FINAL

Conda/Woodall Mountain Mine
Pedro Creek Basin Overburden Disposal Area
Non-Time-Critical Removal Action

90 Percent Design and Implementation Plan

J.R. Simplot Company

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Prepared for:

J.R. Simplot Company
P.O. Box 912
1130 West Highway 30
Pocatello, ID 83204

Prepared by:

FORMATION ENVIRONMENTAL

Formation Environmental, LLC
2500 55th Street, Suite 200
Boulder, Colorado 80301

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AMSL	above mean sea level
ACM	articulated concrete-block mat
ARAR	Applicable and/or Relevant and Appropriate Requirement
ASTM	American Society for Testing and Materials
bgs	below ground surface
BLM	Bureau of Land Management
BMP	Best Management Practice
CCR	Construction Completion Report
cf	cubic feet
cfs	cubic feet per second
CMP	corrugated metal pipe
COPC	Contaminant of Potential Concern
CQA	Construction Quality Assurance
CQC	Construction Quality Control
CSR	Construction Summary Report
cy	cubic yard
D&IP	Design and Implementation Plan
ECO	Engineering Change Order
EE/CA	Engineering Evaluation/Cost Analysis
fps	feet per second
FSP	Field Sampling Plan
FSPS	Field Scale Pilot Study
GPS	Global Positioning System
GSA	grain size analysis
HASP	Health and Safety Plan
IDAPA	Idaho Administrative Procedures Act
IDEQ	Idaho Department of Environmental Quality
MCL	Maximum Contaminant Level
mg/kg	milligram per kilogram
NCHRP	National Cooperative Highway Research Program
NPK	nitrogen, phosphorus and potassium
NRCS	Natural Resources Conservation Service

NTCRA	Non-Time-Critical Removal Action
ODA	Overburden Disposal Area
O&M	operations and maintenance
OSHA	Occupational Safety and Health Act
pcf	per cubic foot
pls	pure live seed
PRSC	Post-Removal Site Control
psf	pounds per square foot
PVC	polyvinyl chloride
QA/QC	Quality Assurance/Quality Control
RAO	Removal Action Objective
RI/FS	Remedial Investigation/Feasibility Study
RUSLE	Revised Universal Soil Loss Equation
SA/CO	Settlement Agreement/Consent Order
SAP	Sampling and Analysis Plan
SHPO	State Historic Preservation Office
SOW	Scope of Work
SWPPP	Stormwater Pollution Prevention Plan
TRM	turf reinforcement mat
USBR	United States Bureau of Reclamation
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USGS	United States Geological Survey
USLE	Universal Soil Loss Equation

EXECUTIVE SUMMARY

This 90 Percent Design and Implementation Plan (D&IP) details the draft design and implementation assumptions for the Non-Time-Critical Removal Action (NTCRA) at the former Conda/Woodall Mountain Phosphate Mine (Conda) (Figure ES-1) to be performed by the J.R. Simplot Company (Simplot).

As an operator of the former Conda Mine, Simplot voluntarily entered into a Settlement Agreement/Consent Order (SA/CO) with the Idaho Department of Environmental Quality (IDEQ), the U.S. Environmental Protection Agency (EPA), and the U.S. Department of Interior's (DOI) Bureau of Land Management (BLM) to conduct the NTCRA. The IDEQ, USEPA, and BLM are hereinafter collectively referenced as the Agencies. This document has been prepared pursuant to the October 11, 2012 SA/CO (IDEQ 2012) to include the following:

- The design and design approach, major design assumptions, and design input.
- Drawings with drawing index including plans, sections, profiles, and details for all major design features.
- Technical specifications.
- Major equipment identification.

The NTCRA will be performed at a previously unreclaimed angle-of-repose overburden pile located on the east side of Woodall Mountain (Figure ES-1). The overburden pile subject to the NTCRA forms part of the Pedro Creek Overburden Disposal Area (ODA). The Pedro Creek ODA is situated along the headwaters area of Pedro Creek, which is the main drainage in the Pedro Creek Sub-Basin and a tributary to Trail Creek. The overburden pile is hereafter referenced as the NTCRA Pile or Pile.

The Removal Action Objectives identified for the NTCRA include:

- Stabilize the Pile from an erosion and seismic standpoint and minimize the potential for future erosion, slumping, and mass-wasting of overburden materials.
- Reduce the releases and migration of selenium and other Chemicals of Potential Concern (COPCs) from the Pile that currently result in exceedances of Maximum Contaminant Levels (MCLs) in groundwater and Idaho water quality criteria in surface water.
- Reduce releases and migration of selenium and other COPCs from the Pile that result in unacceptable risks to wildlife receptors of concern due to elevated concentrations in soils, sediment, and fish in the Pedro Creek drainage.

- Reduce risks to livestock and humans due to exposure to selenium and other COPCs in surface water, soils, and sediments. Reduce concentrations of COPCs in alluvial groundwater which may be used for livestock watering.

The NTCRA includes regrading of the steeply-sloped angle-of-repose overburden pile to a 3:1 slope (Figure ES-2), with placement of a soil cover system. The soil cover will be comprised of material derived from the weathered Dinwoody Formation that is of relatively low permeability. The NTCRA will improve long-term stability and reduce releases of COPCs from the Pile. The regrade of the Pile will result in a new toe area extending a maximum of approximately 350 feet eastward and 400 feet northward beyond the existing toe. The toe of the regraded Pile will remain on property owned by the United States (and administered by the BLM) or by Simplot, and will be no closer than 25 feet from the eastern property boundary.

As a result of property boundary constraints, the 3:1 design results in a significantly larger excavation volume than fill volume. The bulk of the excavated material will be placed as fill within the existing open pit along the south edge of to the Pile, onto grounds along the eastern and northern perimeter of the Pile, and onto the upslope area. Remaining excess fill will be consolidated in an in-pit ODA situated to the west of the NTCRA area (Figure ES-1).

The overarching design criteria and analysis for the NTCRA include:

- Final slope stability with a factor of safety of at least 1.5 for static conditions and a factor of safety of at least 1.1 for design-seismic conditions.

- A minimum 18-inch thick vegetated soil cover on the side slopes and a minimum 12-inch thick vegetated soil cover on the top and upslope areas.

- Accelerated settlement in critical areas through temporary surcharging with excess fill material.

- Dynamic-design peak ground-acceleration analysis for a seismic event having a 10 percent probability of occurring within 50 years (i.e., equivalent to a 500-year event within approximately 16 to 32 miles of the site).

- Sedimentation basins designed to contain runoff volumes from 2-year, 24-hour storm events.

- Emergency overflow structures for the basin embankments around the Pile area designed for long-term stability based on estimated peak flows from a 100-year, 24-hour storm event with a 1-foot freeboard.

- Emergency overflow structures for the basin embankments around the borrow area designed for long-term stability based on estimated peak flows from a 10-year, 24-hour storm event with a 1-foot freeboard.

- Run-on and runoff ditches and structures around the Pile area designed for long-term stability based on estimated peak flow from a 100-year, 24-hour storm event with a 1-foot freeboard.

- Run-on and runoff ditches and structures around the borrow area designed for long-term stability based on estimated peak flow from a 10-year, 24-hour storm event with a 1-foot freeboard.

- Applicable technical codes and standards to meet design objectives.

It is estimated that the NTCRA will require two full construction seasons to complete. Weather will play a large part in the construction process and weather conditions could increase or decrease the required time necessary to complete the project. Site preparatory activities will begin in March/April, 2013.[1] The bulk of the construction activities will be performed between April and November 2013. At the end of the 2013 construction season, the site will be prepared for winter shutdown, the timing of which will be weather dependent. The second construction season will start as early as possible in May/June 2014 and continue until the work is complete. If delays are encountered, the schedule may extend into 2015.

[1] Per the February 8, 2013 Agency-approval of the Memorandum requesting commencement of preparatory and fill-placement activities for the Pedro Creek ODA NTCRA.

1.0 INTRODUCTION

The J.R. Simplot Company (Simplot) has prepared this 90 Percent Design and Implementation Plan (D&IP) to describe the draft design and implementation assumptions for the Non-Time-Critical Removal Action (NTCRA) at the former Conda/Woodall Mountain Phosphate Mine (Conda).

Conda is located approximately 8 miles northeast of Soda Springs in Caribou County, Idaho (Figure 1-1). As an operator of the former Conda Mine, Simplot voluntarily entered into a Settlement Agreement/Consent Order (SA/CO) with the Idaho Department of Environmental Quality (IDEQ), the U.S. Environmental Protection Agency (EPA), and the U.S. Department of Interior's (DOI) Bureau of Land Management (BLM) to conduct the NTCRA. The IDEQ, USEPA, and BLM are hereinafter collectively referenced as the Agencies. The Department of the Interior's U.S. Fish and Wildlife Service and the Shoshone-Bannock Tribes are Support Agencies for the NTCRA. This document has been prepared pursuant to the October 11, 2012 SA/CO (IDEQ 2012) to include the following:

- The design and design approach, major design assumptions, and design input.
- Drawings with drawing index including plans, sections, profiles and details for all major design features.
- Technical specifications.
- Major equipment identification.

The NTCRA will be performed at a previously unreclaimed angle-of-repose overburden pile located on the east side of Woodall Mountain (Figure 1-2). The overburden pile subject to the NTCRA forms part of the Pedro Creek Overburden Disposal Area (ODA). The Pedro Creek ODA is situated along the headwaters area of Pedro Creek, which is the main drainage in the Pedro Creek Sub-Basin and a tributary to Trail Creek. The overburden pile (Figure 1-2) is hereafter referred to as the NTCRA Pile or Pile. The general purpose of the NTCRA is to stabilize the Pile and reduce releases and migration of selenium and other chemicals of potential concern (COPCs)[2] from the Pile to soil, surface water, sediment, and groundwater in the Pedro Creek Sub-Basin.[3] Additional details on the NTCRA objectives are presented in Section 3.

[2] The main Conda COPCs include the risk-driving constituents, selenium, arsenic, cadmium, chromium, nickel, vanadium and zinc, as identified in the Final Conda RI/FS Work Plan and Sampling and Analysis Plan (SAP) (NewFields 2008a, 2008b). Additional constituents are being evaluated as part of the Remedial Investigation.
[3] Decision whether additional clean up actions at the Pedro Creek ODA are necessary to address surface water, groundwater and/or vegetation on the basis of monitoring conducted after completion of the early action, and information generated during the RI/FS.

1.1 Background

Simplot mined phosphate ore at the Conda site using surface mining techniques. Surface mining was accomplished by first removing the material (termed overburden) overlying the ore in the Meade Peak Member of the Phosphoria Formation. The excavated overburden material generally consisted of Rex Chert, Hanging Wall Mudstone, Hanging Wall Phosphatic Shale, Middle Waste Shale, and some Footwall Mudstone materials (Figure 1-3). The removed overburden rock units were placed either back into open pits or onto external ODAs. The Mudstone and Middle Waste Shale contain naturally elevated concentrations of selenium. Physical and chemical weathering of the Mudstone and Middle Waste Shale in the overburden piles results in releases of selenium and other trace metals from the ODAs to the environment.

Remedial Investigation/Feasibility Study (RI/FS) characterization activities have indicated that the angle-of-repose Pile is the primary source of ongoing selenium releases into the Pedro Creek drainage basin. The steep slopes are prone to erosion and contribute to the downstream transport of ODA material. The steep slopes of the Pile also make it potentially unstable and slope failure could result in significant additional releases to the environment. The flat terraces and negatively sloped areas on the Pile promote pooling of spring snowmelt, rainfall, and runoff, contributing to infiltration into the Pile. Infiltrated precipitation released at the base of the Pile is channeled by an underlying draw in the natural ground surface, contributing flow at the seep (sampling location NES-5) located at the toe of the Pile. The seep water contains elevated levels of selenium and other COPCs. Groundwater in close proximity to the Pile contains selenium and other COPCs at concentrations exceeding Federal maximum contaminant levels (MCLs). In addition, because vegetation is directly growing onto the overburden materials, plants directly uptake selenium and other COPCs.

The NTCRA Pile covers approximately 72 acres and includes an upslope area and an angle-of-repose pile that overlies two backfilled pits (Figure 1-2). The upslope area (approximately 20 acres) extends from the Woodall Mountain saddle (to the west) to the main former haul road (Figure 1-2) on the Pedro Creek ODA. Two backfilled pits are present within the footprint of the Pile. These backfilled pits were part of South Woodall (SW) Panels SW-1 and SW-2. The area of the Pile east of the former main haul road covers approximately 52 acres (Figure 1-2).

An Engineering Evaluation/Cost Analysis (EE/CA) (Formation 2010) evaluated removal alternatives that would stabilize the NTCRA Pile from an erosion and stability standpoint, as well as reduce releases and exposure of human and ecological receptors to selenium and other COPCs. The comparative analysis in the Final EE/CA identified an in-place consolidation/regrading alternative (Alternative 4) as the recommended alternative. Alternative 4 includes:

- Regrading the existing steep slopes of the Pile to 2.5:1 to 3:1[4] and the top area to 5:1 to 10:1.

- Regrading the upslope area to 30:1 to 50:1 to promote positive drainage.

- Removing small areas of overburden materials from drainages, detention ponds, or other areas near the Pile and consolidate within the area to be regraded.

- Placing the cut volume as fill down slope from the existing steep slopes and in the exposed pit to the south of the Pile.

- Constructing runoff and run-on control ditches and sedimentation basins as part of surface water management.

- Placing a soil cover of weathered Dinwoody Formation at a minimum thickness of 18 inches on the side slopes and a minimum of 12 inches thick on the upslope and top areas.

- Revegetating the Pile with shallow rooted, low selenium accumulating plant species.

Following a public comment period on the Final EE/CA, the Agencies issued an Action Memorandum (IDEQ et al. 2011) selecting Alternative 4 as the NTCRA for the overburden Pile. The NTCRA is considered consistent with future potential final remedial actions at the Conda site.

Between the issuance of the Action Memorandum and the SA/CO, preliminary design/implementation evaluations identified several mutually agreed upon refinements to the NTCRA, including:

- Grading of the steep slopes to all 3:1 instead of a range of slopes from 2.5:1 to 3:1;

- Grading the upslope area to a minimum slope of 50:1 to promote positive drainage;

- Preparing the foundation in the new toe area by excavating accessible wet, clayey material and replacing with competent well-draining rock, instead of installing the EE/CA proposed trench-based toe drainage system;

- Extending the fill placement onto the slide area to the north; and

- Consolidating excess material in an in-pit ODA located to the west of the Pile (Figure 1-4) and covering the material with a minimum of 18 inches of soil cover.

[4] All slopes referenced in this Plan are presented as (horizontal) : (vertical).

1.2 Document Organization

This report is organized as follows:

- Section 1 – Introduction: a description of the NTCRA and objectives.
- Section 2 – Setting and Conditions: a description of the NTCRA setting as well as a summary of existing conditions in the Pile.
- Section 3 – Removal Action Objectives and Regulatory Requirements: a summary of the removal action objectives and regulatory requirements.
- Section 4 – Design: a summary of the design basis and assumptions.
- Section 5 – Design Technical Analysis: a summary of the technical analyses and calculations in support of the design.
- Section 6 – Removal Action Implementation: a description of the general implementation of the NTCRA construction.
- Section 7 – Construction Quality Control and Assurance: a description of construction quality control (CQC) and construction quality assurance (CQA) that will be performed as work progresses.
- Section 8 – Post Construction Activities: a summary of post-construction monitoring, maintenance, and reporting.
- Section 9 – Project Organization and Schedule: a summary of project organization and a schedule for notifications and deliverables.
- Section 10 – References Cited: a listing of documents cited through this document.

2.0 SETTING AND CONDITIONS

This section provides general information regarding the setting of the NTCRA Pile and current conditions, as well as information regarding the soil and rock borrow areas identified to support the NTCRA.

2.1 NTCRA Area Setting

The NTCRA Pile is situated on land owned by Simplot and BLM (Figure 2-1). The existing toe of the Pile is approximately 270 feet from the eastern property line. As previously mentioned, the Pile is situated in the headwaters area of the Pedro Creek drainage basin. The southeastern portion of the Pile is bounded by Pedro Creek's westernmost tributary (tributary 6). The elevation at the Pile ranges from approximately 6,830 feet above mean sea level (AMSL) at the toe to approximately 7,200 feet AMSL in the upslope area. A seep (sampling location NES-5) emanates at the toe of the Pile. The native ground surface east of the toe of the Pile slopes at approximately 20 to 30 percent and is heavily vegetated.

