO) and ion exchange and waste solids management and containment system. The system was designed to satisfy very restrictive treatable effluent groundwater injection standards and to aid in the long-term recovery of ground water quality in the Grants, New Mexico area.

Project Engineer, Mine Restoration Project, Confidential Client, California
This previously closed old mine began demonstrating groundwater degradation following intensive sampling. As part of the overall enhanced restoration a seepage water treatment system, designed, constructed and commissioned into operation. The process consists of collection, pH adjustment and solids contact clarification followed by media filtration and two stage (separate units) reverse osmosis. The final NPDES standards are expected to be very stringent due to the nearby presence of a major municipal water supply reservoir.

Project Engineer - INEEL Waste Treatment Facility Design, Idaho Falls
Managed the study and design of hazardous materials and radiological water treatment facilities for the fuel reprocessing operation at the Idaho National Engineering and Environmental Laboratory (INEEL).

Project Manager, Kinross Gold – LaCoipa Mine Groundwater Treatment Plan, Chile
Project Manager for a groundwater treatment facility plan at a large gold and silver mine in located in northern Chile. The mine has operated for 20 years using a cyanide vat leach process. Drainage from the tails has contaminated the shallow groundwater with aluminum, boron, zinc, fluoride, manganese, mercury, sulfate, nitrate, cyanide, thiocyanate, cadmium and chloride in addition to pH in the range of 2.4 to 2.8 units. The treatment plan identified two-stage reverse osmosis with treated water recharge of the shallow groundwater aquifer as the recommended alternative. Mr. Cryer is currently leading a design team in design of the reverse osmosis treatment system for the LaCoipa Mine.

Project Manager, Coeur D'Alene Mines – Kensington Mining Project, Alaska
The Kensington Project is a high profile gold mine located north of Juneau, Alaska in an environmentally sensitive area used by sportsmen and recreationists. The planning of the mine began in the early 1990s and has been under study and approval for over 15 years. Construction began in 2005 and is scheduled to continue until 2008. Mr. Cryer was Project Manager for a variety of water treatment analysis and design engineering. Project element included water quality modeling, bench and pilot scale valuation, treatment plant predesign and design from existing ARD, predesign for alternatives for mill water treatment, design of surface water runoff collection and disposal system and a number of specific treatability issues.

Project Manager – Kennecott Mineral Company, Eagle Point Mine, Michigan
The Mine was proposed to be reopened by the owner but would require significant dewatering and treatment of mine water prior to discharge. MWH was retained to evaluate potential water treatment options and develop a concept plan to meet the Company's operating objectives. The best apparent treatment process was determined to involve reverse osmosis for metals removal. However, due to the unusually high boron concentration, a polishing step involving selective ion exchange was required to meet the State of Michigan Part 22 Water Quality Standards. Managed the development of a detailed model, material and water balance, and treatment concept design for the seepage and mine water.

Project Manager - Phelps Dodge Blackwell Smelter Water Quality Feasibility Study, Oklahoma
Project Manager to develop a groundwater restoration pilot treatment study program for the removal and stabilization of heavy metals contaminated by discharge of smelter waste near Blackwell, Oklahoma. Pilot studies and restoration plan were made part of the Supplemental Focused Feasibility Study used to define the best solution to improve hazardous groundwater conditions in a rural area.

APPENDIX B
EXAMPLE DESIGN DRAWINGS

LEGEND:

- 5280 — APPROXIMATE EXISTING GROUND SURFACE CONTOURS AND ELEVATION, FEET
- APPROXIMATE LIMITS OF CLEARING AND GRUBBING
- CIVIL TOWNSHIP OR EQUIVALENT BOUNDARY
- CONTROL LINE AND/OR ROAD CENTERLINE
- COUNTY OR EQUIVALENT BOUNDARY
- CREEK
- 5275 — DESIGN CONTOUR AND ELEVATION, FEET
- DIRT ROAD
- E — ELECTRIC
- W — EXISTING POTABLE WATER PIPELINE
- RW — EXISTING RAW WATER PIPELINE
- X — FENCE
- WILDERNESS BOUNDARY
- INCORPORATED CITY OR EQUIVALENT BOUNDARY
- INVENTORIED ROADLESS AREA
- LATE SUCCESSIONAL RESERVE (LSR)
- NATURAL DRAINAGE
- NEW PIPELINE
- OHP — OVERHEAD POWER
- PATENTED MINE CLAIM BOUNDARY
- PAVED ROAD
- W — POTABLE WATER PIPELINE
- PRIMARY HIGHWAY
- BANK FULL WATER SURFACE BASED ON 2 YEAR FLOW MODELED WITH HEC-RAS
- SS — SANITARY SEWER
- SECTION LINE
- ST — STORM SEWER
- SURFACE WATER FLOW DIRECTION
- TRAIL
- UGE — UNDERGROUND ELECTRIC
- USFS RIPARIAN AND WETLAND DELINEATION
- WATERSHED BOUNDARY

MISCELLANEOUS SYMBOLS:

- ALIQUOT SECTION CORNER
- ARTESIAN WELL
- BENCH MARK
- CORNER MARKER POST
- 5332.785 — HORIZONTAL AND VERTICAL SURVEY CONTROL POINT AND ELEVATION
- LIGHT POLE
- MANHOLE
- MINE ADIT
- POWER POLE
- SECTION CORNER/CONTROL POINT
- 22 — SECTION NUMBER

MISCELLANEOUS SYMBOLS (CONT'D):

- BRIDGE
- 141 — COUNTY HIGHWAY
- CULVERT
- 3:1 — CUT SLOPE, H:V (HORIZONTAL TO VERTICAL)
- 1/1 — DETAIL IDENTIFICATION; DRAWING No. WHERE DETAIL IS SHOWN
- 1/- — DETAIL IDENTIFICATION; DETAIL SHOWN ON SAME SHEET AS ORIGINALLY IDENTIFIED
- EXISTING VEGETATION
- 3:1 — FILL SLOPE, H:V (HORIZONTAL TO VERTICAL)
- FINAL DESIGN ELEVATION 3156.4 / APPROXIMATE GROUND SURFACE ELEVATION 3148.1
- HORIZONTAL TANK
- Mi 2 — MILE
- 1% — PERCENT SLOPE
- PROFILE OR CROSS SECTION IDENTIFICATION; DRAWING NO. WHERE PROFILE/SECTION IS SHOWN
- 119 — STATE HIGHWAY
- 2:1 — SLOPE RATIO
- STRUCTURE
- 50 — U.S. HIGHWAY
- VERTICAL TANK

INVESTIGATION LOCATION SYMBOLS:

- HISTORICAL INVESTIGATION LOCATIONS (BY OTHERS)
- TP1-1BB — BATT TIP
- CPT-1 — CONE PENETROMETER TEST PROBE
- CH-3 — CORE HOLE
- SG-1-WP — DRIVEN WELL POINT
- ST — TECHNICAL BORING EXPLORATION
- HB-1 — HAND AUGER
- TP2-9L — LYSIMETER
- P-1 (HC-1975) — PERMEAMETER
- RC-6-PW-12 — PORE WATER SAMPLER
- P-1 — PORTAL DRAINAGE
- SP-3 — SEEP
- SG — STAFF GAUGE
- RC-7 — SURFACE WATER
- TP-5 — TEST PIT
- 1S/1I/1D — WELL (S = SHALLOW, I= INTERMEDIATE D = DEEP)

EXAMPLE

REV	DESCRIPTION	TECH	ENG	DATE
B	ISSUED FOR AGENCY REVIEW AND COMMENT	DM	PC	07/29/11
A	ISSUED FOR CLIENT REVIEW AND COMMENT	PC	FA	

ISSUE

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DRAWING REFERENCE(S):

DESIGNED BY	C. STRACHAN	07/15/10
DRAWN BY	C. LEE	07/15/10
CHECKED BY	D. RODRIGUEZ	07/15/10
APPROVED BY	P. CROUSE	07/29/11
PROJECT MANAGER	V. DRAIN	07/29/11
CLIENT APPROVAL		
CLIENT REFERENCE NO.		

Newmont USA Limited

PROJECT LOCATION: MIDNITE MINE, WASHINGTON

PROJECT: REMEDIAL DESIGN FOR MIDNITE MINE INFRASTRUCTURE

TITLE: MASTER LEGEND

MWH

SHEET 1-6 | REVISION E

FILE NAME 1008679D037

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GENERAL:

1. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE FROM DAMAGE. ALL IMPROVEMENTS DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE EXPEDITIOUSLY REPAIRED OR RECONSTRUCTED AT THE CONTRACTOR'S EXPENSE WITHOUT ADDITIONAL COMPENSATION.
2. ALL BUILDING COORDINATES ARE TO OUTSIDE CORNER OF COLUMN OR BUILDING.
3. CONTRACTOR SHALL RESTORE ALL SURVEY MONUMENTS THAT ARE DAMAGED OR DESTROYED DURING CONSTRUCTION.

