Appendix 2E

Monitoring Plan

Smoky Canyon Mine Panels F and G
Environmental Monitoring

Introduction

The Smoky Canyon Mine is located in Caribou County Idaho, approximately 10 miles west of Afton, WY. It is a surface phosphate mine that has been in operation since 1984. The existing Smoky Canyon mining and milling operations were authorized by a Record of Decision (ROD) issued in 1982 with the Smoky Canyon Phosphate Mine Final EIS. Since that time, additional decisions have been made which contain monitoring requirements. The mining of Panels B and C was authorized by a 2002 ROD upon the completion of the Final Smoky Canyon Phosphate Mine Supplemental EIS (SEIS). Monitoring of various environmental media is and would continue to be an important component of mine operations. Existing monitoring requirements are compiled in the existing Smoky Canyon Mine, Environmental Monitoring Program Plan.

Simplot has proposed expanding mining operations into two adjacent leases. The proposed mining operations would consist of several open pits in Panel F and Panel G, topsoil stockpiles, mine equipment-parking areas, access and haul roads, a power line extension, pit backfills, external overburden disposal areas, and runoff/sediment control facilities. Existing mill and tailings facilities would be utilized to concentrate the recovered ore. Mining activities would include environmental protection practices to reasonably reduce environmental impacts.

Chapter 4 of the FEIS describes monitoring for each resource. Monitoring is also summarized in Chapter 2 of the FEIS. The Record of Decision would require Simplot to submit monitoring plans to the Agencies for approval. These plans will include a Sampling and Analysis plan and a quality assurance/quality control plan for agency review and approval to protect the integrity and defensibility of the samples. The purpose of this document is to provide further description of monitoring in regard to ground water monitoring, surface water monitoring, fisheries monitoring, and construction and performance monitoring of the store and release cover system described in Section 2.6.1 of the FEIS, Mining Alternative D.

Monitoring described for the Panels F and G portions of the mine would add to existing Smoky Canyon Mine monitoring requirements and not replace existing requirements.

This monitoring plan has been jointly developed by the Bureau of Land Management, Pocatello Field Office (BLM), U. S. Forest Service (FS), Caribou-Targhee National Forest (CTNF), and Idaho Department of Environmental Quality (IDEQ), herein referred to as the Agencies.

Ground Water

Modelling performed during the preparation of the EIS indicates that the Preferred Alternative for the mine expansion into panels F and G would not produce any exceedences of State or federal groundwater quality standards in the regional Wells formation ground water system. However, the proposed mine expansion project is predicted to change groundwater and surface water quality; therefore, groundwater monitoring will be a requirement of any action alternative. A Consent Order (CO) between Simplot and IDEQ, under the State's authorities to administer the Idaho Groundwater Rule (IDAPA 58.01.11), would also require monitoring of groundwater quality.

Groundwater monitoring is currently part of Simplot's environmental monitoring program at Smoky Canyon Mine. New groundwater monitoring tasks associated with the Panels F and G operations would be incorporated into the existing Smoky Canyon Mine, Environmental Monitoring Program Plan.

The objectives of the Panels F and G groundwater monitoring program are:

1. Early detection of impacts from the mine to the regional groundwater systems;
2. Monitor compliance with current State and Federal water quality standards;
3. Measure the effectiveness of mitigations to protect ground water quality;
4. Compare empirical monitoring data collected to predicted model results.

The general approach for monitoring to address these objectives is described herein. A more detailed monitoring plan will be prepared for inclusion with the Smoky Canyon Mine Environmental Monitoring Program Plan and in conjunction with the finalized IDEQ-Simplot Consent Order.

At Panel F, groundwater monitoring would include the baseline well MC-MW-1 and a minimum of 3 additional wells constructed to monitor groundwater adjacent to Panel F, including the South Lease Modification area. The new monitoring wells installed at Panel F would be located along the east side of the panel and completed in the Wells formation groundwater flow system. They would be sited down gradient of the panel along the northeasterly and easterly flow paths between Panel F and South Fork Sage Creek Spring. There may be one less monitoring well if the South Lease Modification is not approved.