A wetlands survey was conducted both in the NTCRA and soil borrow areas in accordance with the U.S. Army Corps of Engineers 1987 Wetlands Delineation Manual (USACE 1987). A wetland is present in the NTCRA area adjacent to the NES-5 seep (Figure 1-4). The wetland is considered jurisdictional because it is hydrologically connected with the Blackfoot River. Due to the presence of overburden material in the wetland, and undesirable plant species and Canada thistle infestations, it received an assessment score of fair. It is considered that the restorability of this wetland is not feasible (JBR 2011a). The Wetlands and Waters of the United States Survey Delineation Report is presented in Appendix A (JBR 2011a).

No cultural resources are known to exist in the NTCRA area. A cultural resources survey was conducted in accordance with the requirements of the National Environmental Policy Act (NEPA 1969) and the National Historic Preservation Act (NHPA 1966). The Cultural Resources Survey is presented in Appendix B (JBR 2011b). Although no cultural resources were identified in the NTCRA area, if any paleontological or archaeological finds are located during the NTCRA, construction will be immediately halted in areas affected by the discovery. A professional archaeologist will be summoned to the site to assess the values of the potential cultural resources and make recommendations to the State Historic Preservation Office (SHPO). If the archeologist determines that the find is an actual cultural resource, at the direction of the SHPO, the construction will be suspended in the area of the find until the find is appropriately documented or removed. Construction will resume when authorized by the appropriate professional.

2.2 NTCRA Area Conditions

The following subsections describe the current conditions in the area of the NTCRA, based on the sampling and evaluations performed to date. Appendix C presents a photo summary of the NTCRA area.

2.2.1 Physical and Geotechnical Conditions

The side slopes of the Pile are currently at the angle of repose or approximately 1.4:1 to 1.6:1. Portions of the side slopes in the southern area of the Pile have been partially regraded and some of these areas have slopes of approximately 2:1. The height of the steep slope areas varies from approximately 230 feet to 280 feet. Various areas of the side slopes currently have erosion rills with some deeper gullies.

There are a number of locations along the top of the Pile and upslope area where pooling of runoff occurs. As previously mentioned, these pooling areas promoted infiltration and contributed flow to the seep (NES-5) at the toe of the Pile. Some of these pooling areas were graded to enhance runoff in 2010 under the Stormwater Management Plan. The seep flows year round, with flows ranging between 0.002 to 0.06 cubic feet per second (cfs) (Table 2-1). The seep flows into a two-tiered sedimentation pond downgradient of the Pile (Appendix C). The lowermost sedimentation pond has a half-round 48-inch diameter corrugated metal pipe (CMP) spillway located in the northern corner of the embankment. Table 2-2 presents a summary of selenium concentrations in the environmental media in the NTCRA area.

The shape of the Pile is a result of the foundation topography and the manner in which it was constructed. The Pile is situated in a draw and was constructed by dumping the material from the top of the Pile and over its face (end dumping). The end dumping resulted in particle size segregation along the slope of the pile, with larger particles residing at the toe and finer particles along the top of the slope. The material in the NTCRA Pile is heterogeneous in nature (derived from differing parent materials), consisting of vertically stratified silty gravels, silty sands and gravels, and clayey gravels with sands. The overburden material is semi-pervious, moist, and has densities ranging between approximately 70 to 90 percent of its maximum dry density (111.8 – 137 pounds per cubic foot [pcf]) based upon samples collected (Appendix D). The fine-fraction materials have low to moderate plasticity.

In the undisturbed area immediately downgradient and east of the existing toe, subsurface materials below the topsoil consist of Dinwoody Formation-derived sandy silt, clayey gravel with sand, and sandy clay, with a zone of soft, lean to high-plasticity (fat) clay. The zone of soft, wet clay found in subsurface soil east of the Pile is compressible and has relatively low shear strength (Appendix D). Materials along the northern toe of the Pile consist of a gravelly-sandy layer of overburden material (from the failed overburden pile in early 1970s) overlying Rex-Chert derived gravelly material or Dinwoody-Formation derived silty clayey sands (Appendix D).

Table 2-3 presents the summary of the laboratory testing results for the various geotechnical samples obtained from the site (Figure 2-2). Details are presented in Appendix D.

2.2.2 Geological Conditions

The general geology in the vicinity of the NTCRA Pile is shown on Figures 2-2 and 2-3. Exploratory drilling during the mine operation identified a transverse fault zone across the Pedro Creek draw. The transverse fault is oriented southeast-northwest and the Meade Peak Member offset along the fault zone suggests a vertical displacement of approximately 150 to 175 feet (Figures 2-2 and 2-3) (Formation 2010).

The Pile overlies the eastward-dipping western limb of the Trail Creek Syncline. Dips in this area range from 40 to 60 degrees. The portion of the Pile in the upslope area overlies the Wells Formation. The overburden materials placed in the backfilled pits overlie the Rex Chert and Meade Peak members of the Phosphoria and the Wells Formation exposed during mining. The portion of the Pile east of the backfilled pits overlies the Rex Chert and Dinwoody Formation (Figures 2-2 and 2-3).

The subsurface geology downgradient of the toe area to the east of the Pile consists of approximately 1 to 1.5 feet of Dinwoody-Formation derived topsoil underlain by approximately 3 to 4 feet of soft, wet weathered Dinwoody Formation (i.e., lean sandy clay). A firm to hard dry clay (also weathered Dinwoody Formation) underlies the soft wet clay at a depth of approximately 5 to 16 feet below ground surface (bgs). Unweathered Dinwoody Formation (i.e., large cobbles, boulders and siltstone) is present from approximately 18 feet bgs and below.

The natural subsurface geology downgradient of the toe area to the north of the Pile (i.e., below the overburden material from the failed pile in early 1970s) consists of Rex Chert and Dinwoody Formation materials (Figure 2-2). Weathered Rex Chert is present at approximately 17 feet bgs in the western portion of the slide area. In the eastern portion of the slide area approximately 1 foot of Dinwoody-Formation derived topsoil is present at approximately 9 feet bgs and underlain by weathered Dinwoody Formation (i.e., lean sandy clay) beginning at approximately 10 feet bgs, with isolated moist layers.

2.2.3 Seismic Conditions

The NTCRA Pile lies within a Zone III seismic region (Uniform Building Code 1991) that extends from northern Arizona through the Wasatch Front in Utah to the Yellowstone and Hebgen Lake regions in Wyoming and Montana. The Idaho Geological Survey has mapped the southeastern part of Idaho, east of the Snake River Plain, as having the highest of three seismic shaking rankings (USFS and BLM 2007). Approximately 20 earthquakes capable of damaging structures, greater than 5.0 on the Richter Scale, have occurred within this seismic region from 1880 through 1994 (USFS and BLM 2007). Although several earthquakes have occurred in recent years, there is no reported evidence they have caused surface features such as scarps, displacement of streams, or creation of sag ponds (USFS and BLM 2007). The near-future earthquake activity is expected to be similar to observations during the past 100 years (BLM and USFS 2002).

The U.S. Geological Survey has developed maps of the peak ground acceleration for various frequency seismic events in the Western United States (USGS 2002). Based on those maps, the seismic event in the area of the Conda site which has a 10 percent probability of exceedance in a 50-year period, equivalent to a seismic event having a 500-year frequency, would have a peak horizontal ground acceleration of 0.20 times the acceleration of gravity (0.20g).

2.3 Soil Borrow Area Setting

The soil borrow areas are situated on land owned by Simplot (Figures 2-1 and 2-4). The Dinwoody Formation borrow area and one of the Rex Chert borrow areas are located in the Hoorah Hollow drainage (approximately 2 miles south of the NTCRA area). The second Rex Chert borrow is located southeast of the Pile, in an open pit (Figure 2-4). Appendix C presents a photo summary of the borrow areas.

A wetland is present in the southwest corner of the Dinwoody Formation borrow area. The wetland was classified as a high functioning, non-jurisdictional wetland and was considered to be in excellent condition (JBR 2011a) (Appendix A). This wetland will be protected during the development of the Dinwoody Formation borrow area.

One cultural resource site, a historic arborglyph site, was identified in the Dinwoody Formation borrow area. The site consists of five carved trees. Although three of the trees were historic and dated back to 1947, the site is not considered to be eligible for nomination to the National Register of Historic Places and no additional historical preservation work is recommended (JBR 2011b) (Appendix B).

2.4 Soil Borrow Properties

Investigations performed to evaluate potential borrow areas for the Dinwoody Formation soil identified an outcrop in the Hoorah Hollow area as an appropriate source of Dinwoody Formation soil (Appendix D). The Dinwoody Formation material was tested in the laboratory for grain-size analyses (ASTM D422), Atterberg Limits (ASTM D4318), and Standard Proctor Compaction (ASTM D698), as well as for organic content and total selenium. Samples from the Dinwoody Formation borrow indicate that the material is primarily composed of sandy silt and silty gravel. Silt contents range between approximately 19 to 77 percent. Organic contents range between approximately 3 to 7.5 percent (Appendix D). Total selenium concentrations in over 300 samples collected from the Dinwoody Formation borrow indicates average concentrations of 1 mg/kg, and ranging from 0.2-6.4 mg/kg (Table 2-4). The Dinwoody Formation material is expected to provide an adequate growth medium (Table 2-5).

Samples of Rex Chert indicate that the material contained approximately 1.5 to 2.4 percent fines. The sulfate soundness of the Rex Chert varied from a loss of approximately 1 percent to 1.5 percent, and the adsorption varied from approximately 2.2 to 3.5 percent (Table 2-3).

3.0 REMOVAL ACTION OBJECTIVES AND REGULATORY REQUIREMENTS

This section summarizes the Removal Action Objectives (RAOs) and presents the Applicable or Relevant and Appropriate Requirements (ARARs) for the NTCRA.

3.1 Removal Action Objectives

The following RAOs were identified to provide the basis for the NTCRA:

- Stabilize the Pile from an erosion and seismic standpoint and minimize the potential for future erosion, slumping, and mass-wasting of overburden materials.
- Reduce the releases and migration of selenium and other COPCs from the Pile that currently result in exceedances of Maximum Contaminant Levels (MCLs) in groundwater and Idaho water quality criteria in surface water.
- Reduce releases and migration of selenium and other COPCs from the Pile that result in unacceptable risks to wildlife receptors of concern due to elevated concentrations in soils, sediment, and fish in the Pedro Creek drainage.
- Reduce risks to livestock and humans due to exposure to selenium and other COPCs in surface water, soils, and sediments. Reduce concentrations of COPCs in alluvial groundwater which may be used for livestock watering.

3.2 Regulatory Requirements

The Final EE/CA identified the state, federal, and tribal ARARs relative to the specific conditions found in the NTCRA area and the scope of potential actions to be performed. Table 3-1 summarizes the ARARs.

3.2.1 Protection of Human Health

Per the requirements of the Safe Drinking Water Act, the Clean Air Act, and any federal and state standards developed and approved to conform with these Acts, all necessary precautions will be put in place to protect human health during and following the implementation of the NTCRA. It is anticipated that the NTCRA activities will not adversely impact human health.

3.2.2 Protection of the Environment

Per the requirements of the Bald and Golden Eagle Protection Act, Endangered Species Act, Fish and Wildlife Coordination Act, Idaho Classification and Protection of Wildlife Rule and the Migratory Bird Treaty Act, no fish, wildlife, or birds will be intentionally possessed, taken, or killed during implementation of the NTCRA. Migratory bird nesting surveys will be conducted to prevent the non-permitted taking of migratory birds and to minimize potential adverse effects on nesting birds. It is anticipated that wildlife habitat in the NTCRA area will be improved through implementation of the NTCRA.

Per the requirements of the Clean Water Act and any federal and state standards developed and approved to conform with the Act, Wetlands Protection, National Emission Standards for Hazardous Air Pollutants, Clean Air Act, Surface Mining Control and Reclamation Act, Idaho Surface Mining Act, all necessary precautions will be put in place to protect habitat during the implementation of the NTCRA.

3.2.3 Hazardous Waste

Based on the samples collected and historical documentation, hazardous wastes have not been identified in the NTCRA area. If hazardous waste is encountered, it will be handled according to the Idaho Administrative Procedures Act (IDAPA) Rules and Standards for Hazardous Waste and Federal Resource Conservation and Recovery Act.

3.2.4 Preservation of Archaeological and Historical Sites

Based on the area-specific surveys and review of historical documentation, no archaeological or historical sites have been identified in the NTCRA area. If archaeological or historical sites are encountered, they will be addressed according to the rules pertaining to the Archaeological and Historic Preservation Act.

4.0 DESIGN

This section presents the design of the NTCRA Pile regrade and related implementation components. The design considered site-specific conditions, ARARs, as well as applicable information from similar reclamation projects at other southeast Idaho phosphate mining sites. General design drawings (G1 through G9), construction drawings (C1 through C39), instrumentation drawings (I1 and I2), reference drawings (REF1 through REF11), and the Technical Specifications are included in Appendix E. A summary of the engineering computations and calculations in support of the design are presented in Table 4-1. Copies of the computations and calculations are presented in Appendix F.

4.1 Design Basis and Criteria

As previously mentioned, the NTCRA includes regrading of the steeply-sloped angle-of-repose overburden pile to a 3:1 slope (Figures 4-1 through 4-4), with placement of a soil cover system (Figure 4-5). The soil cover will be comprised of material derived from the weathered Dinwoody Formation that is of relatively low permeability. The NTCRA will improve long-term stability and reduce releases of COPCs from the Pile. The regrade of the Pile will result in a new toe area extending a maximum of approximately 350 feet eastward and 400 feet northward beyond the existing toe. The toe of the regraded Pile will remain on property owned by the United States (and administered by the BLM) or by Simplot, and will be no closer than 25 feet from the eastern property boundary.

As a result of property boundary constraints, the 3:1 design results in a significantly larger excavation volume than fill volume. The bulk of the fill will be placed within the existing open pit along the south edge of to the Pile, onto grounds along the eastern and northern perimeter of the Pile, and onto the upslope area. Remaining excess fill will be consolidated in the in-pit ODA situated to the west of the NTCRA area (Figure 4-1).

The overarching design criteria and analysis for the NTCRA include:

- Final slope stability with a factor of safety of at least 1.5 for static conditions and a factor of safety of at least 1.1 for design-seismic conditions.

- A minimum 18-inch thick vegetated soil cover on the side slopes and a minimum 12-inch thick vegetated soil cover on the top and upslope areas.

- Accelerated settlement in critical areas through temporary surcharging with excess fill material.

- Dynamic-design peak ground-acceleration analysis for a seismic event having a 10 percent probability of occurring within 50 years (i.e., equivalent to a 500-year event within approximately 16 to 32 miles of the site).

- Sedimentation basins designed to contain runoff volumes from 2-year, 24-hour storm events.

- Emergency overflow structures for the basin embankments around the Pile area designed for long-term stability based on peak flows from a 100-year, 24-hour storm event with a 1-foot freeboard.

- Emergency overflow structures for the basin embankments around the borrow area designed for long-term stability based on peak flows from a 10-year, 24-hour storm event with a 1-foot freeboard.

- Run-on and runoff ditches and structures around the Pile area designed for long-term stability based on peak flow from a 100-year, 24-hour storm event with a 1-foot freeboard.

- Run-on and runoff ditches and structures around the borrow area designed for long-term stability based on peak flow from a 10-year, 24-hour storm event with a 1-foot freeboard.[5]

- Applicable technical codes and standards to meet design objectives.

4.2 NTCRA Design Components

The following subsections present the design components related to the NTCRA. The CQC and CQA related to the NTCRA are discussed in Section 7.

4.2.1 Pile Regrade

The regrade design is shown on Drawings C1 through C8 (side slopes and top area) and Drawings C9 and C10 (upslope area) (Appendix E). The existing angle-of-repose slopes will be regraded to 3:1. As previously mentioned, the regraded pile will extend a maximum of approximately 350 feet eastward. The regraded pile toe will therefore cover the existing jurisdictional wetland at the NES-5 seep (described in Section 2.1 and Appendix A). The top area (between the side slopes and the existing western road) will be regraded to slopes between 5:1 to 10:1. The upslope area (to the west of the existing road) will be regraded to

[5] The borrow areas will not contain any fill structures composed of seleniferous material that need to become stable from a seismic or erosion perspective. Once the revegetation is established, the stormwater controls can be removed. Since the vegetation likely will take hold within the first 2-3 years, it is not necessary to design the stormwater controls for 100-year, 24-hour events. .

approximately 30:1 to 50:1. The regrade will establish positive drainage across the entire surface of the Pile.

