5 PLAN OF OPERATIONS

This proposed MRP is designed to implement Itafos' objectives to maximize the recovery of the economic phosphate resource while minimizing impacts to the environment. The factors that influence the objective to maximize the recovery of the phosphate resource include the economic pit design, ore quality/cutoff grades, and the safe highwall and footwall slope angles. The key resources that could be impacted include groundwater, surface water, wetland, aesthetics, air quality, cultural resources, or wildlife. Final reclamation objectives are to ensure a return to multiple uses of the public lands, protect natural resources, and safeguard continued productive use the lands. These conditions and factors were all considered when determining the ultimate design and reclamation of the open pits, OSA, mine facilities, and the mining sequence.

Overburden mined from the Project will be placed directly as backfill, stored on temporary OSAs for use as backfill later, or stored in a permanent OSA. Most of the overburden mined will be transported directly from the active phase of mining to backfill the historical MCM open pits or into previously mined portions of H1 and NDR.

5.1 Mining Sequence

Itafos has considered several approaches to sequencing the mining of the Project. H1 and NDR could be mined consecutively or simultaneously with some overlap. Itafos proposes to mine H1 first with some overlap as mining transitions from H1 to NDR. Mining phases and overburden handling will be discussed in the following sections.

Mining sequences for H1 and NDR are outlined in Table 5-1 and Table 5-2 below.

Table 5-1. Husky 1 Open Pit Mine Sequence

Phase	Production Years
1	1 through 3
2	2 through 4
3	3 through 5
4	4 through 6
5	5 through 7
6	6 through 8
7	7 through 9
8	8 through 10
9	9 through 11

Table 5-2. North Dry Ridge Open Pit Mine Sequence

Phase	Production Years
10	10 through 12
11	11 through 13
12	12 through 13

Pit designs were completed for both H1 and NDR deposits using the pit shells selected from the pit optimization and geotechnical assumptions.

5.1.1 Preliminary Design

Mining both H1 and NDR assumes using the MCM pits to receive the overburden from the first phases of mining. It is estimated that approximately 11.0 million loose cubic yards (lcy) of NDR overburden will be placed in MCM north pit, and approximately 13.1 million lcy of H1 overburden will be placed in MCM south pit. The remaining overburden will go into the H1 and NDR pits as backfill. Material that cannot be permanently placed (i.e., within the MCM pits, previously mined H1 or NDR pits, or the Permanent OSA) will be temporarily overstacked in the pits, on internal OSAs, or placed in the external temporary OSA. This material will be re-handled for permanent placement as space is available but no later than during final reclamation.

Itafos proposes that the Off-Lease Area north of the H1 Lease be joined to the H1 Lease through a lease modification, which would allow Itafos to extract the Off-Lease Area phosphate resources. Notable to this Off-Lease Area is that an active slurry pipeline currently traverses the area; however, an agreement is in place to relocate the pipeline.

The following considerations were used in the preliminary design of the Project:

- Before mining, GM will be salvaged. GM is discussed in Section 4.1.10, Section 5.5.8, and Section 5.6.9.
- Individual pit and phase designs have been developed to maintain access for equipment, personnel, and supplies as well as facilitate stormwater control.
- Mining sequencing supports production requirements and provides for maximum practical concurrent reclamation.
- Mining and backfill should be scheduled such that reclamation will minimize visual impact as much as practical.

Table 5-3 and Table 5-4 below summarize the backfill capacity and schedule for H1. Table 5-5 and Table 5-6 below summarize the backfill capacity and schedule for NDR.

Table 5-3. Husky 1 Backfill Capacity

Backfill Destination	Capacity (lcy)
SMCM - South (SMCM-S)	1,959,967
SMCM - North (SMCM-N)	9,135,526
H1 North Pit (H1-N)	21,162,134
(Permanent) H1 Ex-Pit (H1-X)	5,128,042
H1 Long Pit (H1-L)	13,648,895
H1 East Pit (H1-E)	16,352,069
H1 South Pit (H1-S)	20,506,704
Total	**87,893,337**

Note:
yd^3 = cubic yard

Table 5-4. Husky 1 Backfill Schedule by Phase

Backfill Schedule		Backfill Destination (lcy)							Total
Phase	Backfill (lcy)	SMCM-S	SMCM-N	H1-N	H1-X	H1-L	H1-E	H1-S	
1	10,910,577	1,959,967	8,950,610						10,910,577
2	10,673,557		184,916	10,488,641					10,673,557
3	9,554,486			9,554,486					9,554,486
4	7,585,110			1,119,007	5,128,042	1,338,061			7,585,110
5	9,420,468					9,420,468			9,420,468
6	9,368,375					2,890,366	6,478,009		9,368,375
7	10,851,673						9,874,060	977,613	10,851,673
8	10,460,353							10,460,353	10,460,353
9	9,068,738							9,068,738	9,068,738
Total	**87,893,337**	**1,959,967**	**9,135,526**	**21,162,134**	**5,128,042**	**13,648,895**	**16,352,069**	**20,506,704**	**87,893,337**

In the latter phases of H1, a temporary OSA will be constructed (with a volume of approximately 12,638,051 yd^3). As part of the final reclamation of H1, the temporary OSA will be re-handled and placed in the backfill of the H1-E and/or H1-S pits. The area of the temporary OSA will be reclaimed. The material volume of the temporary OSA is accounted for in Table 5-4.

In Table 5-3 and Table 5-4, H1-S has an actual backfill capacity of 22,549,788 yd^3. H1-S will be backfilled and reclaimed to accommodate the amount of material available (20,506,704 yd^3) and to maximize the effectiveness of the reclamation contours.