UTILITIES:

1. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL LOCATE ALL EXISTING UTILITIES IN AND AROUND THE AREAS OF NEW CONSTRUCTION. THE CONTRACTOR SHALL POTHOLE FOR EXISTING UTILITIES PRIOR TO SUBMITTAL OF SHOP DRAWINGS, FOR POINTS OF CONNECTIONS.
2. THE CONTRACTOR SHALL PROTECT ALL REMAINING EXISTING UTILITIES.
3. LOCATIONS OF UNDERGROUND UTILITIES SHOWN ON THE DRAWINGS WERE OBTAINED FROM AVAILABLE RECORDS. THE CONTRACTOR SHALL VERIFY ALL LOCATIONS AND ELEVATIONS AND SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT UTILITY LINES WHETHER SHOWN OR NOT SHOWN.
4. PRIOR TO ANY CONNECTION TO AN EXISTING UTILITY, THE CONTRACTOR SHALL COORDINATE WITH THE UTILITY OWNER.
5. PRIOR TO ANY EXCAVATION IN THE VICINITY OF ANY EXISTING UNDERGROUND FACILITIES, INCLUDING ALL WATER, SEWER, STORM DRAIN, GAS, PETROLEUM PRODUCTS, OR OTHER PIPELINES; ALL BURIED ELECTRIC POWER, COMMUNICATIONS, OR TELEVISION CABLES; ALL TRAFFIC SIGNAL AND STREET LIGHTING FACILITIES; AND ALL ROADWAY, STATE HIGHWAY, AND RAILROAD RIGHTS-OF-WAY, THE CONTRACTOR. SHALL NOTIFY THE RESPECTIVE AUTHORITIES REPRESENTING THE OWNERS OR AGENCIES RESPONSIBLE FOR SUCH FACILITIES NOT LESS THAN 3 DAYS NOR MORE THAN 7 DAYS PRIOR TO EXCAVATION SO THAT A REPRESENTATIVE OF SAID OWNERS OR AGENCIES CAN BE PRESENT DURING SUCH WORK IF THEY SO DESIRE. IN THE CASE OF THE UNDERGROUND UTILITY SERVICE ALERT CENTER, THIS NOTICE WILL GIVE THEM TIME TO MARK THE LOCATION OF THE UTILITIES. THE CONTRACTOR SHALL ALSO NOTIFY THE REGIONAL OR LOCAL UNDERGROUND SERVICE ALERT COMPANY AT LEAST 3 DAYS, BUT NO MORE THAN 7 DAYS, PRIOR TO SUCH EXCAVATION.

PIPING:

1. THE CONTRACTOR SHALL COMPLY WITH THE STATE DEPARTMENT OF HEALTH SERVICES CRITERIA FOR THE SEPARATION OF WATER MAINS AND SANITARY SEWERS.
2. THE CONTRACTOR SHALL PROVIDE A MINIMUM OF 36 INCHES OF COVER ON ALL PIPELINES UNLESS OTHERWISE SHOWN OR DIRECTED.
3. STRAIGHT SLOPES SHALL BE MAINTAINED BETWEEN INVERT ELEVATIONS SHOWN OR SPECIFIED.
4. THE CONTRACTOR SHALL ADJUST ALL VALVE BOXES, PULL BOXES AND MANHOLES TO FINISHED GRADE UNLESS OTHERWISE SHOWN OR SPECIFIED. MANHOLES IN OPEN FIELDS SHALL BE SET ONE FOOT ABOVE GRADE. APPROXIMATE RIM ELEVATIONS ARE SHOWN ON DRAWINGS.

EROSION CONTROL:

1. THE CONTRACTOR SHALL SUBMIT AN EROSION CONTROL PLAN FOR WORK PRIOR TO THE START OF CONSTRUCTION.
   a. ALL SLOPES SHALL BE PROTECTED FROM EROSION [illegible] G ROUGH GRADING OPERATIONS AND THEREAFTER, UNTIL [illegible] ALLATI[illegible] OF FINAL GROUNDCOVER.
   b. ALL SLOPE PROTECTION SWALES SHALL [illegible] CONSTRU[illegible]TED AT THE SAME TIME AS BANKS ARE GRADED.
   c. THE CONTRACTOR IS RESPONSIBLE F[illegible] ENTAT[illegible] D MAINTENANCE OF EROSION CONTROL M[illegible] AINED [illegible]THIN THE CONTRACT SPECIFICATIONS OR AS REQUI[illegible] CITY, DISTRICT, OR OTHER REGULATORY AUTHORITY. THE C[illegible] SHALL ALSO PROVIDE ANY ADDITIONAL EROSION CONTROL [illegible] (E.G. HYDROSEEDING, MULCHING OF STRAW, SAND BA[illegible] ERSIO[illegible] DITCHES, ETC.) DICTATED BY FIELD CONDITIONS [illegible] EROSION OR THE INTRODUCTION OF DIRT, MUD, OR DEBRIS [illegible] STING PUBLIC STREETS, WATERWAYS, OR ONTO ADJACENT [illegible] ERTIES DURING ANY PHASE OF CONSTRUCTION OPERATIONS.

ACRONYMS:

AC	ASPHALT CONCRETE
AMSL	ABOVE MEAN SEA LEVEL
BH	BORE HOLE
CH	CORE HOLE
CGS	CLEARING, GRUBBING, STRIPPING
CMP	CORRUGATED METAL PIPE
CND	CONDUIT
CONT	CONTINUOUS
CPT	CORRUGATED POLYETHYLENE TUBING
℄	CENTER LINE
CY	CUBIC YARD
DI	DUCTILE IRON
DIA	DIAMETER
DS	DOWNSTREAM
EL	ELEVATION
ENV	ENVIRONMENTAL
EOP	EDGE OF PAVEMENT
EQUIV	EQUIVALENT
GB	GRADE BREAK
HOR	HORIZONTAL
HDPE	HIGH DENSITY P[illegible]YE[illegible]
HWL	HIGH WATER LINE
ID	INSIDE DIAMETER
INV	[illegible]
LCRS	[illegible]CTIO[illegible] AND RECO[illegible] SYSTEM
LLDPE	LINEAR [illegible] POLYETHYLENE
LF	[illegible]NEAL FOOT
LWL	LO[illegible] WATER LINE
MAX	MAXIM[illegible]
[illegible]	1/1000T[illegible] OF AN INCH
[illegible]	MINIMUM
[illegible]	MONITORING WELL
MH	MANHOLE
MSL	MEAN SEA LEVEL
NFWE	NO FREE WATER ENCOUNTERED
NO	NUMBER
NOM	NOMINAL
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
PC	POINT OF CURVE
PCC	POINT OF COMPOUND CURVE
PI	POINT OF INTERSECTION
PRC	POINT OF RETURN CURVE
PT	POINT OF TANGENCY
PVC	POINT OF VERTICAL TANGENT
PVC	POLYVINYL CHLORIDE
PSI	POUNDS PER SQUARE INCH
PVC	POINT OF VERTICAL CURVE
PVC	POLYVINYL CHLORIDE
RCP	REINFORCED CONCRETE PIPE

ACRONYMS (CONT'D):

REQ'D	REQUIRED
R.O.W.	RIGHT OF WAY
SCH	SC[illegible]
SDR	STANDARD DIMENSIONAL RATIO
SDR	STANDARD DIMENSION RATIO
SPE[illegible]	SPECIF[illegible]TIONS
SS	[illegible]TAIN[illegible]EEL
STA	[illegible]ON
TOC	[illegible] CONCRET[illegible]
TP	[illegible]
TYP	TYP[illegible]
US	UPS[illegible]REAM
FS	UNITED STATES DEPARTMENT OF THE INTERIOR FOREST SERVICE
VERT	VERTICAL
VL[illegible]E	VERY LOW DENSITY POLYETHYLENE

IMPERIAL UNITS:

" OR IN	INCHES
OZ	OUNCES
F	FAHRENHEIT
' OR FT	FEET
MI	MILES
YD	YARD
SQ MI	SQUARE MILES
AC	ACRE
AC-FT	ACRE-FEET
° OR DEGREES	DEGREES
4.9%	SLOPE GRADE

EXAMPLE

ISSUE / REV	DESCRIPTION	TECH	ENG	DATE
B	ISSUED FOR AGENCY REVIEW AND COMMENT	DM	PC	07/29/11
A	ISSUED FOR CLIENT REVIEW AND COMMENT	PC	FA	

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APPROVED BY	P. CROUSE	07/29/11
PROJECT MANAGER	V. DRAIN	07/29/11
CLIENT APPROVAL		
CLIENT REFERENCE NO.		