A total of approximately 1.6 million cy of overburden material will be excavated at the Pile (excluding excavations as part of foundation preparation, roads, and stormwater control construction activities). Approximately 1.04 million cy of the excavated material will be push dozed onto the side-slope areas and approximately 38,000 cy of fill will be placed on the upslope area. The majority of the excess overburden materials (approximately 527,000 cy) which cannot be consolidated into the regraded Pile will be consolidated with an existing in-pit ODA to the west.[6] Any materials placed in the western pit will be graded to reduce infiltration and improve drainage, as discussed in Section 4.3.

Approximately 1,200 cy of sediments, which were removed from the existing sedimentation basin located northeast of the Pile as part of maintenance activities during the fall of 2010, are currently stored near the northeast toe of the Pile. These sediments will be blended with overburden material to be placed as fill.

4.2.1.1 Side Slope Fill Placement

The fill along the side slopes of the Pile (Drawings C1 through C7 in Appendix E) will be placed by push dozing the materials over the edge of the Pile. Materials will then be spread by bulldozers in the toe areas as necessary. Critical areas will be temporarily surcharged with additional fill to reduce the potential for adverse effects to the final cover due to settlement of the fill (Drawing C8, in Appendix E).

4.2.1.2 Upslope Fill Placement

The fill on upslope area (Drawings C9 and C10 in Appendix E) will be placed in approximately 2-foot loose lifts using dozers to spread the piles placed by haul trucks. To reduce the potential for settlement, compaction of each lift will be performed through a minimum of two passes of the empty 785 haul trucks, or other equipment exerting similar ground pressures. To achieve full coverage of the placed lifts, the operators will be instructed to split the tracks of prior compaction passes. Visual observations and simple tests will be used to manage moisture content of the upslope fill. The observed moisture content will be confirmed using measurements taken with a nuclear densometer. The observations include determining if pumping is occurring or is about to occur, or if the material shows signs of undulating ahead of the equipment. In addition, moisture content can be evaluated by hand-finger rolling the material to check its plasticity, since optimum soil moisture content and plastic limit of the soil

[6] The earthwork quantity balance assumes that in general the majority of the cut/fill would have minimal shrinkage. The volumes are plus or minus 10 percent. For the upslope fill, where equipment compaction will occur, an average material loss and shrinkage of 3 to 5 percent between excavation volumes and fill volumes (i.e., about 280,000 cy of cut may end up about 266,000 cy of fill in the upslope area).

often correlate well. If non-optimum moisture conditions occur over large areas, the material may require blending or drying (to reduce moisture content) or water will be applied (to increase the moisture), to improve moisture conditions prior to continued compactive efforts.

To verify compaction, moisture-density tests will be performed at a rate of one per 10,000 cy of materials placed and compacted. Each time a field density test is performed, a local sample of the fill material where the in-place-density was measured will be obtained for the performance of a location-specific Proctor Curve. The in-place density will be compared to the location-specific Proctor to confirm density as a percentage of maximum.

4.2.2 Fill Area Foundation Preparation Design

The foundation plan and typical sections are presented on Drawing C6 (Appendix E). To prepare the foundation in the areas of fill placement along the east and northeast slopes of the Pile, the ground will be cleared and grubbed and unsuitable materials (e.g., topsoil and moist clayey weathered Dinwoody Formation) will be excavated. The fill areas for the upslope and the western pit are comprised of unvegetated overburden materials and do not require clearing or grubbing. The slash and topsoil removed will be hauled away via the haul roads to temporary stockpiles to be situated in areas not interfering with the construction process (Figure 4-6). Slash will be stockpiled on property owned by Simplot. The clayey weathered Dinwoody Formation material will be used to line the floor of the seep and toe-area moisture collection basin (discussed below).

Geotechnical investigations performed in support of the design identified the presence of shallow moist clays (weathered Dinwoody Formation) in areas east of the Pile (Appendix D). This shallow moist clay layer is an undesirable foundation material that can be removed given its proximity to the surface. Based on geotechnical test pits advanced and the existing topography, it is anticipated that an area of approximately 3 acres will be excavated to a depth of approximately 3 to 5 feet (Figure 4-7 and Drawing C6) to remove the moist clays. The moist clays near the existing seep (NES-5) at the toe of the pile will also be excavated as part of the foundation preparation. The actual extent and depth of the excavation will depend on conditions encountered. As previously mentioned some of this clay will be used to line the seep and toe-area moisture collection pond. The rest of the clayey material will be consolidated in the western pit.

A deep zone of fine-grained silty to clayey soil with mixed buried topsoil and roots was observed in test pit north of the NTCRA. These have a maximum thickness of about 7 to 10 feet and are located at depths of approximately 7 to 17 feet below existing ground. These zones were partially consolidated and do not have seepage as does the soft clay zone on the east. Calculations indicate that the consolidation and long-term compression settlement of this zone under 40 feet of additional fill should be less than 4 inches. Therefore, this deeper zone of fine-grained soil will be left in place during the fill operations on the north side of the NTCRA.

4.2.3 Fill Area Foundation Moisture Control Design

To control the moisture in the foundation from the seep NES-5 and drainage from the excavated clay, properly draining competent material will be placed. The excavated clayey material will be replaced with coarse, 6-inch minus, competent material (with less than 3 percent fines) such as gravel and cobbles of Rex Chert or Wells Formation to improve foundation conditions (i.e., material strength and drainage) in the toe area. The competent material will allow for proper drainage of residual moisture in the toe area to improve stability of toe area and the regraded Pile. Based on the findings of the test pits and considering the topography, it is estimated that an area of approximately 3 acres will be excavated.

The toe area moisture will combine with the NES-5 seep flow along a subsurface gravel drain which will convey the seepage to a collection basin. The subsurface gravel drain will be 2 feet wide by 3 feet tall and enclosed in a non-woven geotextile. The drain will begin where the existing NES-5 seep expresses at the surface and extend approximately 270 feet downgradient to the seepage collection basin. The change in elevation from the intake to the discharge is approximately 32 feet. Drawing C23 presents the subsurface drain design. Calculation Set 6 in Appendix F details the foundation preparation and moisture management calculations.

The seep and toe-area moisture collection basin is conservatively designed to contain approximately 35,000 cubic feet (cf) of seepage volume, and will be isolated from the sedimentation basins nearby and allow for potential future treatment considerations (being evaluated in the RI/FS process) of the contaminated water. The basin will be constructed in the overflow sedimentation basin east of the existing sedimentation basin into which NES-5 seep currently discharges. The floor of the new seepage collection basin will be lined with the plastic clay removed from the toe area. The clay liner will be approximately 12 inches thick, compacted and protected by a soil layer approximately 12-inches thick.

Following the clearing and grubbing, the new seepage collection basin will be constructed. At the same time, the trench which will contain the subsurface gravel drain, will also be constructed. Once the trench and the new basin are constructed, the old sedimentation basin will be breached to allow the water to flow into the new basin. Care will be taken to not damage the clay liner in the new seepage collection basin. After the old sedimentation basin has drained, the subsurface gravel drain will be installed in the trench, through the sedimentation basin to the point of discharge at NES-5. Following confirmation that the subsurface gravel drain properly conveys flow, the bottom of the old sedimentation basin will be filled to the top of the gravel drain with the coarse, 6-inch minus, competent material (with less than 3 percent fines) discussed above.

4.2.4 Surcharge of Fill

As previously discussed, critical areas of the regraded Pile, where settlement may induce tensile stresses in the cover system and potentially result in adverse effects to the final cover, will be temporarily surcharged with additional fill. Surcharging such critical areas (e.g., areas of deepest fill) with additional material provides an economical way to accelerate settlement of the fill prior to constructing the final cover system. The objective is to reduce the timeframe within which the most of the settlement would occur, such that any remaining settlement that would occur following the placement of the final cover is within acceptable limits and can be mitigated through routine maintenance.

Surcharge materials will be placed to levels above and beyond the final 3:1 design height as described in Figure 4-8 and Drawing C8. In the northern fill area, a minimum of 5 feet of surcharge will be placed over an area of approximately 0.6 acres at the deepest portion of the fill. In the southern fill area, a minimum of 9 feet of surcharge will be placed over an area of approximately 1.5 acres at the deepest portion of the fill. The additional fill will be left in place and uncovered over one fall-, winter- and spring- wet season to allow for infiltration to facilitate the settlement. The rate of settlement will be monitored using settlement devices such as plates, rods, or cells (Drawings I1 and I2) to determine the amount of settlement achieved. Following the determination that adequate settlement has been achieved, the surcharge materials will be spread across the slope and the areas brought to the final 3:1 grade.

4.2.5 Soil Cover System

A Dinwoody Formation soil-cover system (Figure 4-5) will be placed over the regraded Pile after acceptable settlement has occurred and the surcharge material has been regraded/redistributed. This cover system will promote revegetation and runoff while reducing infiltration and erosion.

As previously discussed, investigations identified an outcrop of Dinwoody Formation in the Hoorah Hollow area (Figure 4-9) as an appropriate source for the soil cover (Appendix D). Salvaged topsoil from the cleared and grubbed areas east of the Pile may be mixed with the Dinwoody Formation soils obtained from the borrow areas. Average total selenium concentrations in the cover materials will not exceed 5.0 mg/kg. Should sampling of the salvaged topsoil indicate the presence of average total selenium concentrations greater than 5.0 mg/kg but less than 13.0 mg/kg, the salvaged topsoil will be blended to obtain a material with less than 5.0 mg/kg average total selenium concentration. Salvaged topsoil with an average total selenium concentration of greater than 13.0 mg/kg will not be used as a cover material (Mackowiak et. al. 2005). Salvaged topsoil with an average total selenium concentration of greater than 13.0 mg/kg will be consolidated with the overburden material on the regraded pile.

The cover system will be a minimum of 18 inches thick on the side slopes and a minimum of 12 inches thick on the top and upslope areas west of the Pile. The cover system will be lightly compacted through dozer travel.[7] If the soil cover becomes compacted to levels that may limit

[7] Research conducted by Goldsmith, Silva, and Fischenich (2001) suggests that a compaction between 80% and 85% of the standard Proctor maximum dry density provides many of the stabilizing benefits of higher soil compaction without jeopardizing the viability of vegetation development and growth.

root growth and development of plants, the compacted soil material will be mechanically loosened by scarification.

To verify that the cover is appropriately lightly compacted (between 80-85 Percent of maximum dry density), moisture-density tests will be performed at a rate of one per 5,000 cy of cover materials placed and compacted. The in-place density will be compared to Standard Proctor (ASTM D698) to confirm density as a percentage of maximum.

As discussed in Section 2.4, the combined topsoil and weathered Dinwoody Formation materials in the borrow area are primarily silty gravel to sandy silt with approximately 19 to 77 percent silt having combined organic contents varying from approximately 2 to 7.5 percent (Tables 2-3 through 2-5). However, fertilizer (nitrogen, phosphorus, and potassium [NPK]), organic materials, and/or mulch will be applied to supplement the nutrients present in the cover material, if necessary. Any needed amendments will be based on agronomist recommendations to achieve good growth following analysis of representative samples of the cover. Additional details are included in the Sampling and Analysis Plan (SAP) (Appendix J).

4.2.6 Erosion Controls

To control erosion, all regraded areas will be revegetated with non-selenium-accumulator plant species, and a total of approximately 15,000-feet of run-on and runoff diversion ditches and berms (Figure 4-10) will be installed in the NTCRA area. The run-on and runoff diversion ditches will drain stormwater from the perimeter of the regraded Pile. In addition, four sedimentation ponds will be constructed to control the transport of sediments during construction and post construction while the vegetation matures.

Various erosion-control devices will be placed on all cover soils on 3:1 side slopes, and other slopes steeper than 15 percent. These will include fabric rolls (straw wattles), turf reinforcement mats (TRMs), mulch with tackifier or other devices. Additional details of the erosion control devices are presented on Drawings C38 and C39.

Prior to winter shutdown in 2013, if the regrade activities are not complete, the area will be hydromulched to reduce erosion. In addition, silt fencing along the perimeter will be checked and fixed if necessary.

Following the completion of all regrading activities, to achieve an on-site soil loss of less than 5 ton/ac/yr prior to vegetation establishment, three buffer strips of erosion controls will be installed. These buffer strips will be located one-third and two-thirds of the distance from the top berm to the bottom of the slope, and at the toe of the graded slope. Each buffer strip can include either: (1) TRMs totaling 10- to 15-ft in width; or (2) 8-inch straw wattles grouped in 3 rows at 5-ft spacing between rows (10-ft total width). These measures will reduce the potential for significant soil loss throughout the regraded area.

After the vegetation/ground cover is over 60 percent established, to achieve an on-site soil loss of less than 2 ton/ac/yr, conservation practices should include a minimum of two buffer strips located either: (1) at the mid-point and toe of the slope; or (2) one-third and two-thirds of the distance from top to bottom of the slope. The buffer strips can be the same materials as noted above.

4.2.6.1 Revegetation Plant Species

The main goals of the vegetative cover are to provide soil erosion control, maximize evapotranspiration, and reduce selenium uptake into the plants. Grasses are the focus of the plant mix because they provide the most effective erosion control, yield both short-term and long-term growth, have fibrous rooting systems, and are the least likely to accumulate selenium. The plant mix of 9 different species, seeding rates of pure live seed (PLS) pounds per acre are listed on Table 4-2, and in Section 02900 of the Technical Specifications (Appendix E). Reasonable efforts will be made to use only PLS and cultivars listed in Table 4-2. In the event that it is not possible to obtain PLS of the cultivars listed in Table 4-2, Simplot will consult with the Agencies through Engineering Change Orders (ECOs) (described in Section 6) to reach resolution on the seed mix to be purchased.

4.2.6.2 Run-on and Runoff Control Ditches

Design of the run-on and runoff controls is based on estimated peak flows from the 100-year, 24-hour storm event as determined by the Natural Resource Conservation Service method (NRCS, 2009), with a minimum of a 1 foot of freeboard. Run-on and runoff control channels will be protected from erosion through placement of erosion control measures, as follows: 1) vegetation (peak flows less than 5 feet per second [fps]), 2) TRM (peak flows between 5 and10 fps), 3) riprap (peak flows between 10 and 15 fps), and 4) grouted riprap or ACM (peak flows greater than15 fps). All non-ACM or grouted-riprap lined ditches that run across overburden material will be lined with compacted Dinwoody Formation material to limit both infiltration of water into the ODA and the possibility of clean water picking up selenium as the water moves through the ditches into the sediment basins. The design hydrologic and hydraulic calculations are presented in Appendix F.

Run-on Controls – Run-on control ditches will be constructed in the following areas:

- along the transition from the top area to steeper side slopes to reduce runoff flows on the side slopes; and

- upgradient from the upslope areas to limit run-on from areas to the west of the overburden Pile from crossing the regraded areas and to convey flow to the perimeter of the regraded areas.

The primary run-on controls for the regraded Pile will be hillside run-on control ditches located west of the upslope area (Drawing C9). One run-on control ditch will drain toward the north and one will drain toward the south. These will typically have side slopes on the hill side of 2:1 to 3:1 (natural hillside) and side slopes adjacent to the regraded upslope area of 2:1. The minimum depth will be 2.1 feet and peak flow velocities during the design storm event are estimated to range from approximately 2.3 to 8.1 feet per second (fps). Therefore these run-on control ditches will be vegetated and TRM will be utilized in ditch reaches having velocities exceeding 5 fps. The upslope area run-on control ditch profiles and typical sections are presented on Drawings C11 and C12.

Runoff Controls – Run-off control ditches will be constructed in the following areas:

- alongside slopes to convey runoff to sediment detention basins;
- along the toe of the regraded pile to convey runoff to sediment detention basins; and
- along the perimeter of the overburden pile in the in-pit consolidation area to limit erosion and infiltration into the overburden.

The runoff control ditch existing in the upslope area adjacent to the access road will remain (Drawings C1 and C9).