Table 5-5. North Dry Ridge Backfill Capacity

Backfill Destination	Capacity (lcy)
NMM	9,312,320
NDR Pits (NDR)	19,920,651
Total	**29,232,971**

Table 5-6. North Dry Ridge Backfill Schedule by Phase

Backfill Schedule		Backfill Destination (lcy)		Total
Phase	Backfill (lcy	NMM	NDR	
1	12,976,917	9,312,320	3,664,597	12,976,917
2	10,933,350		10,933,350	10,933,350
3	5,322,704		5,322,704	5,322,704
Total	**29,232,971**	**9,312,320**	**19,920,651**	**29,232,971**

5.1.2 Husky 1

The mining sequence was developed to mine H1 from north to south. Annual overburden production will vary over the life of H1 mining operations. Based on a production design rate of 2.4 million wet ore tons per year and a total recovery of 21.4 million wet tons, the estimated life of the proposed H1 will be approximately 11 years, accounting for transitional periods between H1 and NDR. It is important to note that there may be a transitional period as H1 is mined out and NDR begins to be mine. During this period, ore may be mined and blended between H1 and NDR, but overburden will not be mixed between H1 and NDR.

As depicted in Table 5-4, the H1 mining sequence will proceed as follows:

- Phase 1 overburden will be placed in the north and south open pits of the SMCM.
- Phase 2 overburden will be placed in the north open pit of SMCM and the northern portion of the excavated H1 pit (H1 north pit).
- Phase 3 overburden will be placed in the H1 north pit.
- Phase 4 overburden will further backfill the H1 north pit, will construct the permanent H1 ex-pit OSA (for use in reclamation and to buttress certain mine features such as the relocation of the upper portions of Maybe Creek), and will begin to backfill the H1 long pit).

- Phase 5 overburden will be placed in the H1 long pit.
- Phase 6 will complete the backfilling of the H1 long pit and backfill the H1 east pit when available.
- Phase 7 overburden will be placed in the H1 east pit and the excavated portions of the H1 pit known as the H1 south pit.
- Phase 8 will backfill the H1 south pit.
- Phase 9 excavated materials will be placed in the southern portions of the H1 pit (H1 south pit).

Beginning as early as Phase 6, the temporary OSA will begin to be constructed. Once constructed and sufficient backfill space is available in southernmost H1 pits, overburden from the temporary OSA will be re-handled and placed in those respective pits.

The above backfilling sequence is provided as the most likely schedule but may change in timing and/or source/destination. The final material placement and material mix will be in accordance with updated figures and maps.

5.1.3 North Dry Ridge

The mining sequence was developed to mine NDR from south to north.

Annual overburden production will vary over the life of the NDR mining operations. Based on a design production rate of 2.4 million wet ore tons per year and a total recovery of 6.15 million wet tons, the estimated life of the proposed NDR mining operations will be approximately 2.6 years, accounting for transitional periods between H1 and NDR. It is important to note that there may be a transitional period as H1 is mined out and NDR begins to be mine. During this period, ore may be mined and blended between H1 and NDR, but overburden will not be mixed between H1 and NDR.

As depicted in Table 5-6, the NDR mining sequence will proceed as follows:

- Phase 1 overburden will be placed in the NMM open pit as backfill and begin the backfill of the southern end of the NDR pit.
- Phase 2 overburden will be placed in the NDR pit.
- Phase 3 overburden will be used to backfill the NDR pit.

The above detailed backfilling sequence is provided as the most likely schedule but may change in timing and/or source/destination. The final material placement and material mix will be in accordance with updated figures and maps.

5.2 Mine Operations

Mining methods will be comparable to the methods currently used by Itafos at the Rasmussen Valley Mine. The mine may be operated up to 24 hours per day, year-round, with overlapping shifts. A 20-foot-wide road may be constructed along both pit crests to provide access to lighting stations, for pit wall inspections, and for removal of any potential fall hazards.

Mining will occur on a series of bench cuts typically with 30-foot catch benches approximately every 90 feet of depth. Overburden will either be ripped or blasted, while ore is not typically blasted. Material will be excavated and loaded into haul trucks with excavators, or front-end loaders for transport to either permanent or temporary overburden backfill locations or the tipple.

5.2.1 Equipment

Based on previous mining experience, equipment required for mining could consist of the following:

- Hydraulic excavators
- Trucks
- Track dozers
- Rubber tire loaders
- Rubber tire dozers
- Road graders
- Backhoes
- Service Trucks
- Water trucks
- Welding trucks
- Tire trucks
- Blasting trucks
- Skid steers
- Forklifts
- Cranes
- Manlifts
- Bucket trucks
- Fuel trucks
- All-terrain lifts
- Light plants
- Steam cleaning trucks
- Seed drill
- Fertilizer spreaders
- Discs
- Hydro mulcher
- Scrapers
- Generators
- Crew Bus
- Light vehicles
- Snowmobiles
- Trailers
- All-terrain vehicles
- Air compressors
- Portable water pumps
- Other Equipment.

The number and type of each piece of equipment may increase or decrease based on operational needs and changes in production schedule or rates.

5.2.2 Material Management

Materials mined can generally be divided into three categories:

- Ore
- Waste with a higher potential of containing leachable selenium (i.e., SeW)
- Waste with a lower potential of containing leachable selenium (i.e., low-SeW or non-SeW).

The determination of SeW, low-SeW, and non-SeW based on lithology is supported by historical data and industry protocols as well as the site-specific geochemistry program. Waste with a higher potential of containing leachable selenium includes the non-ore portions of the Phosphoria Formation (center waste shales, footwall and hanging wall muds, and ore partings) as well as certain members of the Rex Chert Formation. The visually darker lithologies of the Rex Chert Formation members have been shown to contain a higher potential of containing leachable selenium. This includes material labeled as ROM back fill. ROM includes any material that either is higher potential or is mixed with higher potential. While not technically accurate, in documents and within the Southeast Idaho Phosphate industry this material is commonly referred to as SeW.