Newmont USA Limited

PROJECT LOCATION: MIDNITE MINE, WASHINGTON
PROJECT: REMEDIAL DESIGN FOR MIDNITE MINE INFRASTRUCTURE
TITLE: GENERAL NOTES AND ACRONYMS

MWH

SHEET 1-7 | REVISION E
FILE NAME 1008679D051

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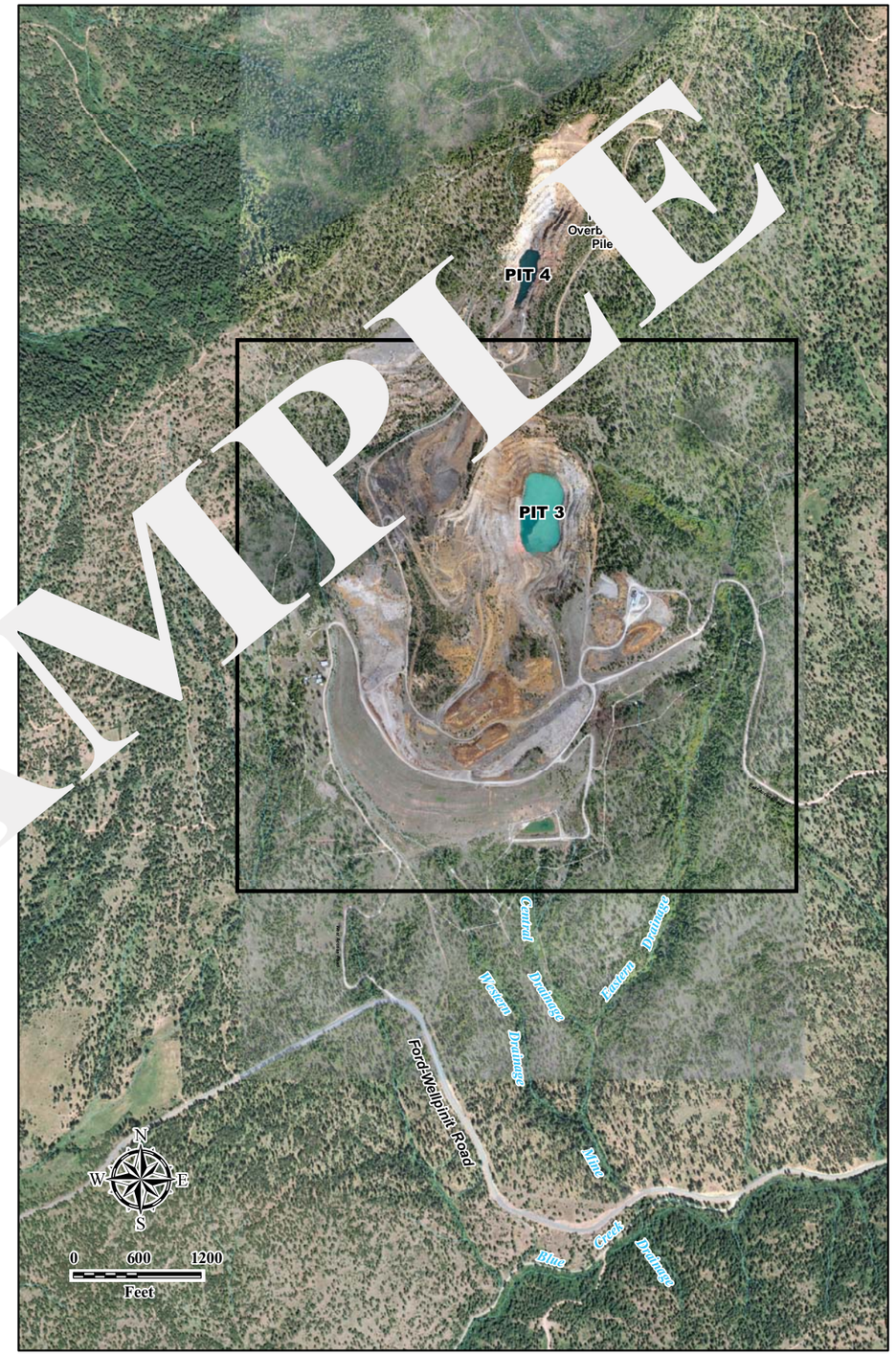

EXAMPLE

ISSUE / REV	DESCRIPTION	TECH	ENG	DATE
B	ISSUED FOR AGENCY REVIEW AND COMMENT	DM	PC	07/29/11
A	ISSUED FOR CLIENT REVIEW AND COMMENT	PC	FA	

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DRAWING REFERENCE(S):
- COORDINATE SYSTEM: WASHINGTON STATE PLANE, NORTH ZONE, NAD 83, US FEET.
- SITE TOPOGRAPHIC CONTOURS AND AERIAL IMAGERY DERIVED FROM AERIAL PHOTOGRAPHY PERFORMED BY OLYMPUS AERIAL SURVEY JUNE 2010.
- SURROUNDING TOPOGRAPHIC CONTOURS DERIVED FROM 1/3 ARCSECOND NATIONAL ELEVATION DATASET (NED) DATED 2006.
- SURROUNDING AERIAL IMAGERY DERIVED FROM WASHINGTON STATE EAST HIGH RESOLUTION ORTHO-GRAPHY DATED 2006.

DESIGNED BY	C. STRACHAN	07/15/10
DRAWN BY	C. LEE	07/15/10
CHECKED BY	D. RODRIGUEZ	07/15/10
APPROVED BY	P. CROUSE	07/29/11
PROJECT MANAGER	V. DRAIN	07/29/11
CLIENT APPROVAL		
CLIENT REFERENCE NO.		

Newmont USA Limited

PROJECT LOCATION: MIDNITE MINE, WASHINGTON

PROJECT: REMEDIAL DESIGN FOR MIDNITE MINE INFRASTRUCTURE

TITLE: PRINCIPAL SITE FEATURES

MWH

SHEET: 1-8

REVISION: A

FILE NAME: 1008679D562

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APPENDIX C
EXAMPLE EARTHWORK SPECIFICATION

SECTION 02200 – EARTHWORK

PART 1 -- GENERAL

1.1 SUMMARY

A. The CONTRACTOR shall perform earthwork as indicated and required for construction of the WORK, complete and in place, in accordance with the Contract Documents.

1.2 CONTRACTOR SUBMITTALS

A. Samples:

1. The CONTRACTOR shall submit samples of materials proposed for the WORK in conformance with the requirements of Section 01300 – Contractor Submittals.

2. Sample sizes shall be as determined by the testing laboratory.

PART 2 -- PRODUCTS

2.1 FILL AND BACKFILL MATERIAL REQUIREMENTS

A. General:

1. Fill, backfill, and embankment materials shall be selected or shall be processed and clean fine earth, rock, gravel, or sand, free from grass, roots, brush, other vegetation and organic matter.

2. Fill and backfill materials that are to be placed within 6 inches of any structure or pipe shall be free of rocks or unbroken masses of earth materials having a maximum dimension larger than 3 inches.

B. Suitable Materials:

1. Materials not defined below as unsuitable will be considered as suitable materials and may be used in fills, backfilling, and embankment construction, subject to the indicated requirements.

2. If acceptable to the ENGINEER, some of the material listed as unsuitable may be used when thoroughly mixed with suitable material to form a stable composite.

3. Mixing or blending of materials to obtain a suitable composite is the CONTRACTOR's option but is subject to the approval of the ENGINEER.

4. The CONTRACTOR shall submit certification to the ENGINEER that the chloride concentration in imported materials within the pipe zone does not exceed 100 ppm, when tested in accordance with the requirements of AASHTO T291-94 – Standard Method of Test for determining Water-Soluble Chloride Ion Content in Soil.

5. Suitable materials may be obtained from on-Site excavations, may be processed on-Site materials, or may be imported.

EXAMPLE

6. If imported materials are required by this Section or are required in order to meet the quantity requirements of the WORK, the CONTRACTOR shall provide the imported materials as part of the WORK,unless a unit price item is included for imported materials in the Bidding Schedule.

C. The following types of materials are defined:

Soil Class	Soil Type[1]	Description of Material Classification	Acceptable Areas
Class I[3,4]	GW	Well-graded gravels and gravel-sand mixtures with little or no fines. 50 percent or more retained in the No. 4 sieve.	As per Drawings
	GP	Poorly graded gravels and gravel-sand mixtures with little or no fines. 50 percent or more retained on the No. 4 sieve. More than 95 percent retained in the No. 200 sieve.	As per Drawings
	SW	Well graded sands and gravelly sands with little or no fines. More than 50 percent passing the No. 4 sieve and more than 95 percent retained on the No. 200 sieve.	As per Drawings
	SP	Poorly graded sands and gravelly sands with little or no fines. More than 50 percent passing the No. 4 sieve and more than 95 percent retained on the No. 200 sieve.	As per Drawings
Class II	GM	Silty gravels, gravelly-sand-silt mixtures. 50 percent or more retained on the No. 4 sieve. Less than 88 percent retained on the No. 200 sieve.	As per Drawings
	GC	Clayey gravels, gravelly-sand-silt mixtures. 50 percent or more retained on the No. 4 sieve. Less than 88 percent retained on the No. 200 sieve.	As per Drawings
	SM	Silty sands, sand-silt mixtures. More than 50 percent passing the No. 4 sieve. Less than 88 percent retained on the No. 200 sieve.	As per Drawings
	SC	Clayey sands, sand-clay mixtures. More than 50 percent passing the No. 4 sieve. Less than 88 percent retained on the No. 200 sieve.	As per Drawings
Class III	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands. Liquid limit 50 percent or less. 50 percent or more passing the No. 200 sieve.	As per Drawings