Runoff controls on the north side of the NTCRA Pile will consist of a repair of the existing eroded area with a new armored channel. This will require compacted fill in the deeply incised area followed by either grouted riprap or ACM channel armoring in the upper, steepest reach, with riprap armoring in the lower reach. A runoff control ditch will also be constructed between the north toe of the NTCRA and the north access road. This runoff ditch will convey runoff flow from the north side of the upslope area, the north portion of the top and the north side slopes of the Pile. This runoff ditch is designed for a peak flow of approximately 76 cfs from the 100-year, 24-hour storm event at the discharge into the northeast sedimentation basin. The gradient of this runoff ditch varies from approximately 16 to 33 percent and peak velocities are in excess of 15 fps (17 fps, max.). Therefore, either grouted riprap or ACM armor will be required in this ditch. The ditch will be at least 2.8-feet deep with 1.5:1 side slopes (ACM) or 2:1 side slopes (riprap and grouted riprap).

Runoff control ditches along the east toe of the NTCRA will be constructed between the toe and access road. The largest east-side runoff ditch flowing north is designed for a peak flow from the 100-year, 24-hour storm event of 32 cfs. Peak velocities will be in the 6 to 9 fps range. This ditch will be a V-ditch with 2:1 side slopes having TRM with vegetation establishment for erosion control.

Energy Dissipation Measures – Energy dissipation measures such as dissipation basins or aprons (Drawings C18-C19, C24 and C27) will be installed to dissipate high-velocity energy from the base of the runoff ditches resulting from estimated peak flows from the 100-year, 24-hour storm event. Most energy dissipation will be constructed in the outfalls to the sedimentation basins through heavy riprap on the chutes and aprons. Heavy riprap aprons will be installed at the discharge of spillways from each sedimentation basin.

4.2.6.3 Sedimentation Basins

Four sedimentation basins (Drawing G5 in Appendix E) and associated embankments, emergency discharge channels/spillways, and overflow devices will be constructed. The capacity and size of the basins will be maximized based on the area available, and designed to retain flow from a 2-year, 24-hour storm event plus 1 foot of freeboard. The basin embankments, overflow devices and discharge channels will be designed to accommodate flow and prevent erosion from the 100-year, 24-hour storm event while providing a minimum of 1 foot of freeboard. Appendix F includes the design calculation details for the sedimentation basins.

Northeast Sedimentation Basin - This basin will have three cells (Drawings C21 through C24). Two smaller pre-sedimentation cells receiving inflow from the north and east runoff-control ditches, and a larger cell receiving flows from the pre-sedimentation cells. The northwestern most pre-sedimentation cell will be separated from the larger cell by a flow-through rock interior berm. This internal berm will have a small overflow notch for normal storm inflows up to the 2-year, 24-hour event; however, it will remain stable for complete overflows for more extreme storm events. Because of the existing slope of the ground surface, the basin will be an excavation with an embankment along the north, south, and east sides. The embankment will have a crest width of 12 feet, 2.5:1 downstream side slopes, and will have a maximum height of 9 to 10 feet above existing ground surface. This embankment will be constructed with select fill from the excavation in lifts of approximately 7 to 9 inches and compacted to at least 95 percent of the maximum dry density as determined by the Standard Proctor test. The total capacity of the new northeast sedimentation basin will be approximately 61,000 cf in all three cells. The runoff from a 2-year, 24-hour storm event on the approximately 70 acres comprising north side of the Pile and upslope area is estimated to produce approximately 57,000 cf of runoff during construction and prior to vegetation establishment. The normal water depth in the basin will allow a 2-foot freeboard to the dam crest. Following construction, runoff flows from the northern portion of the Pile will continue to be routed through this sedimentation basin. An earth-cut, gravel-lined emergency spillway, with a reinforced concrete control section and riprap-lined discharge chute, will be constructed (Drawings C24) in the northern corner of the embankment to discharge estimated peak flows resulting from a 100-year, 24-hour storm event. The spillway is designed with a 25-foot bottom width and a depth of 2 feet to the dam crest with 5:1 side slopes. This spillway will have a capacity of approximately 80 cfs at a water depth of 1 foot, with a foot of freeboard.

East Sedimentation Basin - A new east sedimentation basin will be constructed east of the Pile between the new toe and the east property line, and will consist of three cells (Drawings C25 to C27). The north and south cells will serve as pre-sedimentation ponds and will discharge into the center cell. This sedimentation basin system will receive flows from the majority of the east side of the Pile during and following construction. The volume of runoff from the 2-year, 24-hour storm event on the 40-acre contributing area is estimated to be approximately 31,250 cf. Including a sediment volume of at least 10 percent, the east sedimentation basin is designed for a total volume of 35,000 cf. A basin of approximately 30- to 50-feet wide by approximately 140 to 160 feet long, and approximately 6 feet deep (maximum), is designed to retain this volume. Storm runoff volumes beyond the 2-year, 24-hour event will be discharged through an emergency spillway. Because of the existing slope of the ground surface, the basin will be an excavation with an embankment along the east and southeast sides. The embankment will have a crest width of 12 feet, 2.5:1 downstream side slopes, and will have a maximum height of 9 to 10 feet above existing ground surface. This embankment will be constructed with select fill from the excavation in lifts of approximately 7 to 9 inches and compacted to at least 95 percent of the maximum dry density as determined by the Standard Proctor test. Rock flow-through interior berms will allow water storage on both ends of the pond to discharge into the main, central cell. The normal water depth in the basin will allow a 2-foot freeboard to the dam crest. The east runoff ditch flowing south will discharge into the north portion of the basin in a riprap-lined chute and the east runoff ditch flowing north will discharge into the south end of the basin, also in a riprap-lined chute.

An earth-cut, gravel-lined emergency spillway, with a reinforced concrete control section and a riprap-lined discharge chute, is designed in the central east cell of the east sedimentation-basin embankment to discharge estimated peak flows of a 100-year, 24 hour storm event. The spillway is designed with a 15-foot bottom width and a depth of 2 feet to the dam crest with 5:1 side slopes. This spillway will have a capacity of approximately 54 cfs at a water depth of 1 foot, providing a 1-foot freeboard. The estimated peak flow from a 100-year, 24-hour storm event on the 40-acre runoff area is estimated to be approximately 53 cfs. Extreme storm event discharges will proceed from the spillway down the riprap-lined chute with overland flow to the south branch of Pedro Creek.

Southeast Sedimentation/infiltration Basin - The total capacity of the new sedimentation/infiltration basin at the southeast end of the fill will be in excess of 47,000 cf (Drawings C28 and C29). The runoff from a 2-year, 24-hour storm event on the approximately 55 acres comprising parts of the south NTCRA area, south undisturbed area, and parts of the upslope area is estimated to produce approximately 47,000 cf of runoff during construction and prior to vegetation establishment. Following construction, run-on and runoff flows will continue to be routed through this sedimentation/infiltration basin. This basin will be constructed in a natural depression southeast of the NTCRA Pile. When the site is cleared, grubbed and prepared, it will provide an infiltration basin within Wells Formation material for the majority of storm runoff flows. A 48-inch half-round CMP emergency spillway is designed in the northern portion of the basin to discharge estimated, routed peak flows resulting from a 100-year, 24-hour storm event. This spillway will have a capacity of approximately 15 cfs at a water depth of 1 foot. Extreme storm event discharges will proceed from the spillway to a riprap-lined chute and into a natural drainage within the treed area to the north. The natural drainage discharges into the east runoff control ditch, which ultimately reports to the previously described eastern sedimentation basin.

Southwest Sedimentation Basin - The south run-on control ditch at the southern portion of the upslope area will join the runoff ditch from the south upslope regraded area at a point along the existing road (Drawings C9 and C11). The flows from these ditches will discharge to an excavated sedimentation basin in the southwestern corner of the upslope area. Riprap will be placed at the outlet to provide erosion protection at that location within the basin.

The drainage area contributing flow to the southwest sedimentation basin will be approximately 10.2 acres. Therefore, the size of this basin is required to be at least 8,600 cf to retain estimated runoff from the 2-year, 24-hour storm event including a sediment volume of at least 10 percent. Estimated peak flows beyond the 2-year, 24-hour storm event will be discharged. An excavated basin approximately 100 feet long by approximately 10 to 90 feet wide is designed to contain this volume. The basin will be entirely in cut without an embankment.

Side slopes of the excavated basin will be 2:1 and the maximum depth of water in the basin will be approximately 3 feet. A 48-inch half-round CMP emergency spillway is designed in the southwestern corner of the embankment to discharge estimated peak flows resulting from a 100-year, 24-hour storm event (approximately 13 cfs) with a 1-foot freeboard.

4.3 Excess Fill Consolidation Design

The following subsections present the design for the consolidation of the excess fill with the in-pit ODA to the west (Figure 4-1).

4.3.1 In-Pit Consolidation Design

The design for the in-pit consolidation of excess fill is shown on Drawings C31 through C32.1. The consolidation of the excess fill with the in-pit ODA includes grading the slopes to approximately 3(h):1(v) to 20:1. The grading establishes positive drainage of runoff and allows for collection of the clean runoff in an infiltration basin (Drawings C32 and C32.1).

A total of approximately 527,000 cy of material will be consolidated with the material in the in-pit ODA using the plug-dumping method.[8] The haul trucks that will be used are capable of carrying 150 tons of material and have a gross machine operating weight of 550,000 lbs. Generated dump piles will have heights of approximately 12 to 13 feet. Dozers will be used to level the

[8] Each haul truck places its load next to previously placed loads with a dozer leveling the top of the mounds,

piles into approximately 6 ft lifts to generate a smooth operating surface. Compaction of the lifts will be achieved through haul-truck traffic.

4.3.2 In-Pit Cover System Design

A Dinwoody Formation soil-cover system (Drawing C32.1) will be placed over the consolidated material to promote revegetation and runoff while reducing infiltration and erosion. The cover system will be a minimum of 18 inches thick. This material will be lightly compacted through equipment travel. If the soil cover becomes over compacted, it will be mechanically loosened by scarification to promote vegetation success.

To verify that the cover is appropriately lightly compacted (to 80-85 percent of maximum dry density), moisture-density tests will be performed at a rate of one per 5,000 cy of cover materials placed and compacted. The in-place density will be compared to Standard Proctor (ASTM D698) to confirm density as a percentage of maximum.

The soil cover will be vegetated to provide soil erosion control, maximize evapotranspiration, and reduce selenium uptake into the plants. Grasses are the focus of the plant mix because they provide the most effective erosion control, yield both short-term and long-term growth, have fibrous rooting systems, and are the least likely to accumulate selenium. The plant mix of 9 different species, seeding rates of pure live seed pounds per acre are listed on Table 4-2, and in Section 02900 of the Technical Specifications (Appendix E).

4.3.3 In-Pit Surface Water Management

The objective of the in-pit surface water management is to facilitate runoff and reduce the amount of infiltration. The run-on/runoff in this area will be predominantly resultant of direct precipitation (i.e., this area does not receive runoff from adjacent drainage areas) into a fully contained area. Therefore, there will be no run-on/runoff control ditches. The surface area of the pile will be graded to convey runoff into an infiltration basin (Drawings C32.1). The design hydrologic and hydraulic calculations are presented in Appendix F.

The infiltration basin will be excavated into a Wells Formation outcrop and will not require embankments. The infiltration basin at the east end of the fill is designed with an excavation into the Wells Formation to provide for infiltration of storm runoff flows from the area. The basin will be approximately 150-feet long by approximately 20-feet wide. The runoff from a 2-year, 24-hour storm event on the approximately 52 acres comprising the area is estimated to produce approximately 39,000 cf of runoff during construction and prior to vegetation establishment. Because of the relatively high hydraulic conductivity of the Wells Formation (assumed to be 1 cm/sec, or higher), runoff from storms or snowmelt is normally expected to only raise the water surface less than about 1 to 2 feet above the invert in the infiltration basin.

4.4 Borrow Area Design

The following subsections will present general design details for the development and reclamation of the borrow areas for cover materials. General details are provided since the final dimensions of the borrow area will depend of actual conditions encountered.

4.4.1 Dinwoody Formation Borrow

The primary soil-borrow area is located approximately 1.5 to 2 miles south of the NTCRA area (Figure 2-4). It is estimated that approximately 235,000 cy of cover soil material will be needed. Most of this estimated amount will come from the borrow area and some material may come from salvaged soils from the cleared and grubbed areas. Drawings C33 through C37 provide general construction information for the borrow area.

The borrow area delineation allows for 5 feet of space between the existing roads in the area and the run-on control ditches. The ditches will extend around the perimeter of the borrow areas to the sedimentation basins (Figure 4-11). As the borrow area expands east, the necessary ditches will be installed. The borrow-area ditches and basins will remain in place until the revegetation has fully been established. After the vegetation is fully established, these controls will be removed and reclaimed.

A sedimentation basin will be installed at the downstream portion of each soil borrow area, designed to contain the estimated runoff from a 2-year, 24-hour storm event and discharge runoff from larger storm events. The existing north borrow-area sedimentation basin volume is approximately 9,000 cf and the new south borrow-area sedimentation basin volume is designed for approximately 41,000 cf (based on the maximum estimated borrow area). A vegetation buffer approximately 50-feet wide will be maintained on the northwest portion of the north borrow area, and rows of straw bales will be placed up-gradient of this to provide sedimentation control in that area. Considering that these basins will be capturing runoff from an uncontaminated area and that they will be removed following the establishment of vegetation (i.e., will not need to remain in place for more than 5 years), the emergency spillways will be designed to handle flows from 10-year, 24-hour storm events. Plans of the sedimentation basins at the soil borrow areas are presented on Drawings C35 and C36.

The run-on control ditch to the northeast of the southern borrow is already present in the form of a large berm on the south side of the haul road. This will be diverted into a constructed control ditch where the berm ends down slope. An existing berm along the western road will form part of the run-on control system for the southern borrow. This berm is at least 2 feet high which will contain the peak run-on design flow at that location. General details for the run-on and runoff ditch designs are included in Appendix E.

4.4.2 Rex Chert Borrow

Two chert borrow areas will be utilized during the NTCRA, one for smaller size rock and one for larger rock. The rock borrow areas are located in pits south of the NTCRA area near the soil borrow area and southeast of the Pile (Figure 2-4). Both areas have been utilized as rock sources previously and therefore minimal additional disturbance is expected to be required. This will include drainage rock, gravel surfacing, riprap and large rock for use in energy dissipation.

The small drainage rock (less than 6 inches) and access road surfacing material (less than 2 inches) will be obtained from the existing pit located just west of the proposed Dinwoody Formation borrow area. The rock for riprap and larger dissipation rock will be obtained from the existing Chert outcrop located approximately 0.5 miles southeast of the NTCRA Pile or from suitable offsite rock sources. Coarse screen grizzlies will be used to obtain the larger riprap sized rock. Smaller sized rock (e.g., road base and material to be placed in clay excavated area) will be produced using finer screens.

Wells Formation material may also be obtained from the pit wall in the Rex Chert borrow source southeast of the NTCRA area.

4.4.3 Reclamation of Borrow Areas

Borrow areas will be graded smooth following excavations and approximately 6 to 12 inches of topsoil and colluvium will be placed over the regraded surface. The 2:1 excavation slopes will be flattened to approximately 3:1 and will be seeded and hydromulched with tackifier for erosion control. A regrading plan (as Drawing C37) for the soil borrow areas will be submitted for Agency review and approval no less than 30 days prior to the expected commencement of the reclamation of the borrow area.

4.5 Instrumentation Design

Instrumentation design for the NTCRA will include: 1) settlement monitoring instrumentation for the surcharge loading program and 2) long-term embankment monitoring of the NTCRA Pile and sedimentation basin embankments.

Settlement monitoring of the surcharge loading program will include settlement plates installed on the regraded surface (approximately 1 foot below the surface). Settlement plates consist of a square steel plate with steel riser pipe and plastic pipe sleeve. The settlement plate is typically about 2-feet square and the galvanized steel riser pipes are about 1.5-inch diameter with threaded fittings to add additional sections as needed. Sleeve pipes are typically polyvinyl chloride (PVC) pipes to allow the steel settlement plate to move independently of the surcharge load fill. These rise through the top of the surcharge fill and measure the settlement of the underlying regraded ODA material.

Final long-term settlement of the NTCRA Pile and sedimentation basin embankments will be performed using cylindrical concrete monuments. These will be 8-inch diameter by 4-feet long concrete cylinders placed in the final surface of the Pile at the top of the 3:1 slope. The top of the settlement monuments will be approximately 2 to 3 inches above the final grade and will have embedded metal survey markers. It is anticipated that 3 or 4 of these will be placed at key locations on the final grade. Additionally, one settlement monument will be installed at the crest of the maximum section on the northeast and east sedimentation basin embankments.