Waste with a lower potential of containing leachable selenium includes the topsoil, alluvium, colluvium, Dinwoody Formation, footwall dolomite, sandstone, and shales of the Grandeur Tongue and Wells Formation (collectively referred to as limestone), and certain members of the Rex Chert Formation. The visually lighter lithologies of the Rex Chert Formation members have been shown to contain a lower potential of containing leachable selenium. While not technically accurate, in documents and within the Southeast Idaho Phosphate industry this material is commonly referred to as low-SeW or non-SeW.

Topsoil, alluvium, and colluvium may, based on their properties, be collectively identified as GM Identification of materials as GM is discussed in Section 5.6.9.

Non-ore materials will be used as backfill, cap and cover, or for mine-related facilities construction. If materials are needed for the construction of facilities or the cap (Section 4.1.8), only the lower potential material will be used. Non-ore material will be segregated by the responsible field personnel according to the following guidelines:

- Visually identify Phosphoria Formation materials, including center waste shales, footwall and hanging wall muds, and ore partings, and these materials will not be used for construction of any site facilities.
- Rex Chert Member materials will be identified as ‘dark’ and ‘light, blond or tan’ chert. Dark cherts will not be used for construction of any site facilities. Light or tan cherts will be used in the construction of site facilities. If visual identification is not possible for certain portions of the Rex Chert Formation the material will be classified as dark chert.
- Limestone will be identified for use in the construction of site facilities.
- Topsoil, alluvium, and colluvium will be identified and managed according to Section 4.1.10, Section 5.5.8, and Section 5.6.9.

5.2.3 Pit Water Management

Small-scale water accumulation in the pits from snowmelt, rain, or groundwater seepage that interferes with mining, or that could create a workplace hazard to employees, will be managed according to the SWPPP, the Surface Water Management Plan (Appendix D), and Section 4.1.6.

5.2.4 Employee Safety

Itafos’ primary objective is to provide all employees, contractors, vendors, visitors, and consultants a safe environment in which to work. Itafos has worked hard to develop a safety program that begins with good design and planning and follows through into operations through instruction, awareness, and good practices.

The Mine Safety and Health Administration has jurisdiction over enforcing safety regulations. Safety items that were considered during mine planning include, but are not limited to, the following:

- Highwall and footwall slopes stability
- Mining bench heights
- Surface water and groundwater control
- Haul road widths and safety berm requirements

- Haul road ramp grade or slopes
- External OSA and stockpile stability
- Night shift lighting
- Emergency response
- Equipment inspection
- Operator training
- Proper maintenance of all equipment.

5.2.5 Highwall and Footwall Slopes Stability

Highwall and footwall slope parameters have been developed based on geotechnical evaluation and experience at Itafos' adjacent mining operations in southeastern Idaho (i.e., Rasmussen Valley Mine). Slopes will be maintained in a safe and stable condition throughout the life of mining. Slope stability parameters are discussed in detail in Section 4.1.2. The information obtained will be used to determine if any changes to the mine design will be necessary to ensure slope stability.

5.2.6 Blasting

Itafos will conduct all blasting operations consistent with the requirements of Mine Safety and Health Administration, the Bureau of Alcohol, Tobacco, Firearms, and Explosives, and the Department of Homeland Security. Blasting will be performed with a mixture of ammonium nitrate-fuel oil, blasting emulsions, or other standard blasting agents placed in drilled blast holes. Before blasting, Itafos will inspect the blasting area, sound warning sirens, personnel will be cleared from the area, blast warnings will be broadcast by two-way radio, and guards will be posted on all roads to ensure control of access to the blasting area.

5.2.7 Haul Roads

Active haul road surfaces will be regularly maintained by support equipment to remove rocks and other debris from the road and properly maintain a running surface for haulage units. Roads will be maintained water management is achieved as stated in Section 4.1.6 and Appendix D. Berms will be maintained, ditches will be regularly cleaned, culverts will be repaired, and posted speed limits will be observed to minimize the possibility of haulage accidents, reduce dust emissions, and promote economic equipment life on all haul roads. Road design is provided in Section 4.1.4.

5.3 Public Safety Plan

Itafos is committed to conducting all mining in a way that will not endanger the health and welfare of the general public. Public safety will be maintained by restricting access to the mining areas, ensuring that Itafos personnel follow proper safety procedures at all times, maintaining an appropriate number and location of effective warning signs, and controlling mining-related hazards that have the potential to affect the general public (e.g., wildfire control, rock and debris fall).

Access to the mining areas will be restricted using fencing and warning signs at all designed site access locations.

The public access to FS-134 will be closed from approximately the intersection of the JR Simplot slurry line to Dry Valley Road for the duration of mining and reclamation.

During mining and reclamation at the Project, Itafos proposes that the Blackfoot River Road be used as the primary means for the public to access Diamond Creek Valley and Dry Valley. This temporary proposal will continue to provide adequate public access while minimizing risk to the public.

After mining and reclamation is completed, and as part of the mine reclamation, a new public access road in approximately the old location will be re-established through the reclaimed mining area.

5.3.1 Public and Mine Road Interactions

Itafos anticipates only one location where a haul road and a publicly traveled road meet: where FS-134 currently intersects Dry Valley Road. Itafos will use the Dry Valley Road from this intersection to the shop to move mine vehicles between the shop and the mine. When not in use, the intersection will be gated and locked to restrict access to the haul road from Dry Valley Road. During transit of equipment between the shop and mine, the equipment will be escorted by lead and follow vehicles in order to ensure public safety. Warning signage will also be erected along Dry Valley Road.

5.3.2 Blasting

Warning sirens will be sounded before blasting. Itafos will post employees at all appropriate points to restrict public access after thoroughly inspecting the blasting area.