EXAMPLE

Soil Class	Soil Type[1]	Description of Material Classification	Acceptable Areas
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays. Liquid limit 50 percent or less. 50 percent or more passing the No. 200 sieve.	As per Drawings
	MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts. Liquid limit greater than 50 percent. 50 percent or more passing the No. 200 sieve.	None – Material is unsuitable
	CH	Inorganic clays of high plasticity, fat clays. Liquid limit greater than 50 percent. 50 percent or more passing the No. 200 sieve.	None – Material is unsuitable
Class IV	OL	Organic silts and organic silty clays of low plasticity. Liquid limit of 50 percent or less. 50 percent or more passing the No. 200 sieve.	None – Material is unsuitable
	OH	Organic clays of medium to high plasticity. Liquid limit greater than 50 percent. 50 percent or more passing the No. 200 sieve.	None – Material is unsuitable
	PT	Peat, muck, and other highly organic soils.	None – Material is unsuitable
Class V	Base Course	Aggregates that consist of hard, durable particles or fragments of crushed stone. Free of lumps or balls of clay. Meeting the following gradation, and Attterberg limits. Liquid Limit ASTM D4318-10 – 25 (max) Plastic Limit ASTM D4318-10 – Nonplastic	As per Drawings

Sieve Size	% by Mass Passing Designated Sieve (ASTM D422)		
	Grade A	Grade B	Grade C
2	100		
1.5	97-100	100	
1		97-100	100
3/4			97-100

EXAMPLE

<table>
<tr><th>Soil Class</th><th>Soil Type[1]</th><th>Description of Material Classification</th><th>Acceptable Areas</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td>½</td><td></td><td></td><td></td></tr>
<tr><td>3/8</td><td></td><td>56-70(7)</td><td>67-79(6)</td></tr>
<tr><td>#4</td><td>40-60(8)*</td><td>39-53(6)</td><td>47-59(7)</td></tr>
<tr><td>#40</td><td></td><td>12-21(4)</td><td>12-21(4)</td></tr>
<tr><td>#200</td><td>0-12(4)</td><td>4-8(3)</td><td>4-8(3)</td></tr>
</table>
*- Allowable deviation
</td><td></td></tr>
<tr><td>Class VI</td><td>Wearing Course</td><td>
Aggregates that consist of hard, durable particles or fragments of crushed stone. Free of lumps or balls of clay. Meeting the following gradation, and Attterberg limits.
Liquid Limit ASTM D4318: 35 (max)
Plastic Limit ASTM D4318: Nonplastic
<table>
<tr><th>Sieve Size</th><th colspan="2">% by Mass Passing Designated Sieve (ASTM D422)</th></tr>
<tr><td></td><td>Grade A</td><td>Grade B</td></tr>
<tr><td>1.5</td><td>100</td><td></td></tr>
<tr><td>1</td><td>97-100</td><td>100</td></tr>
<tr><td>3/4</td><td>76-89(6)*</td><td>97-100</td></tr>
<tr><td>3/8</td><td>56-68(6)</td><td>70-80(6)</td></tr>
<tr><td>#4</td><td>43-53(7)*</td><td>51-63(7)</td></tr>
<tr><td>#16</td><td>23-32(6)</td><td>28-39(6)</td></tr>
<tr><td>#40</td><td>15-23(5)</td><td>19-27(5)</td></tr>
<tr><td>#200</td><td>10-16(4)</td><td>10-16(4)</td></tr>
</table>
*- Allowable deviation
</td><td>As per Drawings</td></tr>
<tr><td>Class VII</td><td>Topsoil</td><td>Stockpiled topsoil material from the Site obtained by removing soil. Removal of topsoil shall be done after the area has been stripped and grubbed of vegetation.</td><td>As per drawings</td></tr>
</table>

EXAMPLE

Soil Class	Soil Type[1]	Description of Material Classification	Acceptable Areas

NOTES:

1. Refers to ASTM D 2487 classifications for Classes I, II, III, IV, and V.

2. In accordance with ASTM D 2487, less than 5 percent passes the No. 200 sieve.

3. In accordance with ASTM D 2487, more than 12 percent passing the No. 200 sieve. Soils with 5 to 12 percent passing the No. 200 sieve fall in borderline classification such as GP-GC. If borderline classifications are proposed, approval shall be subject to the CONTRACTOR demonstrating its ability to control moisture content and achieve the required compaction. If the borderline classification is predominately an unsuitable material, the composite material shall be considered unsuitable.

2.2 MATERIALS TESTING

A. Samples:

1. Soils testing of samples submitted by the CONTRACTOR will be performed by a testing laboratory of the OWNER's choice and at the CONTRACTOR's expense.

2. The ENGINEER may direct the CONTRACTOR to supply samples for testing of any material used in the WORK.

B. Particle size analysis of soils and aggregates will be performed using ASTM D 422 - Standard Test Method for Particle-Size Analysis of Soils.

C. Determination of sand equivalent value will be performed using ASTM D 2419 - Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.

D. Unified Soil Classification System:

1. References in this Section to soil classification types and standards shall have the meanings and definitions indicated in ASTM D 2487.

2. The CONTRACTOR shall be bound by applicable provisions of ASTM D 2487 in the interpretation of soil classifications.

2.3 IDENTIFICATION TAPE

A. Unless otherwise indicated, identification tape shall be placed above buried pipelines that are not comprised of magnetic components at least in part. Curlverts are exempt from this requirement.

B. Identification tape shall be 6-inches wide, yellow in color, composed of polyethylene, and provided with an integral metallic wire.

EXAMPLE

C. Tape shall be labeled with CAUTION – BURIED UTILITIES.

PART 3 -- EXECUTION

3.1 EXCAVATION AND BACKFILLING - GENERAL

A. General:

1. Except when specifically provided to the contrary, excavation shall include the removal of materials, including obstructions, that would interfere with the proper execution and completion of the WORK.

2. The removal of such materials shall conform to the lines and grades indicated or ordered.

3. Unless otherwise indicated, the entire Site shall be stripped of vegetation and debris and shall be grubbed, and such material shall be removed from the Site prior to performing any excavation or placing any fill.

4. The CONTRACTOR shall furnish, place, and maintain supports and shoring that may be required for the sides of excavations.

5. Excavations shall be sloped or otherwise supported in a safe manner in accordance with applicable state safety requirements and the requirements of OSHA Safety and Health Standards for Construction (29CFR1926).

6. The CONTRACTOR shall provide quantity surveys where so required to verify quantities for Unit Price Contracts.

7. Surveys shall be performed prior to beginning WORK and upon completion by a surveyor licensed in the state where the Site is located.

B. Removal and Exclusion of Water:

1. The CONTRACTOR shall remove and exclude water, including stormwater, groundwater, irrigation water, and wastewater, from excavations.

2. Dewatering wells, wellpoints, sump pumps, or other means shall be used to remove water and continuously maintain groundwater at a level at least 2 feet below the bottom of excavations before the excavation WORK begins at each location.

3. Water shall be removed and excluded until backfilling is complete and field soils testing has been completed.

3.2 OVER-EXCAVATION

A. Indicated:

1. Where areas are indicated to be over-excavated, excavation shall be to the depth indicated, and backfill shall be installed to the grade indicated.

EXAMPLE

B. Not Indicated:

1. When ordered to over-excavate areas deeper and/or wider than required by the Contract Documents, the CONTRACTOR shall over-excavate to the dimensions ordered and backfill to the indicated grade.

C. Neither Indicated nor Ordered:

1. Any over-excavation carried below the grade that is neither ordered or indicated shall be backfilled and compacted to the required grade with the indicated material as part of the WORK

3.3 EXCAVATION IN LAWN AREAS

A. Where excavation occurs in lawn areas, the sod shall be carefully removed, dampened, and stockpiled in order to preserve it for replacement.

B. Excavated material may be placed on the lawn, provided that a drop cloth or other suitable method is employed to protect the lawn from damage, but the lawn shall not remain covered for more than 72 hours.

C. Immediately after completion of backfilling and testing, the sod shall be replaced and lightly rolled in a manner as to restore the lawn as near as possible to its original condition.

D. The CONTRACTOR shall provide new sod if the stockpiled sod has not been replaced within 72 hours.

3.4 EXCAVATION IN VICINITY OF TREES

A. Except where trees are indicated to be removed, trees shall be protected from injury during construction operations.

B. Trees shall be supported during excavation by any means previously reviewed and accepted by the ENGINEER.

3.5 ROCK EXCAVATION

A. Rock excavation shall include removal and disposal of the following items:

1. rock material in ledges, bedding deposits, and un-stratified masses that cannot be removed using conventional equipment as defined herein and which require systematic drilling and blasting for removal;

2. concrete or masonry structures that have been abandoned; and,

3. conglomerate deposits that are so firmly cemented that they possess the characteristics of solid rock and cannot be removed using conventional equipment as herein defined and require systematic drilling and blasting for removal.

EXAMPLE

B. Scope and Payment:

1. Rock excavation shall be performed by the CONTRACTOR, provided that if the quantity of rock excavation is affected by any change in the scope of the WORK an appropriate adjustment of the Contract Price will be made under a separate Bid Item if such Bid Item has been established.

2. Otherwise, payment will be made in accordance with a negotiated price.

C. Explosives and Blasting: Blasting will not be permitted.

3.6 DISPOSAL OF EXCESS EXCAVATED MATERIAL

A. The CONTRACTOR shall be responsible for the removal and stockpiling of any excess excavated material according to Section 01552 – Staging and Stockpile Areas.