The use of inclinometers may also be considered as part of the long-term monitoring system for the NTCRA Pile. These devices measure long-term movement and deformation of embankments and can be used to determine if movements are constant or accelerating. They are typically installed in boreholes, but can be installed with casings buried in fill or in a trench. The device monitoring is usually accomplished by portable readout units.

5.0 DESIGN TECHNICAL ANALYSIS

This section summarizes the technical analyses and calculations developed in support of the design, and include the following:

- Slope Stability Analyses of Regraded Pile and Sedimentation Basin Embankments (Calculation Set 1)
- Settlement Analysis (Calculation Set 2)
- Consolidation Analysis (Calculation Set 3)
- Surcharge Analysis (Calculation Set 4)
- Hydraulic Analyses (Calculation Sets 5, 6, 7, and 8)
- Erosion Analyses (Calculation Set 9)
- Soil Borrow Area Volume Estimate.(Calculation Set 10)
- Deformation Analysis (Calculation Set 11)

Detailed engineering computations and calculations are included in Appendix F.

5.1 Stability Analyses

Stability analyses of the final regraded Pile and the embankments forming the sedimentation basins were performed to confirm that the regrade design will achieve long-term static factors of safety of at least 1.5 and seismic factors of safety of at least 1.1. Calculation Set 1 in Appendix F details the stability analysis calculations.

5.1.1 Regraded Pile Stability

The stability analyses performed considered the final 3:1 side slopes, as well as the interim slopes under surcharge, using information obtained from the geotechnical investigations performed. The stability analysis was performed using the computer program Slide 6.0.[9] Elements of the evaluation include:

- evaluation of four cross sections through the regraded Pile, representing various cut/fill configurations and foundation conditions (e.g., the presence of a soft, compressible clay unit near the north side of the pile), as well as a sedimentation pond embankment;
- relatively low and high phreatic surfaces within the regraded Pile;

[9] Slide 6.0 was developed by RocScience, 2012. Toronto, Canada.

- circular and block failure modes;
- use of minimum measured strength values for pile materials to add conservatism to the stability analyses (C=0 psf and $\varphi=34^{o}$);
- static and seismic conditions (horizontal design coefficient of 0.20 g and vertical design coefficient of 0.07 g for seismic conditions);
- evaluation of surcharged areas under reduced material strength conditions, as will occur immediately following construction; and
- evaluation of the effects of snow loads on slope stability.

For the final slope configuration under static conditions, the lowest factor of safety computed (1.96) was for a circular failure surface in the northern portion of the Pile under relatively high phreatic surface conditions (Figure 5-1). The circular failure surface extends to a depth of approximately 50 feet through fill material and into the compressible clay unit underlying the regraded pile toe.

For the final slope configuration under seismic conditions, the lowest factor of safety computed (1.10) was for a circular failure surface in the northeastern portion of the Pile under relatively high phreatic surface conditions (Figure 5-2). The deep-seated circular failure surface extends to a depth of approximately 200 feet through fill material and into the Dinwoody Formation underlying the regraded Pile toe.

As previously discussed, surcharged-slope conditions will be present immediately following construction. At that time, it is likely that Pile material placed in fill areas beneath the surcharge will be of lower strength than adjacent cut areas because densification would have not yet occurred. Therefore, fill materials (including the surcharge materials) were assigned a lower angle of internal friction ($\varphi=30^{o}$) than the adjacent cut materials ($\varphi=34^{o}$). Seismic conditions were not evaluated for the surcharge scenarios given their short duration. Further, given this short duration, a safety factor exceeding 1.0 was deemed to be acceptable for these scenarios. For the interim surcharged-slope configuration, the lowest factors of safety computed (1.12 for the northern surcharge area and 1.09 for the southern surcharge area) were for circular failure surfaces. These circular failures were predicted to be shallow, primarily within and immediately below the surcharge material. The stability analyses also revealed that the downslope surface of the surcharge material should be placed at slopes less than or equal to approximately 2.5:1 to minimize local slope movement.

A uniformly distributed snow load of 100 pounds per square foot was evaluated for two scenarios: 1) the surcharge condition on the southern part of the pile with the lowest safety factor (1.09) and 2) the long-term regraded condition on the northeastern part of the pile with the lowest estimated safety factor under seismic conditions (1.10). Imposition of a snow load resulted in minor differences in these factors of safety that were less than 0.01, indicating acceptable results. Given that the snow load was imposed on areas already exhibiting the lowest safety factors, and that those safety factors remained acceptable with the addition of the snow load, evaluation of other cross sections was unnecessary.

5.1.2 Basin Embankment Stability

A conservative stability analysis was performed for the sedimentation basin embankments by evaluating the stability of the largest embankment, located at the northeast sedimentation basin.[10] This analysis assumed the basin was full of water (with 2 feet of freeboard) with seepage through the embankment and material parameters assumed for compacted fill (C=50 psf and $\varphi=31^{o}$).

For static conditions, the lowest factor of safety computed (1.79) was for a circular failure surface that extended to the compacted backfill/Dinwoody contact at a depth of approximately 10 feet. Essentially the same surface was identified as having the minimum safety factor (1.10) under seismic conditions. A snow load of 100 pounds per square foot was imposed on the embankment under seismic conditions. Imposition of the snow load did not decrease the estimated safety factor.

Given that the highest embankment associated with the NTCRA was evaluated under full-water conditions, and that all estimated safety factors were acceptable, evaluation of other, smaller embankments was unnecessary.

5.2 Deformation Analyses

Deformation analyses were performed for the regraded Pile to estimate the potential deformation that might be expected if a seismic event occurs in excess of the design seismic event. Deformation analysis was not performed for the embankments, since the embankment will have fill heights less than 10 feet in thickness. Two different methods were used for this analysis. The first method is the Makdisi and Seed, 1978, “Simplified Procedure for estimating earthquake induced deformations in Dams and Embankments,” and the second method was based on the National Cooperative Highway Research Program (NCHRP), Report 611, 2008, “Seismic Analysis and Design of Retaining Walls, Buried Structures, Slopes, and Embankments.” Calculation Set 2 in Appendix F details the deformation analysis calculations.

The evaluation considered:

- A seismic class of D and magnitude 7 event;

[10] This analysis should be applicable to the east sedimentation basin embankment because materials will be similar and the maximum embankment height will be similar to the northeast sedimentation basin embankment.

- A shear wave velocity of 800 ft/sec for compacted fill and 600 ft/sec for uncompacted fill;
- Maximum fill thickness of approximately 70 feet, and maximum total height of approximately 370 feet for the Pile; and
- A yield horizontal acceleration of 0.25 g.

The likely maximum deformations in the Pile computed from these methods for an extreme earthquake event (i.e., in excess of the design earthquake) are approximately 1.5 to 2.5 feet. Thus the final graded embankments should not experience large-scale failure even under a maximum credible seismic event at the site.

5.3 Foundation Moisture Flow and Seep Collection Basin Analysis

Based upon an approximate discharge rate observed for the wet clay zone encountered in test pits TP-3 and TP-4, it is estimated that the subsurface drainage in the excavated areas will be approximately 0.1 gallon per minute per foot (gpm/foot). Flow measurements collected at the seep during the remedial investigations indicate an average flow of approximately 0.02 cfs (8 gpm) (Table 2-1). Calculation Set 6 in Appendix F details the foundation preparation and moisture management calculations.

It is estimated that an area of approximately 3 acres will require excavation to remove soft, clayey material, based on the findings of the test pits and considering the topography. The estimated total discharge from the excavated area is estimated to be at 31 gpm (0.07 cfs). To dissipate potentially elevated pore-pressures and to handle this flow, the excavated material will be replaced with 6-inch minus rock with less than 3 percent fines that will be connected to a subsurface drain.

The toe area moisture will combine with the seep flow along a subsurface gravel drain which will convey all seepage to a collection basin. The subsurface drain is designed to handle flows of up to 0.20 cfs (90 gpm). The drain will begin where the existing seepage expresses at the current surface and will extend approximately 290 feet downgradient to the seepage collection basin, which is adjacent to the northeast sedimentation basins (Drawings C22 through C24). The change in elevation from the intake to the discharge is approximately 32 feet.

The subsurface gravel drain will be 2 feet wide by 3 feet tall and enclosed by non-woven geotextile. This subsurface drain is conservatively designed for a flow rate of 0.2 cfs (considering the maximum existing measurement of 0.06 cfs, plus 0.07 cfs from new drainage in the toe areas and a factor of safety of 1.5). The gradient of this drain will approximately 12 percent from the existing seep collection point to the new seep containment pond. This drainage material will consist of clean gravel with minimal fines having a hydraulic conductivity of approximately 10 cm/sec. The seep and toe-area moisture collection basin will be isolated from the adjacent northeast sedimentation basins and allow for potential future treatment considerations of the contaminated water to be evaluated as part of the RI/FS process.

The existing sedimentation basin into which NES-5 currently flows has an estimated capacity of approximately 14,400 cf. Based on 2011 and 2012 monitoring data for NES-5, base seep flows in the spring are up to 8.4 times higher compared to fall flows (Table 2-1). The surface water elevation observed in mid-September 2012 (Calculation Set 6 in Appendix F) indicates that the base volume contained in the basin was approximately 3,200 cf. Considering that the maximum spring flow was approximately 8.4 times greater, it is estimated that during spring runoff the basin could have contained around 27,000 cf. Over the period of monitoring (since 2003), the greatest change between spring and fall flows observed was in 2012 (i.e., by a factor of 8.4). The seep collection basin is conservatively designed to contain approximately 35,000 cf of seepage volume.

The new seep collection basin is designed with a smaller bottom area (approximately 3,250 sf), compared to the existing basin (approximately 5,000 sf), to keep the clay liner saturated year round. Although the seep currently flows year round, and is expected to continue to do so for some time following the completion of the NTCRA, it is anticipated that the reduction of infiltration into the Pile will ultimately result in the seep flow decreasing and possibly becoming insignificant.

5.4 Settlement Analyses

Pile Overburden Materials - As previously discussed, the Pile consists of granular silty gravels and sands with a wide range of engineering parameters (e.g., bulk density, particle distribution, shear strength, coefficient of consolidation). Settlement of soils consists of two components: 1) primary, or consolidation, settlement where pore water is “squeezed” out of the soils causing settlement as loads are applied, and 2) long-term, or compression settlement where the soil particles are rearranged and compressed against each other due to applied loads. The standard calculations used to evaluate initial, or consolidation, settlement are applicable to fine-grained cohesive soils. The typical laboratory consolidation tests performed on cohesive soils to provide input to the standard calculations are not designed for granular soils such as those at the NTCRA Pile. The standard calculations therefore do not apply to the overburden material. The rate of primary settlement for granular soils is relatively rapid, and they typically do not exhibit the degree of long-term compression as would fine-grained soils. Therefore, granular soils typically do not cause the problems of post-construction settlement that might be expected from cohesive soils. When information on the volume change or settlement characteristics of a granular soil is needed, it is most frequently obtained by indirect observations (McCarthy 1982). Considering that overburden piles at the nearby Smoky Canyon Mine are comprised of the same materials and are subject to the same climatic conditions as the NTCRA Pile, surface survey[11] measurements at these piles were used to evaluate settlement and estimate the potential settlement that could occur at the NTCRA Pile.

Areas where the fill depths are approximately similar to the depths for the NTCRA Pile were evaluated for post-construction settlement. Surface survey data were evaluated for areas where the fill was placed along steep slopes (e.g., backfilled pits) and where fills were placed on top of side slopes. The settlement evaluations for slope and pit fills are summarized in the surcharge analysis in Appendix F (Calculation Set 4). As shown on Figure 5-3, settlement of slope fills generally ranged from 2 to 3 feet (average 2 feet) for fill depths of 20 feet and greater. As shown on Figure 5-4, settlement of pit fills generally ranged from 2 to 10 feet (average 4 feet) for fill depths of 20 feet and greater. Therefore, it is estimated that the settlement in the slope and pit fill areas at the NTCRA Pile would similarly be limited to approximately 3 and 6 feet, respectively.

Foundation Soils - Foundation soils downgradient of the existing NTCRA Pile may also experience settlement due to the loads from Pile materials placed as part of the regrading. Surface organic soils will typically be removed to depths of 1 to 3 feet along the toe fill zones, prior to placement of the regraded overburden materials. The zone of soft, wet fine-grained soils along the east side of the Pile, identified in test pits at depth of 2 to 5 feet below existing ground surface, will be removed and replaced with relatively incompressible chert material. Therefore, foundation settlement of this area should not be of concern.

The area north of the Pile includes a buried zone of up to 8 to 10 feet of fine-grained, organic soils at depths of approximately 7 to 17 feet below existing ground surface, as discussed above. A laboratory consolidation test (Appendix D) of relatively undisturbed materials from this area indicates a potential consolidation settlement of only about 1 to 2 inches. Therefore, including long-term compression settlement, the total settlement of this subsurface foundation area should be less than about 4 inches.

5.5 Surcharge Analyses

To minimize adverse effects to the final cover due to potential settlement of the fill, the deepest fill areas will be temporarily surcharged with additional material. The analysis to estimate where and how much surcharge, and for how long, is detailed in Appendix F (Calculation Set 4) and considered the following:

- Areas of greatest NTCRA Pile fill depths;
- Minimum fill depths requiring surcharge; and

[11] Simplot performs annual aerial surveys of the Smoky Canyon Mine. Through the process of stereophotogrammetry, the aerial images are used to generate contours with vertical resolutions of approximately 1.25 feet.

- Settlement and settlement time frame at similar overburden piles at the Smoky Canyon Mine.

The amount of settlement occurring in fill comprised of a relatively uniform granular material can be considered to be proportional to the thickness of the fill (i.e., the thicker the fill, the more settlement). With the overburden piles being comprised of a mix of materials of varying particle sizes, it is not possible to develop such a correlation between fill depth and settlement. However, it is possible to bound the potential settlement for areas of deepest fill, based on the settlements observed for fills composed of similar materials and depths.

Fill areas where fill-depth transitions are abrupt may be prone to differential settlement. The areas of fill for the NTCRA Pile where these conditions will exist are the northern and southern fill areas (Figure 4-8). The maximum depth of fill for these areas is approximately 81 feet (Figure 4-8), with rapid fill depth changes of 20-plus feet. Therefore, observed settlement data from similar Smoky overburden piles were analyzed for fills bracketing 80 feet deep (40-120 feet deep). The observed settlement at Smoky overburden piles constructed as slope fills (Figure 5-3) ranged from 2 to 3 feet (average 2 feet) for fill depths ranging between 40 to 120 feet. The observed settlement at Smoky overburden piles constructed as pit fills (Figure 5-4) ranged from 2 to 10 feet (average 4 feet) for fill depths ranging between 40 to 120 feet. This amounts to settlements of approximately 2-6 percent (average 4 percent).

The average settlement observed at Smoky of approximately 4 percent will be used as a potential settlement that may occur at the NTCRA Pile.[12] To determine the lower boundary of fill depths to be surcharged, the analysis considered at what depth an average of 4 percent settlement could result in significant maintenance due to differential settlement. Correction of differential settlements less than 2 feet is generally straightforward and therefore this amount of settlement is adopted as a threshold for the purpose of this analysis. On this basis, the shallowest fill thickness identified as requiring surcharge is approximately 55 feet.

The NTCRA areas with fill depths greater than 55 feet are approximately 1.5 acres (southern fill) and 0.6 acres (northern fill) (Figure 4-8). Based on the amount of average settlements for Smoky pit and slope fills with depths between 40 to 120 feet, with added materials for contingency, the surcharge for the northern and southern fill areas will extend approximately 5 and 9 feet above the 3:1 grade, respectively. These surcharge fills are over double the amount of the anticipated settlements. This will result in volumes of approximately 5,000 and 22,000 cy of surcharge for the northern and southern fill areas, respectively.

To evaluate the implementability of surcharging these areas with the above-mentioned volumes, the analysis took into account the need to remove the surcharge and the corresponding need for a location in which to place the removed surcharge material. Using haul trucks on the 3:1

[12] Typical settlements in municipal solid waste landfills average approximately 5 to 7%, and settlements of industrial landfills are more in the range of about 5%.

slopes will not be feasible or safe. Therefore, removal of the surcharge and placement elsewhere as fill will need to be accomplished by pushing the material downhill with dozers. Considering that the settlement will depend on the material composition of the fill (i.e., parent material make up and grain size distribution), it is possible for the fill to settle more or less than anticipated. From an implementability perspective, and due to the proximity of the Pile to the property boundary, it will be more efficient to bring in more fill if settlement is greater than anticipated, versus having less settlement and not having a place to doze the excess to. Therefore, depressions (i.e., slope areas not graded to 3:1) capable of receiving volumes similar to the total surcharge, will be left available downgradient of the two surcharge areas (Figure 4-8). Additional fill will be brought in, if needed, to achieve final design grades prior to placement of the soil cover system.