At Panel G, groundwater monitoring would include well DC-MW-5 and at least one additional well. The new well would be located on the east side of the panel and completed in the Wells formation groundwater flow system. The well would be sited along the northeasterly flow paths between Panel G backfill and lower Deer Creek. Efforts would be made to locate wells along probable flow paths (faults or fracture zones).

Installation of additional wells at either Panel F or Panel G, or both, could be triggered by observations of impacts in the Wells formation groundwater flow system.

All wells would be designed to monitor water levels and water quality in the regional groundwater system down gradient of the backfill and external overburden fills. Wells will be designed and constructed and developed for their intended purpose and according to Idaho Department of Water Resources rules (IDAPA 37.03.09). The well and screening intervals would be dependent upon site-specific conditions. Screen intervals will be determined by the geologist on site in consultation with the State and Federal Agencies to isolate discrete portions of the appropriate groundwater systems. Wells developed for high volume production pumping would not be acceptable for down-gradient environmental monitoring.

Using the same methods as in the Panels F and G EIS baseline studies, the following contaminants of potential concern (COPCs) would be analyzed: Selenium, Chromium, Cadmium, Manganese, Zinc, and Sulfate. In addition, the following field parameters would be measured: water level, water temperature, pH, dissolved oxygen, and conductivity. Environmental monitoring samples would be collected by Simplot employees trained to collect and field process environmental samples, or a similarly qualified contractor, and analyzed at a laboratory acceptable to the Agencies. Samples would be collected quarterly for the first year and at least two times per year after that until the leases are relinquished or as authorized by the Agencies. Sufficient notice prior to sample collection would be provided by Simplot such that Agency oversight and split sample plans could be arranged. Results would be conveyed to BLM, CTNF, and IDEQ following each sampling event. A summary would be provided to the Agencies annually with the mine's Annual Environmental Monitoring Reports, or more frequently as required by other plans or agreements (e.g., IDEQ Consent Order).

In the event that groundwater quality monitoring detected an apparent increase in COPC concentration relative to the baseline conditions in any monitoring well, the following actions would be taken in response:

1. Confirmation samples would be taken for several consecutive months until three or more samples have been analyzed.

2. All monitoring data for the subject well would be reviewed to determine if the apparent increase in COPC concentration was statistically significant compared to the baseline data.

3. If a statistically significant increase over baseline is not confirmed with the results from this sample set, then the monitoring frequency at that location would continue at the normal semi-annual frequency with ongoing evaluation after each monitoring event to detect significant changes in groundwater quality.

4. If a statistically significant increase over baseline is confirmed, then the potential for downgradient transport of overburden constituents by groundwater flow would be evaluated following a Response Plan prepared by Simplot and submitted to the Agencies for approval. The purpose of the evaluation would be to: 1) help identify the conditions that may be responsible for the observed COPC increases in the monitoring well; 2) predict the long-term environmental effects indicated by the observed conditions; 3) predict if the long-term environmental effects would be in compliance with applicable water quality standards.

   The groundwater fate and transport model used to predict impacts to water resources at Panels F and G provides a conceptual model for groundwater flow based on best available estimates of the aquifer characteristics, hydraulic gradients, and groundwater flow directions. As such, the fate and transport model can serve as the basis for an evaluation of the potential for environmental impacts. Additional geological, hydrological, and geochemical data available at the time of the evaluation would also be considered and, if possible, used to improve that conceptual model. Those newer data would provide a better understanding of groundwater flow in the vicinity of Panels F and G than existed when the groundwater fate and transport model was originally developed for the EIS. Other conditions existing in and around the mining area (e.g., the location of current mining activities if any, reclamation status in the overburden disposal areas, and store and release cover conditions) would also be considered in the evaluation. The empirical data and other additional information available at the time that the change in groundwater quality is observed would be used to update input parameters for the fate and transport model or to support other groundwater transport analyses.

5. If this evaluation of the observed COPC concentrations indicates that the potential for further downgradient transport of overburden constituents is high, then Simplot will propose additional or changed mitigative measures, which could include additional monitoring wells where necessary, to maintain compliance with applicable groundwater standards and surface water quality standards, if necessary.