B. Material shall be disposed of at an approved on-Site disposal area or off-Site at a location arranged by the CONTRACTOR in accordance with laws and regulations regarding the disposal of such material.

3.7 STRUCTURE, ROADWAY, AND EMBANKMENT EXCAVATION AND BACKFILL

A. Excavation Beneath Structures and Embankments:

1. Except where indicated otherwise for a particular structure or where ordered by the ENGINEER, excavation shall be carried to an elevation 6 inches below the bottom of the footing or slab and brought back to grade with compacted materials acceptable for placement beneath structures.

2. The area where a fill or embankment is to be constructed shall be cleared of vegetation, roots, and foreign material.

3. Where indicated or ordered, areas beneath structures or fills shall be over-excavated.

4. The subgrade areas beneath embankments shall be excavated to remove all deleterious native material and where such subgrade is sloped, the native material shall be benched.

5. When such over-excavation is indicated, both the over-excavation and the subsequent backfill to the required grade shall be performed by the CONTRACTOR.

6. After the required excavation or over-excavation for fills and embankments has been completed, the exposed surface shall be scarified to a depth of 6 inches, brought to optimum moisture content, and rolled with heavy compaction equipment to obtain 95 percent of maximum density as determined by ASTM D 698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3).

EXAMPLE

B. Excavation Beneath Paved Areas:

1. Excavation under areas to be paved shall extend to the bottom of the aggregate base or subbase, if such base is called for; otherwise it shall extend to the paving thickness.

2. After the required excavation has been completed, the top 12 inches of exposed surface shall be scarified, brought to optimum moisture content, and rolled with heavy compaction equipment to obtain 95 percent of maximum density.

3. The finished subgrade shall be even, self-draining, and in conformance with the slope of the finished pavement.

4. Areas that could accumulate standing water shall be regraded to provide a self-draining subgrade.

C. Notification of ENGINEER:

1. The CONTRACTOR shall notify the ENGINEER at least 3 Days in advance of completion of any structure or roadway excavation and shall allow the ENGINEER a review period of at least one day before the exposed foundation is scarified and compacted or is covered with backfill or with any construction materials.

D. Compaction of Fill, Backfill, and Embankment Materials:

1. Each layer of backfill materials as defined herein, where the material is graded such that 10 percent or more passes a No. 4 sieve, shall be mechanically compacted to the indicated percentage of density.

2. Equipment that is consistently capable of achieving the required degree of compaction shall be used, and each layer shall be compacted over its entire area while the material is at the required moisture content.

3. Each layer of coarse granular backfill materials with less than 10 percent passing the No. 4 sieve shall be compacted by means of at least 2 passes from a vibratory compactor that is capable of obtaining the required density in 2 passes.

E. Flooding, ponding, and jetting shall not be used for backfill around structures, backfill around reservoir walls, for final backfill materials, or aggregate base materials.

F. Heavy Equipment:

1. Equipment weighing more than 10,000 pounds shall not be used closer to walls than a horizontal distance equal to the vertical depth of the fill above undisturbed soil at that time.

2. Hand-operated power compaction equipment shall be used where the use of heavier equipment is impractical or restricted due to weight limitations.

EXAMPLE

G. Layering:

1. Embankment and fill material shall be placed and spread evenly in approximately horizontal layers.

2. Each layer shall be moistened and aerated as necessary.

3. Unless otherwise approved by the ENGINEER, no layer shall exceed 6 inches of compacted thickness.

4. The embankment and fill shall be compacted in conformance with Paragraph K, below.

H. Embankments and Fills:

1. When an embankment or fill is to be constructed and compacted against hillsides or fill slopes steeper than 4:1, the slopes of the hillsides or fills shall be horizontally benched in order to key the embankment or fill to the underlying ground.

2. A minimum of 12 inches perpendicular to the slope of the hillside or fill shall be removed and re-compacted as the embankment or fill is brought up in layers.

3. Material thus cut shall be re-compacted along with the new material.

4. Hillside or fill slopes 4:1 or flatter shall be prepared in accordance with Paragraph A, above.

I. Compaction Requirements:

1. The following compaction requirements shall be in accordance with ASTM D 698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3) where the material is graded such that 10 percent or more passes a No. 4 sieve and in accordance with ASTM D 4253 - Test Method for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table, and D 4254 - Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density, where the material is coarse granular backfill materials with less than 10 percent passing the No. 4 sieve:

EXAMPLE

Location or Use of Fill or Backfill	Percentage of Maximum Dry Density	Percentage of Relative Density
Embankments and fills not identified otherwise	90	55
Embankments and fills beneath road areas or structures	95	70
Backfill beneath structures and hydraulic structures	95	70
Topsoil	80	NA
Base and wearing course	95	NA

2. All compaction shall be at plus or minus 2% of optimum moisture content as determined by ASTM D 698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3).

3.8 PIPELINE AND UTILITY TRENCH EXCAVATION AND BACKFILL

A. Exploratory Excavations:

1. The CONTRACTOR shall excavate and expose buried points of connection to existing utilities as indicated on the Drawings.

2. Excavation shall be performed prior to the preparation of Shop Drawings for connections and before the fabrication and installation of the pipe

3. The data obtained from exploratory excavations shall be used in preparing the Shop Drawings.

4. Data, including dates, locations excavated, and dimensioned sketches, shall be submitted to the ENGINEER within one week of excavation.

5. Damage to utilities from excavation activities shall be repaired by the CONTRACTOR at their expense.

B. General:

1. Unless otherwise indicated or ordered, excavation for pipelines and utilities shall be open-cut trenches with minimum widths as indicated.

2. Backfill shall not be dropped directly upon any structure or pipe.

3. Backfill shall not be placed around or upon any structure until the concrete has attained sufficient strength to withstand the loads imposed.

EXAMPLE

4. Backfill around water-retaining structures shall not be placed until the structures have been tested, and the structures shall be full of water while backfill is being placed.

C. Trench Bottom:

1. Except where pipe bedding is required, the bottom of the trench shall be excavated uniformly to the grade of the bottom of the pipe.

2. Excavations for pipe bells and welding shall be made as required.

3. Where pipe bedding is required, the bottom of the trench shall be excavated uniformly to the grade of the bottom of the pipe bedding.

D. Open Trenches:

1. The maximum amount of open trench permitted in any one location shall be 500 feet or the length necessary to accommodate the amount of pipe installed in a single Day, whichever is greater.

2. Trenches shall be fully backfilled at the end of each Day or, in lieu thereof, shall be covered by heavy steel plates adequately braced and capable of supporting vehicular traffic in those locations where it is impractical to backfill at the end of each Day.

3. These requirements for backfilling or use of steel plate will be waived in cases where the trench is located further than 100 feet from any traveled roadway or occupied structure; in such cases, however, barricades and warning signs meeting appropriate safety requirements shall be provided and maintained.

E. Embankments, Fills and Structural Backfills:

1. Where pipelines are to be installed in embankments, fills, or structure backfills, the fill shall be constructed to a level at least one foot above the top of the pipe before the trench is excavated.

2. Upon completion of the embankment or structural backfill, a trench conforming to the appropriate detail may be excavated and the pipe may be installed.

F. Trench Shield

1. If a moveable trench shield is used during excavation operations, the trench width shall be wider than the shield such that the shield is free to be lifted and then moved horizontally without binding against the trench sidewalls and causing sloughing or caving of the trench walls.

2. If the trench walls cave or slough, the trench shall be excavated as an open excavation with sloped sidewalls or with trench shoring, as indicated and as required by the pipe structural design.

EXAMPLE

3. If a moveable trench shield is used during excavation, pipe installation, and backfill operations, the shield shall be moved by lifting the shield free of the trench bottom or backfill and then moving the shield horizontally.

4. The CONTRACTOR shall not drag trench shields along the trench causing damage or displacement to the trench sidewalls, the pipe, or the bedding and backfill.

G. Placing and Spreading of Backfill Materials:

1. Each layer of coarse granular backfill materials with less than 10 percent passing the No. 4 sieve shall be compacted by means of at least 2 passes from a vibratory compactor that is capable of achieving the required density in 2 passes and that is acceptable to the ENGINEER.

2. Where such materials are used for pipe zone backfill, vibratory compaction shall be used at vertical intervals of the lesser of:

   a. one-half the diameter of the pipe; or

   b. 24 inches, measured in the uncompacted state.

3. In addition, these materials shall be subjected to vibratory compaction at the springline of the pipe and the top of the pipe zone backfill, regardless of whether that dimension is less than 24 inches or not.

4. Each layer of backfill material with greater than 10 percent passing the No. 4 sieve shall be compacted using mechanical compactors suitable for the WORK.

5. The material shall be placed and compacted under the haunch of the pipe and up each side evenly so as not to move the pipe during the placement of the backfill.

6. The material shall be placed in lifts that will not exceed 6 inches when compacted to the required density.

7. During spreading, each layer shall be thoroughly mixed as necessary in order to promote uniformity of material in each layer.

H. Mechanical Compaction:

1. Backfill around and over pipelines that is mechanically compacted shall be compacted using light, hand-operated vibratory compactors and rollers that do not damage the pipe.

2. After completion of at least 2 feet of compacted backfill over the top of pipeline, compaction equipment weighing no more than 8,000 pounds may be used to complete the trench backfill.