5.3.3 Vendor Access

As the Dry Valley Mine shop and offices will be used for mine staff and equipment maintenance, most vendors will arrive and leave from this location. Vendor access will be restricted to the Project area using security gates, at which all vendors will be required to check in and out. In addition, vendors will be escorted by or be in direct contact with Project area personnel while on site. Itafos may use alternative vendor access controls as needed and after evaluation of safety risks.

5.4 Wildfire Control

Fire prevention will be accomplished by an active safety training program that includes Itafos safe work practices. All mining equipment is fitted with appropriately sized fire extinguishers or automatic fire suppression systems. All light trucks and support vehicles are equipped with fire extinguishers as well. Small wildfires may be extinguished using a dust suppression water truck and/or track-mounted equipment. However, mine personnel and public safety will be considered the highest priority. Local land management agencies and county authorities will be immediately notified in the event of a wildfire on or near the mine site.

5.5 Natural Resources Protection

Itafos is committed to maintaining natural resource values throughout the duration of mining. Subsequent sections address proposed measures to protect the following natural resources:

- Surface water and groundwater
- Reclamation vegetation
- Livestock and wildlife
- Cultural resources
- Wetlands
- Soils
- Vegetation
- Air
- Fisheries and aquatic resources.

5.5.1 Surface Water

Mining described in the MRP has the potential to impact surface waters by introducing pollutants through stormwater runoff or spills. Phosphate mining operations also have the potential to introduce selenium and other metals to surface water, especially from exposed SeW.

Itafos will design and implement appropriate BMPs for erosion, sedimentation, and selenium control to protect surface waters in and around the Project area. In addition, Itafos will limit the quantity of SeW material that will be exposed throughout the life of the mine by direct backfilling and ensuring that the specified cap/cover designs are applied as described in Section 4.1.8. Surface water drainages will be constructed in sequence with the mining phases to minimize surface water runon into the pit and excessive precipitation contact with exposed shale. Water controls for each phase of mining are described in Appendix D.

Surface water management structures described in the Surface Water Management Plan (Appendix D) include several types of structures designed to reduce or eliminate the risk of surface water contamination. Runoff water and silt retention basins will be constructed at strategic locations along the haul roads and around stockpiles and external OSAs. These basins will collect and contain waters exposed to mining disturbances or overburden materials. Ditches will be constructed along the outer perimeters of select disturbed areas and within the disturbed area boundaries to convey stormwater runoff to sediment basins. Culverts will convey natural surface water under roads to maintain drainage and stream flow.

Ditches will be constructed in sequence with the mining phases to minimize runon into the pit and excessive precipitation contact with exposed shales. It is not feasible to capture and divert all off-site stormwater runoff utilizing diversion ditches, which will require that runoff at certain locations be permitted to drain to adjacent pits. Appendix D describes the detailed design criteria of these structures.

5.5.1.1 Stormwater Pollution Prevention Plan

Itafos will prepare a SWPPP in accordance with applicable state regulations. The SWPPP will identify all potential sources of pollutants that could be transported to surface waters in or near the Project area during precipitation events. In addition, the SWPPP will outline control measures and BMPs to be used to prevent or reduce the discharge of pollutants in stormwater.

As part of the SWPPP, Itafos will comply with several requirements for storm event-related surface water monitoring established by the United States Environmental Protection Agency (USEPA) and the Idaho Department of Environmental Quality (IDEQ). The overarching goal of the various monitoring requirements is to demonstrate that episodic stormwater runoff from the site does not degrade surface water quality. A conceptual approach to stormwater management is provided in Appendix D; however, the comprehensive SWPPP will be contingent upon the final approval of the MRP and will remain a “living document” throughout the mine life in order to accommodate the changing mining operations through the various construction phases.

5.5.1.2 Spill Prevention, Control, and Countermeasure Plan

Itafos will prepare an SPCC Plan in accordance with applicable regulations. An SPCC Plan will be implemented to meet the requirements in 40 CFR 112 before placement of the petroleum products on site and will be reviewed every 3 years by the Spill Prevention Coordinator or other qualified personnel. As required by the regulation, all amendments to this SPCC Plan will be reviewed by a Professional Engineer. The engineer will certify that the SPCC Plan has been prepared in accordance with good engineering practices and meets applicable standards.

5.5.2 Groundwater

Constituents mobilized from backfill areas and other mining features during precipitation events have the potential to enter groundwater systems through infiltration. Of specific concern at phosphate mines in southeastern Idaho is the introduction of selenium to the groundwater system. Itafos will protect groundwater resources by selectively handling and placing all SeW directly to pit backfills and using BMPs designed to control runoff of sediments from mining features.

SeW materials will be directly backfilled to previously mined-out phases or to historically mined pits. SeW will be used for backfill in the lower portions of the mined-out pit where practicable and capped and covered. Section 4.1.8 describes each of these cap and cover systems in detail.

Before capping, the backfill areas will be graded to reduce runon and infiltration, while revegetation will encourage evapotranspiration of precipitation. Proper placement and cap/cover of the SeW material will reduce, to the extent possible, precipitation infiltration into the backfill storage areas and subsequent mobilization of selenium to groundwater.

During mining, water can pool in the bottom of the pit even when diversion ditches are used to divert surface runoff away from the pit walls. Some runoff will be allowed to drain into the pit to be managed as contact water. Other sources of pit water include direct rainfall, snow melt, and groundwater exfiltration. Groundwater exfiltration is not expected beyond the occasional interception of a perched aquifer.

As surface runoff accumulates in active pits, it may be necessary to pump the water away from the active pits to facilitate safe mining operations. Pit water will be managed as contact water. Therefore, pit water will be pumped or moved by a water truck to areas of un-reclaimed active backfill within the pit area for infiltration, utilized for dust suppression within zero-release areas in accordance with the SWPPP, or delivered to lined contact water basins with available capacity. Where possible, contact water basins are proposed at various locations to collect and retain stormwater runoff and pit water, as applicable, for zero release.