To evaluate the time interval over which the surcharge should be left in place, the observed rate of settlement at the Smoky overburden piles was evaluated in conjunction with the precipitation records (Appendix F Calculation Set 4). As expected, settlement is greatest if an adequate amount of infiltration occurs. The survey data indicate that with the appropriate amount of precipitation and infiltration, the bulk of the settlement occurs over the first year, consistent with the fact that granular materials settle rapidly. Based on the survey data, the bulk of the settlement should occur over one fall-, winter- and spring- wet season. Settlement of the surcharged areas will be monitored. The decision regarding when to remove the surcharge loads will be made based on measurement settlement data and in consultation with the Agencies.

5.6 Hydraulic Analysis

The hydraulic analysis was performed to estimate peak flows in run-on and runoff control structures from the 100-year, 24-hour storm event for the NTCRA area, and 10-year, 24-hour storm event for the borrow area, as well as the requirement for the sedimentation basins to contain runoff from the 2-year, 24-hour storm event.

Basin sizing determinations are based on guidance included in the United States Bureau of Reclamation Design of Small Dams (USBR, 1987) and the United States Army Corps of Engineers (USACE) Engineering and Design of Runoff from Snowmelt (USACE, 1998). Modeling and analysis of the hydrology in the drainage basin areas were performed using the Natural Resources Conservation Service (NRCS 2012) WinTR-55 Watershed Hydrology program.

General inputs and assumption include:

- A precipitation of 1.6 inches for the 2-year 24-hour storm event;[13]

[13] A snow melt calculation using a melt-rate coefficient of 0.08, with air and base temperatures of 52 and 32 degrees Fahrenheit, respectively, was used to determine if similar to 2-yr, 24-hour storm runoff.

- A precipitation of 2.2 inches for the 10-year 24-hour storm event;
- A precipitation of 3 inches for the 100-year 24-hour storm event;
- Hydrologic Soil Group B; and
- Average Curve Number of 75 (S of 3.33).

The design hydrologic and hydraulic calculations are presented in Appendix F, Calculation Sets 6, 7 and 8.

5.6.1 Run-on and Runoff Hydraulic Analysis

NTCRA Pile - At the regraded Pile, run-on control ditches with a 1-foot, minimum, freeboard are estimated to have peak velocities ranging from approximately 2.3 fps to 8.7 fps (Table 5-1). The analysis for the run-on control ditches indicates the following:

- The run-on ditch west of the northern access road (Figure 4-10, Ditch A) will receive flows from approximately 13 acres, with estimated peak flow rate of 16.9 cfs at the point of concentration;
- The northern portion of the upslope run-on ditch (Figure 4-10, Ditch S) will receive flows from approximately 13 acres, with estimated peak flow rate of 17.5 cfs at the point of concentration;
- The southern portion of the upslope run-on ditch (Figure 4-10, Ditch T) will receive flows from approximately 4 acres, with estimated peak flow rate of 5 cfs at the point of concentration; and
- The berm along the transition onto the 3:1 slope will divert flows from the top of the Pile, with estimated peak flow rate of 6 cfs diverted to the north (Figure 4-10, Berm M), and 8 cfs diverted to the south (Figure 4-10, Berm L).

Runoff control ditches with a 1-foot, minimum, freeboard are estimated to have peak velocities varying from approximately 3 to 5 fps. The analysis for the runoff control ditches indicates the following:

- For the Upslope area:
    - The northern runoff ditch (Figure 4-10, Ditch P) will receive flows from approximately 10 acres, with estimated combined peak flow rate of 46 cfs at the point of concentration.

- The central runoff ditches (Figure 4-10, Ditches B and O) will receive flows from approximately 6 acres, with estimated combined peak flow rate of 8 cfs at the point of concentration.

- The southern runoff ditch (Figure 4-10, Ditch R) will receive flows from approximately 7 acres, with estimated combined peak flow rate of 8.6 cfs at the point of concentration.

- For the Pile:

  - The northern perimeter runoff ditch will receive flows from approximately 65 acres from the northern upslope and northern pile areas, with estimated combined peak flow rate of 76 cfs at the point of concentration (Figure 4-10, Ditch F).

  - The northern portion of the eastern perimeter runoff ditch will receive flows from approximately 15 acres, with estimated peak flow rate of 22 cfs at the point of concentration flowing south (Figure 4-10, Ditch H); the smaller reach flowing south from approximately 4 acres will have an estimated peak flow rate of 5.2 cfs (Figure 4-10, Ditch G).

  - The southern portion of the eastern perimeter runoff ditch will receive flows from approximately 25 acres, with estimated peak flow rate of 31 cfs at the point of concentration (Figure 4-10, Ditch I).

  - The southern perimeter runoff ditch will receive flows from approximately 16 acres, with estimated peak flow rate of 17.5 cfs at the point of concentration (Figure 4-10, Ditch K).

Borrow Area – In the borrow area, run-on and runoff control ditches with a 1-foot, minimum, freeboard are estimated to have peak velocities ranging from approximately 2.8 fps to 4.5 fps, and 3 to 7 fps, respectively, based on a preliminary anticipated borrow-area size of 45 acres. An additional drainage area of approximately 16 acres, located east of the south borrow area, is also available, if necessary. This area, if developed, will drain through the south borrow area and into the south sedimentation basin (Figure 4-11).

Considering the above-mentioned velocities, the ditches will be:

- Small vegetated v-ditches with depths varying from 1.5 to 2.5 feet (including a minimum freeboard of 1 foot), for peak velocities less than 5 fps;

- Small vegetated TRM-armored v-ditches with depths varying from 2 to 2.5 feet (including a minimum freeboard of 1 foot), for peak velocities between 5-10 fps;

- Larger riprap-armored v-ditches with depths varying from 2 to 3 feet (including a minimum freeboard of 1 foot), for peak velocities between 10-15 fps; and

- Larger ACM or grouted-riprap armored v-ditches with depths varying from 2.5 to 3.5 feet (including a minimum freeboard of 1 foot), for peak velocities greater than 15 fps.

5.6.2 Sedimentation Basin Hydraulic Analysis

Northeast Sedimentation Basin - The basin will receive runoff from an area approximately 70.1 acres in size (Appendix F Calculation Set 6) plus direct precipitation into the basin. The precipitation from a 2-year, 24-hour storm event (1.6 inches) on this drainage area, plus direct precipitation into the basin, is estimated to produce approximately 54,123 cubic feet (cf) of runoff volume. The volume of sediment suspended in the runoff, prior to the establishment of the vegetation is estimated to be 10 percent of the runoff (i.e., 5,412 cf) based on professional judgment. Based on the above-mentioned assumptions, the northeast basin is sized to contain a minimum of 60,000 cf (rounding up 54,123 + 5,412= 59,535 cf). The total area needed to accommodate this basin is estimated to be approximately 1.2 acres.

East Sedimentation Basin - The basin will receive runoff from an area approximately 40.5 acres in size (Appendix F Calculation Set 7) plus direct precipitation into the basin. The precipitation from a 2-year, 24-hour storm event (1.6 inches) on this drainage area, plus direct precipitation into the basin, is estimated to produce approximately 31,250 cf of runoff volume. The volume of sediment suspended in the runoff, prior to the establishment of the vegetation is estimated to be 10 percent of the runoff (i.e., 3,125 cf) based on professional judgment. Based on the above-mentioned assumptions, the northeast basin is sized to contain a minimum of 35,000 cf (rounding up 31,250 + 3,125= 34,375 cf). The total area needed to accommodate this basin is estimated to be approximately 1 acre.

Southeast Sedimentation/infiltration Basin - The basin will receive runoff from an area approximately 55 acres in size (Appendix F Calculation Set 7) plus direct precipitation into the basin. The precipitation from a 2-year, 24-hour storm event (1.6 inches) on this drainage area, plus direct precipitation into the basin, is estimated to produce approximately 41,930 cf of runoff volume. The volume of sediment suspended in the runoff, prior to the establishment of the vegetation is estimated to be 10 percent of the runoff (i.e., 4,193 cf) based on professional judgment. Based on the above-mentioned assumptions, the northeast basin is sized to contain a minimum of 47,000 cf (rounding up 41,930 + 4,193= 46,123 cf). The total area needed to accommodate this basin is estimated to be approximately 0.6 acre.

Southwest Sedimentation Basin - The basin will receive runoff from an area approximately 10.2 acres in size (Appendix F Calculation Set 7) plus direct precipitation into the basin. The precipitation from a 2-year, 24-hour storm event (1.6 inches) on this drainage area, plus direct precipitation into the basin, is estimated to produce approximately 41,930 cf of runoff volume. The volume of sediment suspended in the runoff, prior to the establishment of the vegetation is estimated to be 10 percent of the runoff (i.e., 4,193 cf) based on professional judgment. Based on the above-mentioned assumptions, the northeast basin is sized to contain a minimum of 47,000 cf (rounding up 41,930 + 4,193= 46,123 cf). The total area needed to accommodate this basin is estimated to be approximately 0.6 acre.

Western Pit Infiltration Basin - The basin will receive runoff from an area approximately 52 acres in size (Appendix F Calculation Set 8). The precipitation from a 2-year, 24-hour storm event (1.6 inches; 0.21 inch runoff) on this area, is estimated to produce approximately 39,600 cf of runoff volume. Based on the above-mentioned assumptions, the basin is sized to infiltrate a minimum of 40,000 cf/day (rounding up). The total area needed to accommodate this basin is estimated to be approximately 0.1 acre.

Dinwoody Formation Borrow Area Sedimentation Basins – Two sedimentation basins will be developed at the Dinwoody Formation borrow areas: one for the smaller area north of the road, which was developed as part of the Field Scale Pilot Study work in 2012, one for the larger area south of the road. The north sedimentation basin will receive runoff from an area approximately 3 acres in size (Appendix F Calculation Set 10) plus direct precipitation into the basin. The precipitation from a 2-year, 24-hour storm event (1.6 inches; 0.21 inch runoff) on this drainage area, plus direct precipitation into the basin, is estimated to produce approximately 4,600 cf of runoff volume. The volume of sediment suspended in the runoff, prior to the establishment of the vegetation is estimated to be 10 percent of the runoff (i.e., 460 cf) based on professional judgment. Based on the above-mentioned assumptions, the north basin is sized to contain a minimum of 5,100 cf (rounding up 4,600 + 460= 5,060 cf). The actual sedimentation basin constructed is in excess of this (8,100 cf). The total area needed to accommodate this basin is estimated to be approximately 0.1 acre. The south soil borrow area sedimentation basin will receive runoff from an area approximately 18 acres in size (Appendix F Calculation Set 10) plus direct precipitation into the basin. The precipitation from a 2-year, 24-hour storm event (1.6 inches; 0.21 inch runoff) on this drainage area, plus direct precipitation into the basin, is estimated to produce approximately 41,900 cf of runoff volume. A vegetation buffer, approximately 50-feet wide, will be maintained along an existing drainage channel through the south borrow area. Additionally, straw bale checks will be placed periodically in the area. Therefore, it is assumed that a portion of the sediment will be captured in these areas prior to reaching the sedimentation basin. Based on the above-mentioned assumptions, the northeast basin is sized to contain a minimum of 42,000 cf. The total area needed to accommodate this basin is estimated to be approximately 0.5 acre.

5.7 Erosion Analyses

An assessment of erosion was performed using the Universal Soil Loss Equation (USLE), with an independent check using the Revised USLE (RUSLE), to identify areas of the final cover which require additional conservation measures prior to establishment of the vegetation. The estimates have been developed to represent the mass of sediment delivered to the bottom of the modeled hill slope for conditions pre- and post-vegetation establishment (i.e., short-term and long-term), for various conservation practices. The post-established vegetation condition is conservatively evaluated in terms of on-site soil loss throughout the cover area, whereas, the pre-vegetation condition is evaluated in terms of delivery of eroded soil across the perimeter of the cover (i.e., at the toe of the slope). Calculation Set 9 in Appendix F details the erosion analysis.

The average annual soil loss calculation inputs include:

- A rainfall/runoff factor of 10;
- A soil erodibility factor of 0.24 for the placed cover soil and 0.35 for the surface material present prior to placement of the cover soil; and
- Slope length and steepness factors based on 1,000 ft and 33%, respectively.

The post-NTCRA conditions, assuming a vegetated surface cover of 60 percent, represent minimal surface erosion, which is estimated to be less than 2 tons/acre/year. This estimated maximum erosion rate is achieved by implementing conservation measures in steep areas including placement of appropriate erosion control measures along the steep slopes.

5.8 Estimated Material Quantities and Balance

As previously mentioned, the 3:1 design results in significantly more excavation than fill at the NTCRA area. Approximately 1.6 million cy of material will be excavated. Approximately 1.04 million cy of fill will be redistributed within the Pile, and approximately 38,000 cy of fill will be placed on the upslope area. The excess of approximately 527,000 cy of fill will be consolidated within the in-pit ODA to the west. Approximately 235,000 cy of cover soil will be required for the NTCRA, upslope area and west pit area covers. Approximately 70 cy of chert gravel will be required for the access roads and approximately 25,000 cy of chert gravel and cobbles will be required for the east toe foundation area.

6.0 REMOVAL ACTION IMPLEMENTATION

This section describes the general implementation of the NTCRA construction. Construction will follow the requirements established in this D&IP and any modifications detailed in ECOs. Simplot will advise the Agencies at least ten calendar days prior to beginning construction. Further detail regarding construction and CQA and CQC is presented in the Technical Specifications in Appendix E.

6.1 Health and Safety and Access Controls

6.1.1 Health and Safety Plans

The NTCRA construction and sampling activities will be conducted under the Health and Safety Plans (HASPs) for construction and sampling provided in Appendix G. The intention of the HASPs is to protect on-site personnel, local residents, and visitors from potential hazards associated with the construction and sampling activities. The HASPs were prepared in accordance with EPA's Standard Operating Safety Guide (PUB 9285.1-03, PB 92-963414, June 1992). In addition, pursuant to 40 CFR Part 300.150, the HASPs comply with all currently applicable Occupational Safety and Health Act (OSHA) requirements, standards and regulations found at 29 C.F.R. Part 1910, (Occupational Safety and Health Standards); Part 1926 (Construction Standards), including the General Industry Standards found in Part 1910; and the general duty requirements of section 5(a)(1)(29 U.S.C. 654 (a)(1); and other applicable safety laws and regulations.

The HASPs describe the following: general facility information, personnel affiliated with the NTCRA, levels of protection, personal protective equipment, personal hygiene, safe work practices, medical surveillance, air monitoring, decontamination, site work zones, contaminant control, emergency planning information, and record keeping guidelines.

Copies of the HASPs will be maintained in the project field office.

6.1.2 Access Controls

Access to the NTCRA area will be restricted. Vehicle access will be controlled by having visitors check in at the Conda Pump Station, and only individuals with permission to be in the area will be granted access. In addition, perimeter fencing will be installed around the construction area along the property boundary lines, as well as around the new seep collection basin, to keep wildlife, livestock, and unauthorized individuals safely away (Appendix L). All personnel accessing the site will be required to follow the HASPs.

6.2 Construction Sequence

It is estimated that the NTCRA will require two full construction seasons to complete. Weather will play a large part in the construction process and weather conditions could increase or decrease the required time necessary to complete the project. Site preparatory activities will begin in March/April.[14] The bulk of the construction activities will be performed between April and November 2013. At the end of the 2013 construction season, the site will be prepared for winter shutdown, the timing of which will be weather dependent. The second construction season will start as early as possible in May/June 2014 and continue until the work is complete. If delays are encountered, the schedule may extend into 2015.

Late winter/early spring work, while the ground surface is still frozen, will include preparatory activities such as:

- Equipment mobilization;
- clearing and grubbing;
- installation of sedimentation basins, temporary stormwater controls, and temporary erosion controls;
- push dozing fill into the southern pit and placement of fill upslope (to create a topsoil stockpiling);
- preparation of the toe area foundation; and
- construction of the access roads.