I. Pre-Placement Conditions:

1. Immediately prior to placement of backfill materials, the bottoms and sidewalls of trenches and structure excavations shall have any loose, sloughing, or caving soil and rock materials removed.

EXAMPLE

2. Trench sidewalls shall consist of excavated surfaces that are in a relatively undisturbed condition before placement of backfill materials.

J. Pipe And Utility Trench Backfill:

1. Pipe Zone Backfill

a. Definitions

1) The pipe zone is defined as that portion of the vertical trench cross-section lying between a plane below the bottom surface of the pipe and a plane at a point above the top surface of the pipe as indicated.

2) The bedding is defined as that portion of pipe zone backfill material between the trench subgrade and the bottom of the pipe.

3) The embedment is defined as that portion of the pipe zone backfill material between the bedding and a level line as indicated.

b. Final Trim

1) After compacting the bedding, the CONTRACTOR shall perform a final trim using a stringline for establishing grade, such that each pipe section when first laid will be continually in contact with the bedding along the extreme bottom of the pipe.

2) Excavation for pipe bells and welding shall be made as required.

c. The pipe zone shall be backfilled with the indicated backfill material.

d. Pipe zone backfill materials shall be manually spread evenly around the pipe, maintaining the same height on both sides of the pipe such that when compacted the pipe zone backfill will provide uniform bearing and side support.

e. The CONTRACTOR shall exercise care in order to prevent damage to the pipeline coating, cathodic bonds, and the pipe itself during the installation and backfill operations.

2. Trench Zone Backfill

a. After the pipe zone backfill has been placed, backfilling of the trench zone may proceed.

b. The trench zone is defined as that portion of the vertical trench cross-section lying as indicated between a plane above the top surface of the pipe and a plane at a point 18 inches below the finished surface grade, or if the trench is under pavement, 18 inches below the roadway subgrade.

EXAMPLE

3. Final Backfill

   a. Final backfill is defined as backfill in the trench cross-sectional area within 18 inches of finished grade, or if the trench is under pavement, backfill within 18 inches of the roadway subgrade.

K. Except for drainrock materials being placed in over-excavated areas or trenches, backfill shall be placed after water is removed from the excavation and the trench sidewalls and bottom have been dried to a moisture content suitable for compaction.

L. Layering:

   1. Backfill materials shall be placed and spread evenly in layers.

   2. When compaction is achieved using mechanical equipment, the layers shall be evenly spread such that when compacted each layer shall not exceed 6 inches in thickness.

M. Identification Tape

   1. Install identification tape as indicated.

   2. Terminate the tape in a precast concrete box either adjacent to or part of the valve box, manhole, vault, or other structure into which the non-metallic pipe enters or at the end of the non-metallic pipeline.

   3. The termination box shall be covered with a cast iron lid.

   4. The box shall be located at grade in paved areas or 6 inches above grade in unpaved areas.

N. Trench Shield:

   1. If a moveable trench shield is used during backfill operations, the shield shall be lifted to a location above each layer of backfill material prior to compaction of the layer.

   2. The CONTRACTOR shall not displace the pipe or backfill while the shield is being moved.

O. Compaction Requirements:

   1. The following compaction requirements shall be in accordance with ASTM D 698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3) where the material is graded such that 10 percent or more passes a No. 4 sieve, and in accordance with ASTM D 4253 - Standard Test Method for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table, and D 4254 - Standard Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density where the material is coarse granular backfill materials with less than 10 percent passing the No. 4 sieve.

EXAMPLE

Location or Use of Fill or Backfill	Percentage of Maximum Dry Density	Percentage of Relative Density
Pipe embedment backfill for flexible pipe.	95	70
Pipe bedding and over-excavated zones under bedding for flexible pipe,.	95	70
Pipe embedment backfill for steel yard piping	---	70
Pipe zone backfill portion above embedment for flexible pipe	95	70

2. All compaction shall be at plus or minus 2% of optimum moisture content as determined by ASTM D 698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3)

3.9 FIELD TESTING

A. General:

1. Field soils testing will be performed by a testing laboratory of the OWNER's choice at the OWNER's expense, except as indicated below.

B. Density:

1. Where soil material is required to be compacted to a percentage of maximum density, the maximum density at optimum moisture content will be determined in accordance with ASTM D 698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3).

2. Where cohesionless, free draining soil material is required to be compacted to a percentage of relative density, the calculation of relative density will be determined in accordance with ASTM D 4253 and D 4254.

3. Field density in-place tests will be performed in accordance with ASTM D 1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method, ASTM D 2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place By Nuclear Methods (Shallow Depth), or by such other means acceptable to the ENGINEER.

C. Remediation:

1. In case the test of the fill or backfill shows non-compliance with the required density, the CONTRACTOR shall accomplish such remedy as may be required to ensure compliance.

EXAMPLE

2. Subsequent testing to show compliance shall be by a testing laboratory selected by the OWNER and paid by the CONTRACTOR.

D. CONTRACTOR's Responsibilities:

1. The CONTRACTOR shall provide test trenches and excavations, including excavation, trench support and groundwater removal for the OWNER's field soils testing operations.

2. The trenches and excavations shall be provided at the locations and to the depths as required by the OWNER.

- END OF SECTION -

EXAMPLE

APPENDIX D
LIST OF PROJECT RELATED DOCUMENTS
DECEMBER 2008 THROUGH MAY 2012

Midnite Mine Submittals Dec-2008 through May-2012

Dec	2008	Draft Residuals Management Plan
Feb	2009	Residuals Management Plan
Feb	2009	Contingency Plan for the Midnite Mine Water Treatment Plant
Feb	2009	OM&M Plan for the Midnite Mine Water Treatment Plant
Feb	2009	Health and Safety Plan
Feb	2009	Standard Operating Procedures for the Performance Monitoring Plan
Feb	2009	Performance Monitoring Plan
Feb	2009	Quality Assurance Project Plan
Mar	2009	Transportation Plan for Shipment of the Sludge from the WTP to the Perma-Fix Facility
Mar	2009	Treatability Testing Plan for Optional WTP Modifications
Mar	2009	Residuals Transportation Plan for the Midnite Mine Water Treatment Plant
Mar	2009	Treatability Testing Plan: Pilot Scale Testing of Uranium Removal Using Anionic Exchange with Conventional Strong-Base Resins
Mar	2009	Draft Security Fencing and Signage Plan
Mar	2009	Letter to BIA outlining required steps that must be undertaken to obtain access for fence construction
Mar	2009	Letters to allotment owners informing them of the need to install a fence
Mar	2009	Letter to appraisal report to assess the fair market value of the Tribal and allotment lands outside the area of the prior mining leases that would be impacted by construction of the fence
Mar	2009	Letters to allotment owners regarding the terms of a business lease for construction and maintenance of the fence
Mar	2009	Proposed Draft Fence Alignment and Typical Detail of the Fence
Apr	2009	Revision 3 Residuals Management Plan
Apr	2009	Letter to Chairman of the Spokane Tribal Business Council requesting an opportunity to meet with the Tribe's representative to discuss the fence proposal and terms of a business lease authorizing fence construction and maintenance
Apr	2009	Application to the Tribe for a ground disturbance permit for fence construction
Apr	2009	Bid Package for Security Fence
Apr	2009	Security Fence and Signage Plan
May	2009	Addendum No. 1 to Bid Package for Security Fence
May	2009	Revision 1 Contingency Plan for the Midnite Mine Water Treatment Plant
May	2009	Revision 1 OM&M Plan for the Midnite Mine Water Treatment Plant
May	2009	Revision 1 Health and Safety Plan
May	2009	Revision 1 Standard Operating Procedures for the Performance Monitoring Plan

Midnite Mine Submittals Dec-2008 through May-2012

May	2009	Revision 1 Performance Monitoring Plan
May	2009	Revision 1 Quality Assurance Project Plan
May	2009	Revision 1 Security Fence and Signage Plan
May	2009	Revision 1 Treatability Test Plan
Jul	2009	Revision 2 Treatability Test Plan
Aug	2009	Revision 1 Report of Results Field-scale Feasibility Assessment of Passive Biological Treatment at the Dawn Mining Company Millsite
Aug	2009	Revision 1 Stockpile Area Characterization Plan Dawn Mining Company Millsite
Aug	2009	Revision 2 Quality Assurance Project Plan
Aug	2009	Revision 2 Performance Monitoring Plan
Aug	2009	Assessment of Interim Mechanisms Technical Memorandum
Aug	2009	Pre-Design Data Needs Report
Aug	2009	Technical Memorandum Midnite Mine Surface and Groundwater Quality Data Summary 1998-2008
Aug	2009	Revision 3 Treatability Test Plan
Nov	2009	Responses and Summary Data Analyses: Phase I RD/RA OM&M Plan (including Quality Assurance Project Plan, HASP) and Performance Monitoring Plan
Nov	2009	Revision 1 Pre-Design Data Needs Report
Nov	2009	Attachment 3 of Appendix B Seismic and Slope Stability
Dec	2009	Technical Memorandum Assessment of Interim Mechanisms: Responses to Comments and an Updated Technical Memorandum
Dec	2009	Revision 2 Pre-Design Data Needs Report
Dec	2009	Blue Creek Delta Sediment Characterization Technical Memorandum
Dec	2009	Fencing and Signage Plan Final Inspection Report
Jan	2010	Version 1 Quality Assurance Project Plan for the PDDN Investigation Work Plans
Jan	2010	Work Plan for Surveys and Field Reconnaissance Investigation
Jan	2010	Work Plan for Geologic Investigation of Pits and Assessment of Pit Sediments
Jan	2010	Surface Water Investigations Work Plan
Jan	2010	Site Seismic Analysis Evaluation Technical Memorandum
Feb	2010	Draft Version 2 Quality Assurance Project Plan for the PDDN Investigation Work Plans
Feb	2010	PDDN SOP 1 Sediment Thickness Probe
Feb	2010	Revision 1 PDDN SOP 2 Sediment Sampling Using a Van Veen Bottom Grab Sampler
Feb	2010	Revision 2 PDDN SOP 3 Decontamination of Environmental Sampling Equipment