Overall, as discussed in Section 5.5.1, Itafos will design and implement BMPs for erosion, sedimentation, and selenium control at the Project area to limit runoff from mining components and potential infiltration. Sediment control could include, but not be limited to, the use of erosion mats, straw wattles, brush barriers, silt fences, diversion ditches, and sedimentation ponds.

Itafos will conduct mining in accordance with Section 39-120, Idaho Code (Ground Water Quality Rule). Itafos may request set points of compliance from the IDEQ before mining operations per IDAPA 58.01.11.401. The set points of compliance requested will be determined as planning proceeds and baseline data are collected.

5.5.3 H1 Permanent Overburden Storage Area

The potential for releases of selenium and other COPCs from overburden materials to surface water within the Southeast Idaho Phosphate Patch is well documented. Significant resources have been expended by both agencies and industry to investigate this issue. A detailed review of the research is beyond the scope of this MRP. The general finding is in the case of permanent ROM OSAs that are external to mine pits, oxic water that infiltrates into these OSAs may mobilize selenium and/or other COPCs that then may express at the toe of these OSAs and transport the constituent(s) to surface water.

The design of the permanent OSA is such that the ‘toe’ of the OSA is located at the edge of the northern H1 pit and is covered by additional backfill. Water that infiltrates at the permanent OSA would migrate northward through the backfill and express directly into the pit backfill and infiltrate to bedrock groundwater similar to water that infiltrates directly into the pit backfill. As designed, water infiltrating into the permanent OSA would not report to surface water, thereby protecting surface water from being impacted.

Appendix C3 provides the design cross-section and long section depicting the H1 permanent OSA and historical MCM pit backfills for both H1 and NDR. The Proposed Action Cap and Cover Technical Memorandum (Arcadis 2020 in progress) will be submitted to provided additional details on the proposed cap and cover.

5.5.4 Livestock and Wildlife

Itafos personnel will visually survey the mine areas daily for the presence of livestock. If livestock are at potential risk, they will be removed from the area immediately.

Movement into or out of the Project area by wildlife will not be controlled; therefore, Itafos will promote the positive interaction of mining with wildlife. Wildlife species will be further evaluated and defined through the baseline study work. Possible mitigation efforts to reduce impacts on wildlife will be considered during the Environmental Impact Statement process.

5.5.5 Cultural Resources

The protection of any cultural and paleontological resources identified through baseline surveys as potentially eligible to the National Register of Historic Places will be continued at the Project area. If vertebrate fossils are exposed during mining, the locations will be recorded and, if possible, the fossil may be initially classified. Notification could be provided to the BLM, State Historic Preservation Office, the landowner, and USFS depending on the location of the find. Similarly, any previously unknown cultural resource sites discovered during mining will be cordoned off and left as found until an appropriate agency or scientific representative can examine, document, and retrieve or record the artifact or the characteristics of the site.

5.5.6 Waters of the United States

Baseline studies have identified all jurisdictional Waters of the United States, including wetlands, within the Project area. Consultation with the United States Army Corps of Engineers (USACE) is ongoing to obtain the necessary Clean Water Act Section 404 Permits.

Itafos will avoid and minimize potential impacts to the riparian areas and avoid impacts to wetlands as much as practical. Wetlands will be further evaluated through the USACE 404 permitting process.

5.5.7 Soils

Soil erosion will be controlled using BMPs at the site. BMPs for soil erosion may include, but are not limited to, the use of straw waddles and sediment fencing to control water and soil movement from mining disturbances, erosion matting on haul road fill slopes to control soil movement in drainages, and brush barriers to control runoff from external OSAs and GMSAs during precipitation events. Monitoring will be conducted to evaluate the effectiveness of the BMPs regularly. Itafos will adjust erosion control techniques as necessary based on this monitoring as will be provided in the SWPPP.

5.5.8 Growth Media

At sites such as H1 and NDR, GM tends to be a scarce natural resource. Therefore, the primary goal is to maximize the recovery and reuse of materials that will be utilized for GM in reclamation. The preferred method of handling GM is the immediate placement as cover upon being salvaged. The immediate placement of GM in reclamation promotes continued growth vitality of microbial colonies and of vegetative matter and existing seed banks. Some GM will have to be stockpiled, as reclamation areas may not always be available at the time of original salvage.

Itafos will use either direct placement of salvaged GM or stockpiled GM as vegetative GM. Wherever practical, Itafos will practice direct placement of salvaged GM. Itafos will follow the guidance provided by the CTNF in a letter to the BLM dated December 8, 2014 regarding construction material for reclamation (USFS 2014). The letter provides a summary of updates to ENG: Construction Materials: Reclamation, based on soil pH rating values specifically tailored to the reclamation of phosphate mines in southeast Idaho.

GM stockpiles are discussed in Section 4.1.10.

5.5.9 Vegetation

Vegetation in the Project areas typically consists of aspen or mixed aspen-conifer forest and high-elevation rangelands on higher ridge elevations with big sagebrush shrubland dominating ridge flanks. Silver sagebrush shrublands cover lower elevations and non-wetland valley floors. Wetlands, when present, tend to occur at lower elevations near existing creeks and streams.

Existing vegetation will be protected to the extent practicable by limiting disturbances to only those areas needed for implementation of the MRP. As outlined in Table 4-1 and Table 4-2, the proposed total disturbance acreages for the H1 and NDR pits are 372 and 140 acres, respectively. Of those, approximately 332 acres (89.2 percent of the total acreage) within the H1 pit and approximately 128 acres (91.4 percent of the total acreage) of the NDR pit are forested. As described in Section 5.5.8, GM will be directly placed onto reshaped slopes whenever possible. Native seed mixes will be applied to complement the existing plant communities on all reclamation. The proposed seed mixes are presented in Table 5-7. Noxious weeds will be continuously managed throughout mining.