6. Groundwater monitoring would continue during and following implementation of any response actions to demonstrate that the measures taken were effective in reducing the transport of overburden constituents to groundwater.

According to water quality standards developed under the Clean Water Act and the Idaho Ground Water Quality Rule, the long-term concentration of selenium in surface water is 10 times less than that allowed in groundwater. Certain springs in the area that are along suspected transport pathways can serve as an exposure point for groundwater affected by mine operations. As the regional groundwater system is expressed at surface springs in specific locations downgradient of the mine, groundwater discharges would also be monitored as surface water at these locations.

Any mine-related groundwater wells used as a drinking water source, if any, would also be sampled in accordance with the Federal Safe Drinking Water Act and Idaho regulations for drinking water quality.

Surface Water

Additional surface water monitoring sites (**Table 1**), pertaining to this project would be integrated into the current surface water monitoring program, which is described in the Comprehensive Environmental Monitoring Program Plan for Smoky Canyon Mine. Surface water monitoring would also be conducted in accordance with the Consent Order between Simplot and the IDEQ. The following stations would be included in the mine's surface water monitoring program.

The purpose of the surface water monitoring program would be to:

1. Detect changes in surface water quality and quantity associated with the mine operations;

2. Demonstrate compliance with Clean Water Act and Idaho surface water quality standards downstream of mine operations;

3. Compare empirical surface water monitoring data with impact results predicted in the EIS; and

4. Measure the effectiveness of mitigations applied at the mine to protect surface water quality from sediment and chemical pollutants.

Table 1 - Surface Monitoring Stations

Crow Creek	
Surface Water Station	**Spring/Seep**
SW-CC-1a	
SW-CC-350	
SW-CC-150	
SW-CC-75	
Sage Creek	
Surface Water Station	**Spring/Seep**
LSV-2	
LSV-3	
LSV-4	
South Fork Sage Creek	
Surface Water Station	**Spring/Seep**
SW-SFSC-800 (LSS)	
SW-UTSFSC-900	
SW-SFSC-500	
USS	
Manning Creek	
Surface Water Station	**Spring/Seep**
SW-MC-800	
Deer Creek	
Surface Water Station	**Spring/Seep**
SW-DC-800	SP-UTDC-700
SW-DC-500	
SW-DC-400	
South Fork Deer Creek	
Surface Water Station	**Spring/Seep**
SW-SFDC-300	
North Fork Deer Creek	
Surface Water Station	**Spring/Seep**
SW-NFDC-900	SP-UTNFDC-540
SW-NFDC-200	
Wells Canyon	
Surface Water Station	**Spring/Seep**
SW-WC-800	SP-UTWC-400
Stewart Canyon	
Surface Water Station	**Spring/Seep**
	SP-ST-100
	SP-ST-200

Using the same methods as in the Panels F and G EIS baseline studies, analysis would include the following parameters: flow, water temperature, pH, Conductivity, Dissolved Oxygen, TDS, TSS, Hardness, Sulfate, Cadmium, Chromium (III) and (VI), Selenium, Manganese, Nickel, and Zinc. Sample collection would take place two times per year (spring, fall). Sufficient notice prior to sample collection would be provided by Simplot such that agency oversight and split sample plans could be arranged. Sampling would be conducted by a trained and qualified Simplot employee or a trained and qualified third-party contractor. Results, including laboratory analytical reports, would be reported to the BLM Pocatello Field Office, Caribou-Targhee NF Soda Spring Ranger District, and IDEQ Pocatello Regional Office annually with the mine's Annual Environmental Monitoring Reports, or more frequently as required by other plans, agreements, or other agency direction (e.g., IDEQ Consent Order).

Baseline conditions of surface water stations currently vary in regard to concentration of analytes. Several Sage Creek stations measure impacts from the current Smoky Canyon Mine operations. Data collected at two monitoring stations (springs) in the Deer Creek drainage showed naturally elevated concentrations of selenium and cadmium. Thus, surface water monitoring data would be evaluated in regard to change from baseline conditions with trend analysis. If data indicates that there are significant impacts from the Panels F and G mine operations, sampling frequency would be increased to determine the nature of the impact. If the Agencies determine a release is occurring, Simplot would undertake specific action described in the monitoring plan in response to the release. Those efforts would at a minimum include determination of the source of the release and development of preventative measures to address the release.