Midnite Mine Submittals Dec-2008 through May-2012

Feb	2010	Mine Waste Investigations Work Plan
Feb	2010	Borrow Source Investigations Work Plan
Feb	2010	Work Plan for Borrow Investigations
Feb	2010	Water Treatment Plant Investigations Work Plan
Feb	2010	Pre-Final Design Interim Mechanisms Drawings 1-13
Feb	2010	Pre-Final Design Report Interim Mechanisms
Feb	2010	Pre-Final (90%) Design for the Interim Mechanism
Feb	2010	Treatability Test Plan Data Report
Mar	2010	Revision 1 Work Plan for Surveys and Field Reconnaissance Investigation
Mar	2010	Abbreviated RAWP for the Pit 4 Diversion
Mar	2010	Work Plan for Site Access Roads Investigation
Mar	2010	Work Plan for Groundwater Investigations
Mar	2010	PDDN SOP 8 Groundwater Sampling
Mar	2010	PDDN SOP 9 Surface Water Sampling
Mar	2010	Revision 2 PDDN SOP 3 Decontamination of Environmental Sampling Equipment
Mar	2010	Version 3 Quality Assurance Project Plan for the PDDN Investigation Work Plan
Mar	2010	Draft RAWP Interim Mechanisms
Apr	2010	RAWP Interim Mechanisms
Apr	2010	Ion Exchange Treatability Testing Evaluation Report
Apr	2010	Ion Exchange Treatability Testing Data Report
Apr	2010	Final Design for the Interim Mechanisms
Apr	2010	Revision 1 Geologic Investigation of Pits and Assessment of Pit Sediments Work Plan
Apr	2010	Revision 1 Site Seismic Evaluation Technical Memorandum
May	2010	Revision 2 OM&M
May	2010	RAWP Interim Mechanisms
May	2010	Revision 1 RAWP Interim Mechanisms
May	2010	Revision 2 Design for the Interim Mechanisms
May	2010	Revised Treatability Test Plan Data Report and Data Evaluation Report
May	2010	Revision 1 Borrow Source Investigations Work Plan
Jun	2010	Revision 2 PDDN SOP 4 Foundation Soil Drilling and Sampling

Jun	2010	Revision 1 PDDN SOP 8 Groundwater Sampling
Jun	2010	Revision 1 PDDN SOP 9 Surface Water Sampling
Jun	2010	Revision 2 PDDN SOP 10 Pit Sediment Sampling
Jun	2010	Revision 2 Geologic Investigation of Pits and Assessment of Pit Sediments Work Plan
Jun	2010	Revision 2 Mine Waste Investigations Work Plan
Jun	2010	Revision 2 PDDN SOP 7 Direct Gamma Field Survey
Jun	2010	Revision 1 Surface Water Investigations Work Plan
Jun	2010	PDDN SOP 11 Hydrologic Field Reconnaissance
Jun	2010	Revision 1 Water Treatment Plant Investigations Work Plan
Jun	2010	Revision 2 Work Plan for Borrow Investigations
Jun	2010	Revision 1 Work Plan for Site Access Roads Investigation
Jun	2010	Work Plan for Groundwater Investigations
Jun	2010	Revision 1 Ion Exchange Treatability Testing Evaluation Report
Jun	2010	Revision 2 Ion Exchange Treatability Data Evaluation Report
Jun	2010	Technical Memorandum Work Plan for Borrow Investigations Revision 1
Jun	2010	Technical Memorandum on WTP Investigation Work Plan
Jun	2010	Engineering Change Notice for Interim Mechanisms l
Jun	2010	PDDN SOP Surface Water Investigation
Jun	2010	Revision 2 PDDN SOP 6 Hollow Stem Auger Drilling and Sampling
Jun	2010	Revision 2 PDDN SOP 5 Geotechnical Geochemical Test Pits and Sampling
Jun	2010	Work Plan for Surface Water Investigations
Jul	2010	Revision 1 PDDN SOP Surface Water Investigations
Jul	2010	Revision 1 PDDN SOP 11 Hydrologic Field Reconnaissance
Jul	2010	WTP Investigation Work Plan
Jul	2010	Revised Draft Preliminary Water Treatment Plant Facility Siting Work Plan
Aug	2010	Technical Memorandum Documenting Commercial Borrow Sources
Aug	2010	Revision 4 PDDN Quality Assurance Project Plan Investigations Work Plan
Aug	2010	Technical Memorandum for the Backfilled Pit Drainage Assessment
Aug	2010	Technical Memorandum Alternative Borrow Source Identification
Aug	2010	Design Investigation Report for the Surveys and Field Reconnaissance Work Plan

Midnite Mine Submittals Dec-2008 through May-2012

Aug	2010	Revised Draft Water Treatment Plant Facility Siting Work Plan
Sep	2010	Draft WTP Pre-Design Work Plan
Sep	2010	Technical Memorandum Request for EPA Approval of Background Locations for Down-Hole Gamma Measurements
Sep	2010	PDDN SOP 12 Discrete Depth Sampling with the GoFlo Bottle
Sep	2010	PDDN SOP 13 Bathymetric Surveys
Sep	2010	Addendum to Survey Design Investigation Report
Sep	2010	Addendum to Design Investigation Report for the Surveys and Field Reconnaissance Work Plan
Sep	2010	WTP Pre-Design Work Plan
Oct	2010	Technical Memorandum for the Surface Water Investigations
Oct	2010	Draft Surface Water Design Investigation Report
Nov	2010	Revision 1 Technical Memorandum for the Backfilled Pit Drainage Assessment
Dec	2010	Pre-Final Inspection Report and the Construction Completion Report
Dec	2010	Conceptual Filter Press Design
Dec	2010	Revision 5 PDDN Quality Assurance Project Plan
Dec	2010	Revision 1 WTP Pre-Design Work Plan
Dec	2010	Revision 4 Residuals Management Plan
Dec	2010	Technical Memorandum for Pre-Final Construction Inspection Interim Mechanisms
Dec	2010	Volume II Phase 1 RD/RA OM&M
Dec	2010	Revision 1 PDDN SOP 14 Acoustic Doppler Current Meter Profiler ADCP Mooring
Dec	2010	Revision 1 PDDN SOP 15 Low-level Mercury Analysis Sample Collection
Dec	2010	Construction Completion Report Interim Mechanisms
Dec	2010	Conceptual Filter Press Design
Dec	2010	Addendum to Phase I RD/RA OM&M Plan (including Quality Assurance Project Plan, HASP) and Performance Monitoring Plan
Dec	2010	Revision 1 PDDN SOP 12 Discrete Depth Sampling with the GoFlo Bottle
Jan	2011	90% Design for the Filter Press for the Water Treatment Plant
Jan	2011	Technical Memorandum RD/RA Construction Phasing Options
Jan	2011	Design Investigations Report for the Geologic Investigations of Pits and Assessment of Pit Sediments
Jan	2011	Borrow Source Design Investigation Report
Jan	2011	Revision 1 Data Collection for NPDES Permit Application Work Plan
Jan	2011	Replacement pages for Revision 5 PDDN-Quality Assurance Project Plan