5.5.10 Air

All applicable air quality documents will be developed and submitted in accordance with Idaho air permitting requirements. Mining-related emissions from the Project consist principally of fugitive dust and combustion emissions from the mining operations.

Watering and chemically sealing the roads with mag chloride as necessary during the dry season will control dust emissions on the roads. Itafos has historically used water truck(s), as described in Section 5.2.1, to ensure that sufficient quantities are applied to haulage roads for dust suppression. Itafos will construct water production wells to obtain water for dust suppression in the Project area as discussed in Section 4.2.3.

5.5.11 Fisheries and Aquatic Resources

To maintain fisheries and aquatic habitats where they exist, stream crossings will be constructed so that water flows are maintained in sufficient depths and volumes to allow fish passage as exhibited by surrounding portions of the stream. Surface water protection is discussed in Section 4.1.6 and Appendix D. Appropriate permits will be obtained from the USACE and the Idaho Department of Water Resources. As described in Section 5.6, fill materials and culverts will be removed at the conclusion of mining to re-establish natural drainage ways.

Table 5-7. Revegetation Seed Mixes

Scientific Name	Common Name	Native Status	Pounds per Acre	Percentage of Seed Mix
Grasses				
Agrostis gigantea	Redtop bentgrass	Native	2	4
Bromus marginatus	Mountain brome	Native	4	9
Calamagrostis canadensis	Bluejoint grass	Native	4	9
Calamagrostis rubescens	Pine reedgrass	Native	2	4
Elymus cinereus	Great Basin wildrye	Native	3	7
Elymus glaucus	Big bluegrass	Native	5	11
Elymus spicatus	Bluebunch wheatgrass	Native	3	7
Elymus trachycaulus	Slender wheatgrass	Native	4	9
Festuca idahoensis	Idaho fescue	Native	2	4
Koeleria macrantha	June grass	Native	1	2
Phleum pratense	Timothy	Non-native	1	2
Pseudoroegneria spicata	Bluebunch wheatgrass	Native	4	9
Stipa [Nassella]viridula	Green needlegrass	Native	2	4
Thinopyrum intermedium	Intermediate wheatgrass	Non-native	1	2
Triticale sp.	Sterile annual rye (Quick Guard)	Non-native	1	2
Forbs				
Achillea millefolium	White yarrow	Native	1	2
Balsamorhiza sagittata	Arrowleaf balsamroot	Native	1	2
Linum lewisii	Lewis blue flax	Native	1	2
Shrubs and Subshrubs				
Symphoricarpos oreophilus	Mountain snowberry	Native	1	2
Dasiphora fruticosa	Cinquefoil	Native	1	2
Purshia tridentata	Bitterbrush	Native	1	2
Total			**45**	**100**[1]

Note:
[1] Sum of percentage of seed mix accounts for rounding.

5.6 Reclamation

The intent of the proposed reclamation is to re-establish regional drainage patterns; provide native vegetative cover suitable to stabilize the surface; re-establish the pre-mining multiple land uses of recreation, wildlife habitat, and livestock grazing; and limit the risk of long-term post-mining environmental impacts. Reclamation of the Project area will consist of backfilling open pits, regrading OSAs and haul roads, placing caps and covers, handling GM, re-establishing drainage patterns, removing mining-related facilities, and restoring vegetation. The ultimate surface disturbance resulting from the implementation of the MRP will total approximately 1,180 acres. However, approximately 1,056 acres (or 98 percent) of the total disturbance will be reclaimed. The remaining 2 percent consists of the pit walls exposed in the partially backfilled pit area (e.g. exposed highwalls) and haul roads that will be partially reclaimed to a final width of 20 feet, allowing access and maintenance roads to the above-mentioned reclaimed structures and facilities. Table 5-8 and Table 5-9 below present reclamation schedules for H1 and NDR, respectively.

Table 5-8. Husky 1 Reclamation Schedule

Phase	Years	Operational Zone	Mine Pits	Historic Mine Pits (SMCM)	Haul Roads	Water Management - ponds and ditches	Streams and Creeks	Ore Stockpile and Tipple Area	Permanent Overburden Storage Area (OSA)	Temporary Overburden Storage Area (OSA)	Growth Media Stockpiles	Mine Facilities (Dry Valley)	Total Area (by Phase)	Cumulative Area
Disturbed Area (acres)														
	Pre-Mining	0	0	0	32	2	13	61	0	0	8	0	**116**	116
1	Years 1-3	9	31	14	0	3	0	0	0	0	0	0	**57**	173
2	Years 2-4	8	24	63	0	2	0	0	0	0	0	0	**97**	270
3	Years 3-5	10	25	0	0	3	0	0	0	0	0	0	**38**	308
4	Years 4-6	20	75	0	0	2	0	0	7	0	0	0	**104**	412
5	Years 5-7	18	56	0	0	2	0	0	48	0	0	0	**124**	536
6	Years 6-8	16	52	0	0	3	7	0	0	0	0	0	**78**	614
7	Years 7-9	14	47	0	0	2	0	0	0	0	0	0	**63**	677
8	Years 8-10	12	35	0	0	3	0	0	0	20	0	0	**70**	747
9	Years 9-11	10	31	0	0	2	0	0	0	29	0	0	**72**	**819**
Reclaimed Area (acres)														
1	Years 1-3	0	0	0	0	0	13	0	0	0	0	0	**13**	13
2	Years 2-4	0	0	0	0	0	0	0	0	0	0	0	**0**	13
3	Years 3-5	0	0	14	0	8	0	0	0	0	0	0	**22**	35
4	Years 4-6	10	31	63	0	0	0	0	0	0	0	0	**104**	139
5	Years 5-7	8	25	0	0	0	7	0	0	0	0	0	**40**	179
6	Years 6-8	10	26	0	0	6	0	0	7	0	0	0	**49**	228
7	Years 7-9	24	74	0	0	0	0	0	48	0	0	0	**146**	374
8	Years 8-10	18	57	0	0	2	0	0	0	0	0	0	**77**	451
9	Years 9-11	17	53	0	0	3	0	0	0	20	0	0	**93**	544
	Post-Mining	30	110	0	32	5	0	61	0	29	8	TBD	**275**	**819**