Monthly inspections during snow free periods would be conducted along the outer toes and slopes of all external overburden fills to look for indications of seeps or springs discharging from the overburden. Each inspection would be recorded and seep/spring locations recorded with GPS using non-mine grid coordinates. Any such locations would be added to the surface water monitoring stations.

Fisheries

A project of this magnitude and complexity requires a solid monitoring program to ensure mining impacts do not exceed established standards and direction. In addition, The National Forest Management Act (36 CFR 219) and the National Environmental Policy Act (1505.2(c) and FR Vol. 57 No. 182 page 43212) require monitoring where applicable. The Caribou Forest Plan requires "Baseline, concurrent and/or post-mining water quality and aquatic habitat monitoring (both surface and groundwater) that provide a statistically valid characterization shall occur at all phosphate mine sites (where the reclamation bond has not been released) as described in an approved monitoring plan."

Monitoring was designed to validate the assumptions made during infiltration and transport modeling and attempts to address some uncertainties associated with the complexity of the selenium issue. The effectiveness of the aquatics protection measures within the mining plan and the project mitigation measures would be monitored through fish population surveys, aquatic habitat surveys, and selenium concentration inventories. All monitoring reports are due two weeks before the spring Annual Operations Meeting. These monitoring measures were developed by the Agencies in cooperation with Idaho Department of Fish and Game (IDFG).

Fish Populations

J.R. Simplot Company would fund fish population monitoring in key units within the Crow Creek watershed. This population monitoring would generally occur every three years for 50 years. After 21 years, the Agencies would determine if there is a need to change the frequency of monitoring or continue with every three years. Monitoring every three years is helpful at least initially to account for natural fluctuations in trout populations in mountain streams. Less frequent monitoring does not provide enough resolution in population trends to accurately make population effects determinations.

Fish population monitoring would occur during low flow. Fish population monitoring would occur in Crow Creek (sampling sites CC-150, CC-350, CC-1A), Spring Creek (Three sampling sites to be determined by J.R. Simplot Company. They should be similar as possible to conditions that exist at the Crow Creek sites.), Beaver Dam Creek (Three sampling sites to be determined by J.R. Simplot Company, located in the lower, middle, and upper sections of the stream. If there is not enough available habitat in this stream, sampling sites can be decreased to two), Sage Creek (LSV-4, LSV-2C, LS), South Fork Sage Creek (LSS and one more site as far upstream of there as possible), Deer Creek (DC-100, DC-200, DC-600), North Fork Deer Creek (NFDC-700, NFDC-200), and South Fork Deer Creek (SFDC-100).

A backpack electro shocker (or current best technology) and at least 2 netters would be used to sample each 100-meter unit utilizing a 3-pass method. Surveyors would request sampling permits and coordinate their efforts with IDFG, and Wyoming Department of Game and Fish (WYGF) when surveying in Wyoming. The fish population data would be entered into a database provided by IDFG and USFS and a monitoring report would be prepared summarizing the data and detected trends. Data and reports would be shared with BLM, IDFG, WYGF, IDEQ, and the CTNF fisheries program. Data would be reviewed by the Agencies and negative trends would be reported to the Forest Supervisor. Forest Service action in response to these trends would be at the discretion of the Forest Supervisor. After 30 years, IDFG and CNF Fisheries Biologists would again review the population monitoring effort and determine if adjustments to the sampling schedule or strategy are necessary. If adjustments are not unanimously agreed upon, sampling would continue as-is until year 50. If fish population data do not indicate long-term negative trends after 50 years of monitoring, the Agencies would determine the need to continue the surveys for an additional 50 years. If there were a long-term negative trend detected in the project site streams by year 50, the survey would continue for an additional 50 years as necessary. Any determination to change monitoring frequency must be approved by the Forest Supervisor and BLM District Manager.