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Feb	2011	Performance Monitoring Program Annual Report for 2010
Feb	2011	Revision 3 Data Collection for NPDES Permit Application Work Plan
Feb	2011	Site Access Roads Design Investigation
Feb	2011	Groundwater Design Investigation Report
Feb	2011	Revision 2 PDDN SOP 12 Discrete Depth Sampling with the Go-Flo Bottle
Feb	2011	PDDN SOP 16 Treatment Plant Sampling
Feb	2011	Midnite Mine 2010 Performance Monitoring Plan Annual Data Transmittal Report
Feb	2011	Letter to BJ Kieffer Spokane Tribe of Indians – Water Storage Ponds
Feb	2011	Mine Waste Design Investigation Report
Feb	2011	Volume I Project Manual for Midnite Mine WTP, Filter Press Addition
Feb	2011	Volume II Project Manual for Midnite Mine WTP, Filter Press Addition
Feb	2011	Report Characterization of Mine Waste Along Mine Access Roads and Mine Drainage Sediments
Mar	2011	Technical Memorandum Summary of the Meeting (1.19.2011), revised DQOs, Rationale Table for Sample Locations/Parameters
Mar	2011	Technical Memorandum Revisions to Midnite Mine Performance Monitoring Plan and Quality Assurance Project Plan
Mar	2011	Revision 1 Technical Memorandum Blue Creek/Blue Creek Delta Sediment Characterization
Mar	2011	Revision 2 Technical Memorandum for the Backfilled Pit Drainage Assessment
Mar	2011	Revision 5 Residuals Management Plan
Mar	2011	Revision 1 Residuals Transportation Plan
Mar	2011	Revised Construction Quality Assurance Plan
Mar	2011	Filter Press Addition – Construction Quality Assurance Plan
Mar	2011	Complete Bid Documents for Construction of the Filter Press Addition
Mar	2011	Pre-Final RAWP for Backfilled Pits Area Drainage Improvements
Mar	2011	Revision 1 Design Investigations Report for the Geologic Investigations of Pits and Assessment of Pit Sediments
Mar	2011	Revision 1 Borrow Source Design Investigation Report
Apr	2011	Revision 1 Midnite Mine Design Groundwater Investigation Report
Apr	2011	Revision 2 Design Investigations Report for the Geologic Investigations of Pits and Assessment of Pit Sediments
May	2011	Revision 1 Surface Water Design Investigation Report
May	2011	Revision 1 Mine Waste Design Investigation Report
May	2011	Revised 2 Borrow Source Design Investigation Report
May	2011	Revision 1 Site Access Roads Design Investigation

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May	2011	Revision 1 Pre-Final RAWP for Backfilled Pits Area Drainage Improvements
Jun	2011	Work Plan for Geotechnical Investigations for the WTP Storage Ponds
Jun	2011	Revision 2 Final RAWP Backfilled Pits Area
Jun	2011	PDDN SOP 18 Rotary Drilling and Rock Coring
Jun	2011	PDDN SOP 17 Seismic Refraction Surveys
Jun	2011	PDDN SOP 12 Discrete Depth Sampling with the GoFlo Bottle
Jun	2011	Mine Waste Design Investigation Report – Hillside Waste Rock
Jun	2011	Revision 2 Midnite Mine Design Groundwater Investigation Report
Jun	2011	Supplement to the Work Plan for Mine Waste Investigations – Hillside Waste Rock
Jun	2011	Work Plan for Storage Pond Site Investigations
Jun	2011	Revision 1 Work Plan for Storage Pond Site Investigations
Jun	2011	Revision 2 Pre-Final RAWP for Backfilled Pits Area Drainage Improvements
Jun	2011	Work Plan for Phase II Rhoads Property Borrow Investigations
Jun	2011	Work Plan for Field Investigations to Collect Required Data for the proposed WTP storage pond locations
Jun	2011	Letter to the Tribe requesting approval for the use of Ligno dust suppressant
Jun	2011	Midnite Mine Western Drainage Alluvial Wells Testing Plan
Jun	2011	PDDN SOP 19 Standpipe Piezometer Installation in Test Pits
Jul	2011	Revision 1 PDDN SOP 19 Standpipe Piezometer Installation in Test Pits
Jul	2011	Revision 2 PDDN SOP 19 Standpipe Piezometer Installation in Test Pits
Jul	2011	Revision 1 Supplement to the Work Plan for Mine Waste Investigations – Hillside Waste Rock
Jul	2011	Revision 1 Work Plan for Field Investigations to Collect Required Data for the Proposed WTP Storage Pond Locations
Jul	2011	Revision 1 Work Plan for the Phase II Borrow Source Design Investigation
Jul	2011	Revision 3 Performance Monitoring Plan
Jul	2011	Revision 2 PDDN SOP 17 Seismic Refraction Surveys
Jul	2011	Revision 1 Supplement to the Mine Waste Design Investigation Report – Hillside Waste Rock
Jul	2011	Response and Work Scope and Schedule to Work Proposed to Evaluate Potential Modifications to Water Treatment Operations
Jul	2011	Engineering Change Notice for Backfilled Pits Area Drainage Improvements
Jul	2011	Revision 1 Work Plan for Geotechnical Investigations for the WTP Storage Ponds
Jul	2011	Supplement to the PDDN and Quality Assurance Project Plan
Aug	2011	Revision 2 Work Plan for Geotechnical Investigations for the WTP Storage Ponds

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Aug	2011	Development of the Blue Creek Assessment Program - Characterization Plan
Aug	2011	Revision 7 RMP
Aug	2011	Revision 2 Work Plan for Storage Pond Site Investigations
Aug	2011	Draft Set of DQOs and Outline for the Proposed Blue Creek Assessment Program
Aug	2011	Technical Memorandum on Mine Waste Characterization
Sep	2011	Revision 1 Technical Memorandum Mine Waste Characterization
Sep	2011	Memorandum Evaluating the Potential Implementation of a High Density Sludge System at the Current WTP
Oct	2011	Mine Waste Evaluation
Oct	2011	Technical Memorandum Pre-Design Data Needs Reports which includes Recommendations for Additional Data Collection
Oct	2011	Technical Memorandum Detailing Proposed Additional Test Pits on the Hillside Waste Rock Pile
Oct	2011	Blue Creek and Delta Assessment Work Plan
Oct	2011	Third Quarter Performance Monitoring Plan Data Transmittal Report
Oct	2011	Technical Memorandum Rhoads Property Borrow Investigation Phase II
Oct	2011	Technical Memorandum recommending a reduction in the number of analytes for the final sampling events pursuant to NPDES permit application work plan
Oct	2011	Evaluation of Supplemental RD Data Needs
Oct	2011	Technical Memorandum Detailing Proposed Rockfall Hazard Monitoring
Nov	2011	Revision 1 Technical Memorandum Evaluation of Supplemental RD Data Needs
Nov	2011	Memorandum On-Site Pilot Scale Test of Filter Press Equipment
Dec	2011	Revision 1 Technical Memorandum Rhoads Property Borrow Investigation Phase II
Dec	2011	Revision 1 Technical Memorandum Detailing Proposed Rockfall Hazard Monitoring
Jan	2012	Draft Supplemental to the Work Plan for Geologic Investigation of Pits and Assessment of Pit Sediments
Jan	2012	Additional Pit Wall Seep Monitoring Supplement to the Work Plan for Geologic Investigation of Pits and Assessment of Pit Sediments
Jan	2012	Work Plan and Quality Assurance Project Plan for Additional Pilot-Scale Testing of Uranium Removal Using Anionic Exchange Resins
Jan	2012	Revision 2 Evaluation of Supplemental RD Data Needs
Jan	2012	Revision 2 Technical Memorandum Rhoads Property Borrow Investigation Phase II
Jan	2012	Work Plan for the Additional Pilot Scale Testing of the IX System for the Water Treatment Plant
Feb	2012	Construction Completion Report Midnite Mine Remedial Action Backfilled Pits Area Report
Feb	2012	Revised pages to Revision 2 of the OM&M Plan on Interim Mechanisms

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Feb	2012	Temporary Vehicle Decontamination Work Plan
Feb	2012	Phase 1 RD/RA Operation, Maintenance and Monitoring Plan Revised Attachment 4 and Attachment 6
Feb	2012	Updated OM&M
Feb	2012	Fourth Quarter Annual Performance Monitoring Plan Data Transmittal Report
Feb	2012	Midnite Mine 2011 Performance Monitoring Program Annual Data Transmittal Report
Mar	2012	Design Investigation Report for the Storage Pond Investigations
Mar	2012	Updated Supplement to the Work Plan for Geologic Investigation of Pits and Assessment of Pit Sediments
Mar	2012	Remedial Design Work Plan
Mar	2012	Revision 1Temporary Vehicle Decontamination Work Plan
Mar	2012	Revision 1 Draft Supplemental to the Work Plan for Geologic Investigation of Pits and Assessment of Pit Sediments
Mar	2012	Additional Information to the Tribe on use and reclamation of the Borrow Area
Mar	2012	Additional Pit Wall Seep Monitoring - Supplement to the Work Plan for Geologic Investigation of Pits and Assessment of Pit Sediments
Mar	2012	Storage Ponds Investigation Report
Apr	2012	Draft Health and Safety Information for Emergency Responders
Apr	2012	Draft Visitor Health and Safety Plan
Apr	2012	Midnite Mine Rockfall Hazard Monitoring Quarterly Report; First Quarter, 2012
Apr	2012	Midnite Mine 2012 Performance Monitoring Program First Quarter Data Transmittal Report
Apr	2012	Revised Work Plan and Quality Assurance Project Plan for Additional Pilot-Scale Testing of Uranium Removal Using Anionic Exchange Resins
May	2012	Revision 2 Temporary Vehicle Decontamination Facility Work Plan
May	2012	Institutional Control Implementation and Assurance Plan (ICIAP)
May	2012	Engineering Change Notice for Interim Mechanisms for Backfilled Pits Area Drainage Improvements
May	2012	Letter to Tribe proposing Preliminary Vegetation Survey of the White Tail (Rhoads) Property
May	2012	Preliminary Addendum to the Waste Rock Investigations
May	2012	Revision 2 Treatability Test Plan Quality Assurance Projection Plan
May	2012	Technical Memorandum Supporting the Midnite Mine Water Treatment Explanation of Significant Difference
May	2012	Revision 1 Remedial Design Work Plan