Table 5-9. North Dry Ridge Reclamation Schedule

Phase	Years	Operational Zone	Mine Pits	Historic Mine Pits (NMM)	Haul Roads	Water Management - Ponds and Ditches	Ore Stockpile and Tipple Area	Growth Media Stockpiles & Ready Line	Mine Facilities (Dry Valley)	Total Area (by Phase)	Cumulative Area
Disturbed Area (acres)											
	Pre-Mining	0	0	0	47	1	Accounted for with H1	0	0	**48**	48
1	Years 1-3	14	63	71	0	5	0	11	0	**164**	212
2	Years 2-4	13	60	0	0	5	0	0	0	**78**	290
3	Years 3-4	9	23	0	0	4	0	0	0	**36**	**326**
Reclaimed Area (acres)											
1	Years 1-3	0	0	0	0	0	0	0	0	**0**	0
2	Years 2-4	14	62	71	0	0	0	0	0	**147**	147
3	Years 3-4	0	0	0	0	7	0	0	0	**7**	154
	Post-Mining	22	84	0	47	8	Accounted for with H1	11	TBD	**172**	**326**

Note:
TBD = to be determined

5.6.1 Waterways

Recognizing that the proposed pits will truncate existing drainage basins, these erosional features will need to be re-established once backfilling is complete. The re-established drainages will be designed to accommodate the 100-year, 24-hour storm event. Drainages will be incorporated into the final backfill topography. As needed, the final drainage will be protected to reduce erosion. The Surface Water Management Plan included in Appendix D provides detailed descriptions of these re-established drainage waterways including approximate locations and layout.

5.6.2 Permanent Pit Overfill Areas and External Overburden Storage Areas

Several areas to both the east and west sides of H1 pit require overfill areas. These areas are required to ensure necessary final reclamation hydrology. Overfill areas to the west of the pit will receive ROM backfill and are necessary to ensure positive eastward drainage to the extent practical. Some small areas may require northward or southward drainage for a brief period before easterly drainage can occur. Overfill areas to the east of the pit will receive only limestone backfill. The primary function of the east side overfill is to buttress the western bank of the Maybe Creek realignment and to ensure positive eastward drainage.

H1 will require one permanent external OSA, located between the two primary H1 pits predominantly on the Off-Lease Area. The primary function of the permanent OSA is to buttress the western bank of the Maybe Creek realignment. This will ensure that the realignment of Maybe Creek is stable and will reduce the risk of Maybe Creek self-realigning in the future to a less desirable location, such as across backfill. The eastern toe of the permanent OSA will be constructed entirely of limestone to ensure that the waters of Maybe Creek do not come into contact with ROM backfill and potentially transport COPCs off site.

5.6.3 Access and Haul Roads

The North Maybe Canyon road leading to the NMM CERCLA site will not be reclaimed until a final remediation plan for that site has been adopted and approved. Similarly, the South Maybe Canyon haul road leading to the CERCLA site will not be reclaimed until final remediation actions and stabilization have occurred. Final reclamation of these roads will be the responsibility of the current owner of the MCM Lease at the time. Haul and access road reclamation for the H1 and NDR Leases are discussed further in subsequent sections.

Most newly proposed access and haul roads will be obliterated by pulling fill materials back into the road cuts. However, portions of the main haul road in Maybe Canyon and Stewart Canyon may be used to re-establish permanent access through the area. If this occurs, these portions of access and haul roads will be reclaimed to an approximate 20-foot road width similar to the existing USFS Road 134. Fill slopes will be reshaped to between a maximum 3H:1V and 2 percent minimum slope. Berms and haul road running surfaces will be considered higher potential waste (Section 5.2.2) and returned to the pit as ROM backfill. Road material intended to be left in place for the permanent road will be tested for COPCs known to occur in the area. If the material is deemed by the agencies to contain unsatisfactory levels of COPCs, additional material will be removed for ROM backfill, and testing will be repeated.

Reclaimed roads or the reclaimed portions of roads that will not be permanent will then be covered with a minimum of 12 inches of GM before reseeding. BMPs will be used to address soil erosion at reseeded sites until vegetation is established.

All road culverts will be removed, and the natural drainage patterns will be re-established, unless otherwise needed to maintain waterways with respect to permanent access roads. The locations of culverts that will remain, or new culverts that will be installed, will be dependent upon final road grading and adjacent contouring (to be completed during final reclamation) of the reclaimed surface. BMPs will be used to address soil erosion at culvert removal sites until vegetation is established. Haul road water management structures will be reclaimed with the haul road adjacent to the structures. As the access and haul roads will be the last disturbances to be reclaimed in the Project area, the water management structures must be reclaimed concurrently. Water management structures, such as retention basins, will be cleaned of any higher potential materials (Section 5.2.2) before the originally excavated materials are used to fill the structures and blended into the surrounding topography. Pit disturbance would be reclaimed concurrent with mining, it expected to take approximately 2 years to reclaim all roads and other disturbance after cessation of mining.

Intermittent access may be required for environmental monitoring, site inspections, and other post-closure activities at various sites throughout the Project after mine closure. It is not anticipated that all access roads will be specifically designed to grant such access, but rather, that simple two-track alignments will be allowed to develop to accommodate needed access. It is not anticipated that these two-track alignments will be open to the public; therefore, traffic should be minimal.

5.6.4 Remaining Pit Wall Exposures

Most of the open pits will receive full, crest-to-crest backfill; however, a portion of the pits will have some remaining pit wall exposures at the end of final reclamation for several reasons. These reasons include but may not be limited to the following:

- USFS restrictions against backfill steeper than 3H:1V
- Material balance constraints
- Schedule constraints
- Hydrology design requirements.