Aquatic Habitat

J.R. Simplot Company would fund aquatic habitat surveys that would be conducted once prior to mining, the year after Panel G is opened, and the year after the reclamation release. Any additional physical survey requirements would be event driven. The Agencies can request additional surveys after hydrological events that had the potential to affect monitoring parameters. Physical surveys would occur during low flow periods and include R1/R4 longitudinal surveys and channel cross-sections.

Longitudinal surveys would occur in Deer, South Fork Sage, and Wells Canyon creeks. During the longitudinal surveys, all perennial stream length would be surveyed using a modified Hankin-Reeves survey methodology (R1/R4), as described in Overton et al. (1997) or the current best technology. More information about this survey methodology can be found at: http://www.fs.fed.us/rm/boise/research/techtrans/projects/r1r4inventory/r1r4inv_procedures.shtml

All applicable parameters within this reference would be used in the survey. In addition, a Stream Reach Inventory and Channel Stability Evaluation would be conducted and documented for each survey reach. The R1/R4 data would be entered in the R1/R4 database, the datasheets and database copied, and both shared with the Agencies.

Cross section surveys would occur in Crow Creek (CC-150, CC-350, CC-1A), Beaver Dam Creek (same locations as fish population sites. This would be a one time only sample), Sage Creek (LSV-4), South Fork Sage Creek (LSS), Deer Creek (DC-200, DC-600), and North Fork Deer Creek (NFDC-700, NFDC-200).

The IDEQ Stream Habitat Index would be performed at each cross section site. This requires such parameters as bankfull width, reach length, stream gradient, Rosgen stream type, sinuosity, substrate, width:depth ratio, stream bank condition, bank stability, stream bank cover, canopy closure, large woody debris, number of pools, pool variability, predominant habitat type, overhead cover, embeddedness score, pool substrate character, channel shape, disruptive pressure, zone of influence, instream cover, bank angle, and % undercut banks. These parameters would be measured and/or ranked, then used to derive a SHI value that can be compared to other sites being evaluated and to reference sites.

The cross sections would include channel cross-section diagrams, Wolman pebble counts, sediment grab samples (Duffield 1996), and a Riffle Stability Index as described by Kappesser (1992). In addition, at these cross sections, macroinvertebrate samples would be collected in accordance with IDEQ Beneficial Use Reconnaissance Program protocol for establishment of a macroinvertebrate biotic index to monitor beneficial use support.

The data would be entered into a database and a monitoring report would be prepared summarizing all physical survey data and detected trends. The report would be shared with the CTNF Fisheries personnel, BLM, IDFG, and IDEQ. The Agencies would review the data and reports and report negative trends to the Forest Supervisor. Forest Service reaction to the trends would be at the discretion of the Forest Supervisor.

Selenium

Trends in selenium concentrations within sediment, macroinvertebrates, periphyton, and fish would be monitored every 6 years (and as many annual baseline surveys would be conducted as possible, between the project decision and project implementation). Sampling would occur during low flow conditions. Sediment chemistry, benthic macroinvertebrate and periphyton tissue chemistry, and fish tissue would be studied. In addition, every 6 years, a minimum of one redd (fish nest) would be sampled for juvenile trout near each Crow, Sage, South Fork Sage, Deer, and North Fork Deer creek sampling location listed below and the Spring and Beaver Dam creek locations listed above in the population monitoring section (if not sampled during the separate site specific criteria development effort). If trout redds are sampled for the CERCLA site specific criteria process in the future and the samples are at least as frequent as the samples required in this monitoring plan, the redd samples required through this plan would be discontinued. The redd sampling would occur through redd excavation. Percent of the juvenile trout in the redd that were deformed would be documented. A permit is required through either IDFG or WYGF (depending upon sample location) for this activity.

The Agencies reserve the right to require fish egg selenium composition sampling within spawning gravels if trends in selenium concentration monitoring and populations are considered detrimental to the well-being of fish populations.