Work in 2013 will also include placement of fill along the perimeter of the Pile and excavation of excess material and consolidation with the in-pit ODA to the west. In addition, the south portion of the Dinwoody Formation borrow area will be developed in 2013 and Dinwoody material will be stockpiled in the upslope area. Winter shutdown in 2013 will include surcharging the critical areas as described in Section 4 and covering as much of the partially regraded slopes as possible with salvaged topsoil from the clearing and grubbing or with hydromulch to minimize erosion until cover soils are placed. The surcharged areas will remain uncovered to allow the infiltration of precipitation to expedite the settlement process. Figures 6-1 through 6-7 in Section 6.6 present further details regarding the phasing of construction.

[14] Per the February 8, 2013 Agency-approval of the Memorandum requesting commencement of preparatory and fill-placement activities for the Pedro Creek ODA NTCRA.

The second year of construction will include completion of the regrading activities and installation of the final cover. It is anticipated that, following settlement monitoring in critical areas, the cover system would be completed in 2014. A schedule is presented in Section 9.

6.3 Construction Equipment

It is anticipated that the following (or equivalent) construction machinery will be used:

- Three Cat 785 Haul Trucks;
- One Cat 993 Loader;
- Five Cat Dozers (one D-6, one D-8, two D-10s and one D-11);
- One Cat 16G Motor Grader;
- Two or three Cat 637G Wheeled-Tractor Scrapers;
- One Cat Excavator;
- Two or three Cat 740 Articulated Trucks; and
- One Cat 740 Articulated Water Truck.

In addition, various other support machinery (i.e., light trucks, preventative maintenance equipment, haul road maintenance machinery, etc.), will be present on-site.

6.4 Mobilization

Mobilization work will include the process of assembling all earthwork equipment and other equipment necessary for the work on-site. The intent is to mobilize most, if not all, of the heavy equipment (e.g., haul trucks, loader, scrapers, etc.) before commencement of the freeze/thaw cycle in the spring of 2013.

It is envisioned that the main project office will be established at the Conda Pump Station, with an additional office trailer situated near the area of construction. Equipment and materials will be staged partially at the Pump Station and near the construction area, as necessary. Temporary water supply and sanitation facilities will also be installed near the area of construction.

6.5 Site Preparation Activities

Site preparation activities will include construction of access roads, clearing and grubbing of construction areas, the construction of the sedimentation basins, and installation of all temporary stormwater and erosion facilities.

6.5.1 Best Management Practices

Best Management Practices (BMPs) will be utilized for stormwater and erosion control, dust generation control, and waste management. These BMPs will be implemented prior to clearing and grubbing and during any regrading of the Pile or placement of fill. Such BMPs will consist of temporary run-on and runoff control ditches, sedimentation basins, anchored straw bales, straw wattles, silt fences, and hydromulch. Dust suppression will be performed as necessary using water trucks, and possibly additives such as magnesium chloride on haul roads. The Stormwater Pollution Prevention Plan (SWPPP) describes the BMPs, including those aforementioned, to reduce potential pollutants in stormwater discharges from the site in accordance with Best Conventional Technology and Best Available Technology as mandated by the Federal Clean Water Act. The SWPPP is included as Appendix H to this document.

Construction related waste will be staged and stored in the vicinity of the NTCRA area or at Simplot's nearby pump station facilities. Construction-related waste will be stored in accordance with IDAPA Solid Waste Management Rules. In addition, the pump station will be used to handle and store petroleum products for the NTCRA in accordance with current operating procedures.

6.5.2 Clearing and Grubbing and Foundation Stabilization

It is anticipated that an area of approximately 17 acres will be cleared to accommodate the construction activities east of the Pile (Figure 4-6). In collaboration with the USFWS and the BLM, Simplot will perform an inspection of the areas to be cleared and grubbed, as well as areas approximately 100 feet beyond. The nesting survey will be implemented before and during the clearing and grubbing to identify and mitigate for inactive and active bird nests (Appendix K). The objective of the nesting survey is to avoid impacting nesting birds during the clearing and grubbing activities by:

- Locating nests prior to commencement of the clearing and grubbing;
- Removing nests prior to commencement of nesting; and/or
- Providing a distance between construction activities and active nests if active birds nesting are identified.

The nesting survey will be done in compliance with the applicable ARAR's (i.e. Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act).

Some of the slash and tree trunks will be saved for later use in the reclamation process. Topsoil will be stripped from these areas and stockpiled for use as an interim winter cover and potential reclamation use as described in Section 6.9. Silt fencing and other BMPs will be installed during the clearing and grubbing process.

Stabilization of foundation in the areas of fill will include excavation of the surface and near-surface materials that are inappropriate as foundation materials (e.g. top soil, moist clayey material). The excavated area will replaced with coarse, competent rock to provide a stable foundation prior to placing any regraded fill. The coarse rock will provide a conduit to convey any shallow groundwater to the seepage collection basin at the northeast corner of the regraded Pile. This water will be kept separate from the runoff collection basins.

6.5.3 Stormwater Control Structures

Run-on and runoff control ditches will be installed or modified, as necessary, before placement of any fill or regrading of the overburden Pile.

The sedimentation basins will be constructed prior to placement of regrading fill. This will require excavation of approximately 60,000 cy of native soils with a total volume of compacted fill of approximately 16,000 cy. Silt fences will be installed along the downgradient sides of the basin construction areas.

6.6 Major Regrading of Pile

Regrading of the Pile will occur predominantly by pushing material from the top of the Pile over the edge using dozers. Figures 6-1 through 6-7 summarize the sequencing of the regrading process.

Phase 1 - The major regrading in 2013 will begin with the process of push dozing fill into the southern pit.

Phase 2 – During second phase, the majority of the top area will be regraded as the fill placement in the southern pit progresses northward. This will allow for the construction of the temporary haul road to central area of the Pile where excess material (i.e., material which cannot be consolidated within the regraded Pile) will be removed and taken to the western pit for consolidation with the in-pit ODA. The haul road will be extend eastward as the cut and fill placement progresses.

Phase 3 – The process of placing fill in the north area will begin during third phase.

Phase 4 – The fourth phase will involve completing fill placement in the north area and fine-tuning of the final Pile grade.

6.7 Surcharging of Critical Fill Areas

As previously mentioned, a surcharge of overburden material will be temporarily placed in critical areas to expedite settlement. The regrade work performed in 2013 will be protected as necessary during the 2013-2014 winter shutdown period. This will include verifying that all drainage from work areas is contained within runoff ditches draining into the sedimentation basins. Silt fencing will surround all work areas and will remain in place during the 2013-2014 winter shutdown period.

6.8 Borrow Area Development

With the northern Dinwoody Formation borrow area already having been partially developed as part of the Field Scale Pilot Study (FSPS) construction, only the southern borrow area will need to be developed in 2013/2014. It is anticipated that an area of approximately 20-22 acres will be cleared to develop the borrow area (Figure 4-9). This will require installation of the run-on and runoff control ditches and construction of the sedimentation basin prior to excavation of the borrow area. Silt fencing will be installed along the down-gradient areas of the borrow areas.

A portion of the upper 6 inches of topsoil will be stripped from the borrow areas and pushed into a berm along the perimeter of the borrow area for later use in reclamation. Straw bales and/or silt fence will be placed around these stockpiles. The rest of the topsoil, and weathered Dinwoody clayey soils which underlie the colluvium, will be screened for selenium concentrations by collecting grab samples from grids 100 feet wide by 100 feet long, prior to excavating down to the gravel-cobble zone. Material with selenium concentration less than 5 mg/kg will be excavated for transport to the NTCRA area. That material will be either stockpiled in the northern portion of the upslope area for later use as cover material or directly applied as cover material. Prior to any topsoil stockpiles being placed on the northern portion of the Upslope Regrade area, an 18-inch layer of Dinwoody Formation material will be spread over the area to serve as a barrier between the stockpiles and the regarded material below. In-situ Dinwoody Formation borrow materials will be sampled as described in Appendix J.

Following removal of all borrow soils, grading will be performed as necessary to provide a relatively smooth, uniform surface eliminated potential areas which could allow runoff to pool.

6.9 Salvaging of Stripped Topsoil

The Dinwoody Formation derived topsoil excavated from the cleared and grubbed areas east of the NTCRA Pile will be sampled and tested for selenium to evaluate whether the material can be used in the soil cover. As previously mentioned, materials that have total selenium concentrations between 5.0 and 13.0 mg/kg can be blended with materials that have concentrations below 5.0 mg/kg (as described below). The goal is to adequately identify any topsoil material that has selenium concentrations above 5.0 mg/kg and keep from stockpiling that material at the northern end of the Upslope Area.

Grab samples from the topsoil to be excavated east of the Pile will be collected from a 100 by 100 foot grid. These samples will be used to determine areas where the Dinwoody Formation derived topsoil is less than 5 mg/kg of selenium, so that the material can be stockpiled in the northern portion of the upslope area. The stockpiles of salvaged topsoil will be kept separately from any Dinwoody Formation stockpiles. Each of the generated stockpiles of salvaged topsoil will be sampled again, to determine whether they need blending with the Dinwoody Formation material from the borrow area prior to placement. If any stockpile is found to have a selenium concentration greater than 13 mg/kg, it will be removed and incorporated with the overburden material. Additional details regarding sampling are included in the Sampling and Analysis Plan (SAP) (Appendix J).

6.10 Cover Soil Material Blending

Following the confirmation sampling of the stockpiles, piles with selenium concentrations between 5.0 mg/kg and 13.0 mg/kg will be blended with other piles. Piles to be included in the blending process will be selected based on selenium concentration levels encountered, with the final objective of having a blend with average selenium concentrations less than or equal to 5 mg/kg.

Piles will be blended by first leveling the Dinwoody Formation material using a bulldozer or loader. This equipment will also be used to spread the topsoil material onto the leveled Dinwoody material. Blending will be performed using the dozer (blade and rippers), a grader, or disk harrow. A second Dinwoody pile will be added to the previously mixed material for further blending. The final mixed material will be stockpiled for confirmation sampling that average selenium concentrations less than or equal to 5 mg/kg. Further blending will continue until average selenium concentrations are less than or equal to 5 mg/kg. Further blending will occur when the blended stockpile material is ultimately used to construct the cover.

6.11 Cover Placement

Cover soil will be placed in a single lift using GPS-guided equipment to reduce the potential for contamination of the clean soils. It is anticipated that the soils will be delivered to the site from the borrow areas and either placed at the top or bottom of slope areas. Cover soils will then be spread by pushing the material up on the side slopes, and spreading with low-ground-pressure equipment. It is anticipated that some of the regraded Pile will be covered in 2013 (except any surcharged areas). The remainder of the cover soil placement will occur in 2014.

Upper growth medium soils will not be over compacted, and if surfaces appear to be over compacted surface roughening may be required prior to seeding. The thickness of cover soils will be checked periodically to verify that the required soil thicknesses are achieved.

6.12 Revegetation

Seeding of the final covered areas will occur in the fall of 2014, prior to snow cover. Fall planting allows for seed germination and seedling growth to begin the following spring, when temperature and moisture conditions are favorable for the initiation of plant growth. The seed mix proposed for use includes grasses; many of which have been identified in the surrounding native (i.e., undisturbed) areas, and consists of the following species:

- Mountain brome (*Bromus marginatus*);
- Slender wheatgrass (*Elymus trachycaulus*);
- Western wheatgrass (*Pascopyrum smithii*);
- Pubescent wheatgrass (*Agropyron intermedium*);
- Big bluegrass (*Poa secunda*);
- Sheep fescue (*Festuca ovina*);
- Orchard grass (*Dactylis glomerata*);
- Prairie junegrass (*Koeleria macrantha*); and
- Tufted hairgrass (*Deschampsia cespitosa*).

These species have shallow rooting zones and are non-selenium accumulators. A certified seed vendor will be used, and the species and poundage of pure live seed (PLS) to be purchased will be based on rates identified on Table 4-2.

The seed mix may be applied using both drill-seeding and/or broadcast seeding techniques. Drill seeding and broadcast seeding will be performed first, followed by hydromulching. The hydromulch will include a mulch and tackifier, and will be applied primarily to the steep areas to reduce erosion during initial vegetation establishment. The seeding will be performed in two steps. The first step will include an application of the seed mix and any necessary fertilizer, to improve seed contact with soil. The seed mix will be uniformly drill-seeded and/or broadcasted on the soil surface at a rate of 27 lbs/acre. The second step will include the mulch with tackifier application.

Borrow areas will be graded smooth following excavations and approximately 6 inches of topsoil and colluvium will be placed over the regraded surface. The 2:1 excavation slopes will be flattened to 3:1 and will be seeded and hydromulched with tackifier for erosion control in the same manner as previously described.

6.13 Monitoring Well Installation

Simplot will install two sets of nested groundwater monitoring wells, each consisting of two well casings in one borehole, downgradient of the NTCRA area and near the property boundary (Figure 6-8). One of the nested wells will be completed in the shallow alluvium/colluvium and the other nested well will be completed underlying Dinwoody Formation. These wells will aid Simplot in monitoring groundwater conditions following the completion of the NTCRA. Appendix M presents the installation and construction details for the new monitoring wells. These wells will be installed in the fall of 2013.

6.14 Reclamation

Access roads without future benefit (i.e., those utilized solely for construction purposes), borrow areas, and other areas developed to support construction needs (e.g., permanent road fills, temporary fencing) will be reclaimed. Reclamation may include regrading, shaping, application of amendments and topsoil, and reseeding with the approved seed mixture. Reclamation activities will be completed in compliance with the applicable ARAR's (i.e. Surface Mining Control and Reclamation Act, Idaho Surface Mining Act, Federal Land Policy and Management Act, and Rules Governing Exploration, Surface Mining, and Closure of Cyanidation Facilities).

6.15 Demobilization

Depending on equipment needs elsewhere, demobilization of the equipment may or may not take place in 2013. The work area will then be prepared for the 2013/2014 winter shutdown as discussed above.

Following completion of construction in 2014, all equipment will be removed from the site and cleanup of construction debris will be performed. The site will be left in a clean and tidy condition at the end of final demobilization.

7.0 CONSTRUCTION QUALITY CONTROL AND ASSURANCE

Construction quality control and assurance will be performed to assure that the project is constructed in conformance with approved plans and specifications. The information and guidelines provided in this section are intended to provide verification that the implementation of the NTCRA is performed in accordance with the approved design plans and specifications and any approved field and design changes issued during construction. This section includes the guidelines, information, and forms required to provide for documentation of CQC and CQA to achieve a successful project.

7.1 Personnel Roles and Responsibilities

The construction will be performed by Simplot. As the constructor, Simplot will be responsible for the CQC and for complying with the construction documents, drawings, and specifications. Simplot will assign a Project Manager who will have the ultimate responsibility for the construction and oversight of the NTCRA as well as for conformance with the final design requirements. The Project Manager will be supported by a team of individuals (i.e., construction manager, quality control staff, and contractors) who will help implement the construction and CQC. The CQA inspection and testing will be performed by Formation Environmental, to certify that the NTCRA is being constructed in accordance with the approved plans, specifications, and any approved changes. Figure 7-1 identifies the individuals responsible for the management of the project, design, construction, CQC, CQA, and Agency oversight. The duties and responsibilities for these roles are described below.

Project Management – Simplot's Project Manager, with support from Formation Environmental, is responsible for overall management and construction of the NTCRA and for meeting the project schedule. Simplot's Project Manager's responsibilities include budgeting, scheduling, personnel management and management of various subcontractors. Formation Environmental will support Simplot with the regulatory requirements of the NTCRA. Simplot's and Formation Environmental's Project Managers will serve as the primary contacts with the Agencies.

Project Engineer - The Project Engineer will be registered as a Professional Engineer in the State of Idaho. The Project Engineer is responsible for the overall design of the NTCRA. The Project Engineer will be independent of the construction contractor(s), but directly accountable for the successful completion of the NTCRA. The Project Engineer will also supervise the preparation of the construction certification report. The duties and responsibilities of the Project Engineer include but are not limited to the following:

- Review and approve construction drawings and specifications.

- Support the CQA Manager in interpreting the meaning and intent of the construction drawings and specifications.
- Support the CQA Manager in determining that the construction is progressing as designed.
- Perform site inspections.
- Review and evaluate change orders proposed by Simplot or the CQA team.
- Review and certify the final "as-built" drawings indicating the features constructed and the existing location of all features.
- Certify the construction completion report

Construction Manager - The Construction Manager is responsible for ensuring that the construction team follows the final design drawings and specifications. The Construction Manager will have overall responsibility for implementing the CQC program, including providing daily construction reports documenting testing and construction activities. The daily reports will be provided to the Project Engineer and the CQA Manager.