Where full crest-to-crest backfill will not be achieved, the following minimum criteria for final reclamation will be addressed:

- Maximum 3H:1V and minimum 2 percent grade
- First priority will be to completely cover the eastern pit wall (chert wall)
- Second priority will be to provide an eastern drainage pattern.

If eastern drainage cannot be achieved, then western drainage patterns (into the limestone wall) will be designed. Where practical such western drainage will then be directed north or south till eastern drainage off the backfill can be achieved. Where such a design is not practical the western drainage will be allowed to infiltrate into the limestone pit wall.

5.6.5 Facilities

All portable equipment and facilities will be removed from the site. The staging area soils will be analyzed for total petroleum hydrocarbons. If levels are discovered to be in exceedance of applicable regulations, the soils will be treated and/or removed based on then current applicable regulations for the levels identified. The staging area will then be ripped, and if necessary re-graded, to approximate the natural topography. The area will then receive the cover or cap and cover as provided in Section 4.1.8.

If no longer needed, the fuel farm at DV Shop Area will be decommissioned in accordance with applicable regulations. The area will then be ripped, and if necessary re-graded, to approximate the natural topography. The area will then receive the cover or cap and cover as provided in Section 4.1.8.

If no longer needed, water wells will be abandoned in accordance with then current applicable regulations. Any disturbance associated with the well site will be re-graded then receive the cover or cap and cover as provided in Section 4.1.8.

If no longer needed, fencing and signage placed during mining will be removed from the site to be recycled, sold, or otherwise properly disposed.

5.6.6 Revegetation

Itafos will conduct two types of revegetation activities within the Project area. The first type is interim revegetation on areas disturbed by construction and subject to future re-disturbance. The second type is final revegetation of those areas having had final reclamation cap and/or cover soil replaced.

Interim revegetation may be completed, as needed, on cuts and fills around the mine, on road fills, and on other areas that will remain disturbed during mining and are subject to excessive erosion. The objective of this program is to provide a self-regenerating vegetation that is easily established and that will stabilize the surface against erosion. Itafos will use agency-approved seed mixes specified for target species and application rates for interim revegetation. Where necessary, interim seeding will be completed during the first planting season (typically fall) after the construction is complete. The seed mixture selected for interim revegetation is provided in Table 5-7.

The objectives of the final revegetation of disturbed areas are similar to those of the interim program except that, in addition to stabilizing the ground surface, Itafos will establish vegetation that will support the USFS' multiple land use plan as described in the Revised Forest Plan for the Caribou National Forest (USFS 2003).

The areas to be revegetated will be properly prepared to receive seeds through placement, grading, and smoothing of GM. Seeds will be drilled, broadcast, hydroseeded, or applied by other methods onto the area. Soils may be amended with fertilizer and/or soil amendments based on Itafos' analysis of the area to be seeded. All soil amendments will be certified as weed-free. Seeding will be conducted the first fall season following the preparation of an area to reduce the period during which a disturbed area is exposed to erosion forces. During seeding, Itafos will inspect all areas to ensure that seeding techniques were effective and that all areas received the required seed mix at the recommended application rates.

Subsequent to initial seeding, Itafos will inspect revegetation areas according to the Environmental Monitoring Plan (EMP) to ensure appropriate seed germination and coverage. Results of the inspections will be reported to USFS until the revegetation effort achieves the reclamation goals as provided in the

EMP. Adaptive management measures may be employed if Itafos believes that sites are not on track to reach reclamation goals. Additionally, the USFS may provide recommendations for improvement.

A noxious weed control program will be instituted throughout mining operations, during site closure, and will continue until agreement with the agencies that site closure is complete. The noxious weed control program will be designed and implemented according to the requirements of the Idaho State Department of Agriculture and the Revised Forest Plan for the Caribou Nation Forest (USFS 2003) or the current iteration at the time.

5.6.7 Hydrocarbons

Fuels, oils, lubricants, hydrocarbons, and other covered fluids will be used throughout the site. The Project will operate under a fully compliant SPCC plan.

Any contaminants that may come into contact with the ground during operations will be managed according to the SPCC and applicable regulations. If, during final reclamation, any contaminants are discovered, those contaminants will be remediated according to the SPCC and all applicable regulations.

Any areas of hydrocarbon contamination encountered during reclamation will be removed for treatment and proper disposal per the SPCC.

5.6.8 Return to Landowner Use

In addition to the previously stated reclamation objectives, reclamation activities have been designed to protect natural resources. Reclamation success will be demonstrated through vegetation community structure, percent ground cover, species diversity, and evaluation of the selenium content in soils and vegetation in the reclaimed areas. It is anticipated that post-mining uses of both public and private lands will be similar to pre-mining uses.

5.6.9 Growth Media Material Balance

It is anticipated that approximately 1.25 M bcy of GM will be salvaged from the disturbed areas. Itafos has calculated that as much as 1.55 M lcy of GM will be required for final reclamation. Available GM and anticipated uses for the H1 and NDR areas are presented in Table 5-10 and Table 5-11. Any deficits in the volume of GM material required may be resolved by borrowing sources from nearby privately held lands.

Table 5-10. Husky 1 Growth Media Salvage and Reclamation

Stage	Acres	Lift (ft; salvage)	Cover Depth (ft; reclamation)	Total
Salvage (available)	743	0.8		958,965 bcy
Reclamation (needed)	743		1	1,198,707 lcy

Table 5-11. North Dry Ridge Growth Media Salvage and Reclamation

Stage	Acres	Lift (ft; salvage)	Cover Depth (ft; reclamation)	Total
Salvage (available)	216	0.8		278,784 bcy
Reclamation (needed)	216		1	348,480 lcy