CQC Manager - The CQC Manager is responsible for overseeing all CQC testing and supporting the Construction Manager. The CQC Manager will ensure that the equipment operators are properly following the plans and specifications. The duties and responsibilities of the CQC Manager include but are not limited to the following:

- Perform and/or oversee all CQC activities by CQC staff (including surveyors).
- Ensure that all ordered materials meet specifications and are installed per the manufacturers recommendations.
- Coordinate CQC activities with the Construction Manager.
- Maintain copies of all CQC testing results and certifications.
- Prepare and distribute daily construction reports to the Construction Manager and the CQA Manager.

CQA Manager - The CQA Manager will report directly to the Project Engineer. The CQA Manager will ensure that the NTCRA is properly constructed in accordance with all plans and specifications. The duties and responsibilities of the CQA Manager include but are not limited to the following:

- Perform and/or oversee all CQA activities by CQA staff (including surveyors).
- Ensure that all installed equipment and materials have passed the required tests.
- Coordinate CQA activities with the Construction Manager and the Project Engineer.
- Maintain copies of all CQA and CQC testing results and certifications.
- Prepare and distribute weekly construction reports to the Project Engineer.

Regulatory Oversight – The Agencies will be responsible for providing oversight of the NTCRA implementation activities. EPA, IDEQ, and BLM, or their designated representatives, will make periodic inspections of the construction activities to assure that the NTCRA is proceeding in substantial compliance with the approved Final Designs, ECOs, and the approved final D&IP. Respondent shall provide full and complete access to EPA, IDEQ, and BLM or their designated representatives during periodic inspections, and as much as practicable, accompany them during these inspections. Any deficiencies in construction or construction not in substantial compliance with the approved Final Designs, ECOs, and the approved final Implementation Plan will be noted during periodic inspections.

7.2 Construction Quality Control

The CQC will be an ongoing process of controlling and measuring material and earthwork characteristics to provide verification that the work is performed in accordance with the approved plans, specifications, and field changes. The CQC will be performed by qualified members of Simplot's construction team (Figure 7-1) and recorded in daily logs or on field forms.

7.2.1 Materials Sampling and Materials Installation

Material quality control will consist of inspecting materials (e.g., piping, TRM, seed mix, etc.) and equipment (e.g., nuclear instrument, etc.) to ensure that they meet requirements.

7.2.2 Earthwork

Earthwork quality control will consist of grain size analyses (GSAs) of the Dinwoody Formation and Rex Chert borrow material and overburden materials. In addition, testing of the soil cover, fill area, and sedimentation basin embankment will include moisture content and field compaction testing. Samples will be collected for GSAs from native soils to be used as compacted fill in the sedimentation basin embankment.

Nuclear instrument testing of the soil cover, fill area, and sedimentation basin embankment will be performed in accordance with ASTM D2922 to confirm in-place compacted density and moisture of fill materials as compared with ASTM D698 (Standard Proctor Compaction Curve). The frequency of compaction testing for compacted fill in the sedimentation basin embankment will be one test per 500 cy, or one test per lift, whichever is more frequent. Any area of embankment fill that fails to meet the compaction acceptance criteria will be reworked until a subsequent test shows acceptable results. Such re-working may require adding water to the materials if they are more than 3 percent dry of the optimum moisture content or scarifying and air drying the materials if they are more than 3 percent wet of the optimum moisture content. The embankment areas of failed compaction tests will then be re-compacted and retested as necessary until the test indicates compliance with specifications.

The frequency of compaction testing for the soil cover will be one test per 10,000 cy, as detailed in Attachment 1. Any area of the cover that fails to meet the compaction acceptance criteria will be re-tested for confirmation and reworked until a subsequent test shows acceptable results.

Quality control evaluation of grading fills west of the pile will be according to the Method Specification developed following the above-mentioned Test-Fill Study.

Quality Control of geometric limits (e.g., grade and contour) will be through use of wooden grade stakes and GPS-guided equipment. The placement of stakes will be by a qualified surveyor using standard surveying techniques. Daily survey will be required during construction to verify that design lines and grades are achieved within acceptable tolerances.

7.2.3 Surveying

Survey control will be established prior to construction using the existing coordinate system and topography. Day to day surveys will be performed by a Simplot surveyor. A final survey will be performed at both the regraded overburden pile and borrow areas to document as-constructed conditions. The final survey will be performed to General-Order surveying accuracy by a surveyor registered in Idaho or by a qualified surveyor under the supervision of an Idaho-registered surveyor. The final as-built survey will be stamped by an Idaho-registered surveyor.

7.3 Construction Quality Assurance

Independent CQA inspection and testing will be performed by Formation Environmental to verify the adequacy and effectiveness of the construction. The CQA will include construction inspection and management, as necessary; periodic confirmation sampling and testing of earthwork and materials (e.g., composted manure and elemental sulfur); review of material submittals, construction reporting and communications; and documentation of all CQA activities. Should CQA and CQC test results vary significantly, additional testing may be requested by the Project Engineer to validate the results.

7.3.1 Construction Inspection and Management

Construction inspection will include observation of construction at the NTCRA Pile and borrow areas. Minor questions from the constructors will be answered by Formation's on-site CQA manager. The Project Engineer will be contacted, as necessary, for clarification of design intent or possible design change needs. It is anticipated that the Project Engineer will visit the site periodically during construction. Necessary design changes identified by the lead engineer during construction will be documented and submitted to the Agencies for review.

The CQA manager will coordinate all third-party site surveying needs and will coordinate CQA testing. A qualified individual will periodically sample earthwork materials, perform CQA tests for GSA and field compaction, and verify cover thicknesses.[15] It is estimated that the CQA tests for earthwork GSA, soil cover compaction, and embankment-fill compaction will be performed at a rate of approximately 10 percent of the CQC tests. Quality assurance surveying may be performed, as necessary, to verify the accuracy of the surveying.

7.3.2 Verification Sampling and Testing of Earthwork and Materials

Submittals for materials (e.g., pipe, silt fence, seed, mulch, geotextiles, etc.) and testing results will be reviewed by the CQA Manager and the Project Engineer for compliance with specifications. If alternative materials, other than the specified material, do not meet the specifications, a revised submittal will be obtained to provide conformance with specifications.

7.3.3 Review of Material Submittals and QC Data

Simplot will obtain submittals for materials (e.g., pipe, silt fence, seed, mulch, geotextiles, etc.) used to construct the NTCRA. Such submittal information will be reviewed by the lead engineer for compliance with specifications. If alternative materials, other than the specified material, do not meet the specifications, a revised submittal will be obtained to provide conformance with specifications.

7.4 Engineering Change Orders

Changes to the approved final design identified as necessary will be documented with ECOs and submitted to EPA, IDEQ, and BLM (when the ECO is on lands administered by the BLM) for review, prior to construction. If the Agencies determine that the ECO does not constitute a significant design change, comments (if any) will be provided to Simplot. Simplot will incorporate the Agencies' comments, issue a final ECO, and implement the change. If the Agencies determine that the ECO constitutes a significant design change, comments on the draft ECO may be submitted to Simplot. Simplot will address and/or incorporate the comments and will submit a final ECO to the Agencies for signature prior to implementing the changes

[15] Cover thicknesses will be verified through manual measurements and evaluating GPS data from construction equipment.

noted in the ECO. Simplot will work with the Agency representative(s) to collaboratively resolve any substantive design changes identified as necessary during the construction process.

7.5 Construction Inspections and Reporting

7.5.1 Periodic Inspections

Throughout the construction process, various inspections will be conducted and reports will be submitted.

Periodic inspections of construction activities will be performed by the Project Engineer as well as by Agency representatives. During inspections, Simplot will provide safe, unrestricted access to the NTCRA site and escort Agency representatives, if possible. Notes will be taken on construction deficiencies or noncompliance with approved Final Designs, any ECOs, and the Final D&IP. The Agencies will notify Simplot of any deficiencies or discrepancies. If any are identified, Simplot will take necessary actions to bring the construction into compliance or initiate a dispute resolution.

7.5.2 Construction Reporting and Communications

During the course of construction, Simplot will prepare weekly and monthly reports, as well as an interim construction summary report.

Weekly Reports – The weekly reports will provide a summary of construction progress, construction issues, scheduling issues, accidents/health and safety issues, resolution of any issues, and a summary of weather conditions during the reporting period. The weekly reports will be submitted to EPA, IDEQ, and BLM in electronic format within three (3) working, days following the conclusion of each period (reporting periods will end every Sunday).

Monthly Reports – The monthly reports will include a summary of all work performed during that month, including construction, well drilling/installation, water level data, sampling and analysis, updated schedule, and issues/resolutions. The monthly reports will include a summary of deliverables (including any changes to deliverables or their schedules), and work planned for the subsequent month. The monthly reports will also include a copy of the weekly reports as attachments. The monthly reports will be submitted electronically and by hard copy to EPA, IDEQ, and BLM within ten working days following the end of the calendar month.

Construction Summary Report – An interim Construction Summary Report (CSR) will be prepared at the end of the 2013 construction season. The report will provide a record of activities conducted during the 2013 construction season, document field decisions made, and describe the basis for considering the work as completed. The report will also provide construction QA/QC records, copies of drawings generated to specify construction activities, an interim as-built survey map, project photographic log, and documentation of ECOs.

8.0 POST CONSTRUCTION ACTIVITIES AND REPORTING

This section describes the post-construction inspections, monitoring, maintenance and reporting.

8.1 Pre-Final and Final Construction Inspections

When Simplot makes a preliminary determination that construction is complete, Simplot will notify the Agencies for the purpose of conducting a pre-final inspection. The pre-final inspection will consist of a walk-through inspection of the facilities constructed as part of the NTCRA. The purpose of the inspection is to determine whether the project is complete and consistent with the approved Final Designs, the Final D&IP, and any ECOs. Any outstanding construction items discovered during the inspection shall be identified and noted. Simplot will prepare a pre-final inspection report that will outline the outstanding construction items, actions required to resolve items, and estimated completion date for these items.

Within five working days after completion of any outstanding work identified in the pre-final inspection report, Simplot will notify the Agencies for the purpose of setting a final inspection date. If the Agencies determine that a final inspection is necessary, the final inspection will consist of a walk-through inspection of the facilities constructed as part of the NTCRA. The pre-final inspection report will be used as a checklist with the final inspection focusing on the outstanding construction items identified in the pre-final inspection. A final inspection report will be prepared by the Simplot confirming that outstanding items have been addressed.

8.2 Construction Completion Report

A Construction Completion Report (CCR) will be prepared following the completion of the final inspection. The report will provide a record of activities conducted during the implementation of the NTCRA relative to the design, document field decisions made, and describe the basis for considering the work as completed. The report will also provide construction QA/QC records, copies of drawings generated to specify construction activities, a final survey map, project photographic log, documentation of design changes during construction and final as-built drawings.

The final CCR will include information presented in the interim CSR as well as all construction progress descriptions, documentation, and data generated during the 2013-2014 construction seasons. Final as-constructed drawings will be prepared based on a final survey. Certification that the construction has been performed in accordance with approved plans and specifications, and approved field and design changes during construction, will be made in the final CCR the

Project Engineer. It is anticipated that the final CCR will be completed within 4 months of construction completion.

8.3 Post Removal Site Control Plan

Post-removal site control (PRSC) activities at the Pedro Creek ODA NTCRA will continue for at least five years following the construction completion. Some maintenance may be required if unanticipated conditions develop that may reduce remedy performance. Areas of erosion will be restored with approved soil and reseeded. Debris will be removed from run-on and runoff control structures, and repairs will also be performed, if necessary. Areas of pooling, or settled areas which may inhibit proper drainage, will be regraded to reduce pooling and maintain free drainage.

A PRSC Plan will be developed following completion of all NTCRA construction. This will provide all necessary operations and maintenance (O&M) requirements including inspection schedules and procedures, performance monitoring criteria and requirements, regular maintenance activities anticipated and emergency procedures, as necessary. The final as-constructed drawings of the NTCRA will be appended to the PRSC Plan as will any inspection and monitoring forms required. The PRSC Plan will be submitted under a separate cover, per the requirements of the SA/CO and its accompanying SOW.

9.0 PROJECT SCHEDULE

Table 9-1 presents a general schedule of events based upon the October 11, 2012 SA/CO (IDEQ 2012). A summary of the construction schedule and work products that will be submitted are included in the schedule.

10.0 REFERENCES CITED

Bentley Systems, Inc. 2007. Haestad Methods Flowmaster® Hydraulic Analysis Software.

BLM and USFS. 2002. Final Supplemental Environmental Impact Statement, Smoky Canyon Mine Panels B and C. Prepared by JBR Environmental Consultants, Inc., Sandy, UT. BLM, Pocatello Field Office, Pocatello, ID. USFS, Caribou-Targhee National Forest. April.

Formation Environmental, LLC. 2010. Conda/Woodall Mountain Mine Draft Engineering Evaluation/Cost Analysis, Idaho prepared for J.R. Simplot Company, May 2010.

IDEQ 2012 – Settlement Agreement/Consent Order

Idaho Department of Environmental Quality (IDEQ), U.S. Environmental Protection Agency (EPA), and U.S. Bureau of Land Management (BLM). 2011. Action Memorandum – Request for a Non-Time Critical Removal Action to be conducted on the Pedro Creek Overburden Disposal Area of the former Conda/Woodall Mountain Phosphate Mine Site, Caribou County, Idaho. July.

JBR Environmental Consultants, Inc. 2011a. Wetlands and Waters of the United States Survey Delineation Report Conda/Woodall Mountain Mine Pedro Creek Removal Action, Caribou County, Idaho. Prepared for J.R. Simplot Company. November 2011.

JBR Environmental Consultants, Inc. 2011b. Cultural Resources Survey for J.R. Simplot Company's Conda/Woodall Mountain Mine Pedro Creek Overburden Disposal Area Removal Action. Prepared for J.R. Simplot Company. November 2011.

Mackowiak, C.L. and Amacher, M.C. 2005. Plant Uptake of Selenium from Soils Overlying Unmined Sedimentary Rock Units and Potential Use of These Soils as Capping Materials for Revegetated Waste Rock Dumps.

Makdisi and Seed, 1978. A Simplified Procedure for Estimating Earthquake-Induced Deformations in Dams and Embankments.

McCarthy, D.F., 1982. Essentials of Soil Mechanics and Foundations – Basic Geotechnics. Second Edition. Reston Publishing Company, Reston, VA. 632 pp.

National Cooperative Highway Research Program (NCHRP), 2008. Seismic Analysis and Design of Retaining Walls, Buried Structures, Slopes and Embankments, Report 611.

National Historic Preservation Act of 1966

National Oceanic and Atmospheric Administration (NOAA), 1973. Precipitation Frequency Atlas of the Western United States, NOAA Atlas II Idaho, U.S. Weather Service.

National Resource Conservation Service (NRCS), 2009. Hydraulic Design Manual, U.S. Department of Agriculture.

NRCS. 2012. Win TR-55 Watershed Hydrology Program.

National Environmental Policy Act of 1969

NewFields. 2008a. Final Conda/Woodall Mountain Mine RI/FS Work Plan. Prepared for the J.R. Simplot Company. December.

NewFields. 2008b. Final Conda/Woodall Mountain Mine RI/FS Sampling and Analysis Plan. Prepared for the J.R. Simplot Company. December.

RocScience, 2009. Slide 5.0 - 2D Limit Equilibrium Slope Stability Analysis Software, Toronto, Ontario.

Uniform Building Code. 1991. Seismic Zone Map of Idaho and Contiguous United States. University of Idaho Seismic Stations. 1991.

U.S. Army Corps of Engineers (USACE). 1987. Corps of Engineers Wetlands Delineation Manual Technical Report Y-87-1, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station, Vicksberg, MS.

USACE. 1998. Engineering and Design of Runoff from Snowmelt.

United States Bureau of Reclamation Design of Small Dams. 1987. A Water Resources Technical Publication

USFS and BLM. 2007. Smoky Canyon Mine Panels F & G, Final Environmental Impact Statement. Prepared by JBR Environmental Consultants, Inc., Sandy, UT. Caribou-Targhee National Forest and BLM Idaho State Office. October.

USGS. 2002. Peak Acceleration with 10% Probability of Exceedance in 50 years USGS Map. October. Accessed September 2012. http://earthquake.usgs.gov/hazards/products/conterminous/2002/maps/wus/pga.wus.10pc50.pdf

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