Selenium sample locations are in Crow Creek (CC-150, CC-350, CC-1A), Beaver Dam Creek (same locations as fish population sites. This would be a one time only sample), Sage Creek (LSV-4), South Fork Sage Creek (LSS), Deer Creek (DC-200, DC-600), and North Fork Deer Creek (NFDC-700, NFDC-200).

All samples would be taken every 6 years except at Beaver Dam Creek, where sampling is only required once. Sampling and analysis would be consistent with the interagency fish tissue selenium sampling protocol (currently being developed).

Data and reports would be provided to the Agencies for their review. If the Agencies identify concerns or negative trends, the Forest Supervisor and BLM District Manager would be notified. Forest and BLM response to the assessment report would be at the discretion of the Forest Supervisor and BLM District Manager. After 30 years, Fisheries Biologists from FS, BLM, IDFG, and IDEQ will review the selenium monitoring effort and recommend necessary adjustments to the sampling schedule or strategy to the Forest Supervisor and BLM District Manager. These assessments would continue for 50 years, unless the Agencies decide to terminate them due to no detected impacts. After 50 years, the Agencies would decide each decade up to 100 years whether to continue the assessments. Decisions for continuing monitoring must be reviewed and approved by the Forest Supervisor and BLM District Manager.

This monitoring effort is in addition to and does not supplant state water quality standards for selenium, or other metals, in surface water and for support of beneficial uses such as coldwater aquatic life.

Store and Release Cover Quality Control

Sensitivity analysis conducted as part of the infiltration modelling identified the saturated hydraulic conductivity (K_{sat}) of the Dinwoody layers as key elements of the Deep Dinwoody cover system's ability to meet the net percolation design criteria. The K_{sat} of the as-built Dinwoody layers may depend on the ability of the construction equipment to mechanically breakdown larger particles, which can be encountered in the Dinwoody formation, as well as the water content and dry density of the as-built conditions. A two-phased program of field testing would be conducted early in the Panel F mining operations to verify that the cover can be built according to the design and guide the development of the construction QA/QC for the full-scale cover and subsequent performance monitoring.

<u>Phase 1 QA/QC Test Program</u>

In Phase I of the Dinwoody field testing, two adjacent test plots would be graded on a 3H:1V slope of CWS ROM material in the Panel E area using Dinwoody material mined from the Panel F overburden; each test plot would be approximately 2.5 acres in size. One test plot would consist of finer textured Dinwoody material and the other test plot would be constructed with coarser textured Dinwoody. Two feet of chert material would be placed on the regraded ROM. Dinwoody being evaluated in Phase I of the QA/QC proposal would be placed as proposed for the full production cover and evaluated utilizing different treatments. The three treatments that would be tested on each layer include:

- Treatment 1: A D10 or larger dozer constructs the Dinwoody lift using "normal" practices; that is, the operator is not directed to ensure a certain number of passes over the area, but simply works it until the desired lift thickness is achieved. Sampling and testing of this layer would follow its construction.

- Treatment 2: A D6 or larger dozer pulls a sheepsfoot roller and travels up and down the length of the test plot such that that the entire test area receives two passes from the roller with 50% overlap on each pass. Sampling and testing of this layer would follow its construction.

- Treatment 3: A D6 or larger dozer pulls a sheepsfoot roller and travels up and down the length of the test plot such that the entire plot receives two *additional* passes from the roller with 50% overlap on each pass. Sampling and testing of this layer would follow its construction.

The Deep Dinwoody layer would be placed by a D10 or larger dozer in a 1-foot thick layer and tested, then two other construction treatments would be conducted on this layer with subsequent testing after each treatment; then a 2-foot layer of Dinwoody (layers known in the design as the Upper and Lower Dinwoody layers) would be placed with a D10 or larger dozer, and again two additional treatments would be applied to this layer with testing in between the initial placement and each treatment.

The design thicknesses of each layer of the cover, i.e. chert (2 feet), Deep Dinwoody (1 foot), Upper/Lower Dinwoody (2 feet), and topsoil (1-2 feet), would be increased by 0.3 feet during construction to account for the accuracy (± 0.3 feet) of the GPS control on the construction equipment. The as-built layer thicknesses would be confirmed with spot checks using standard surveying techniques.

As previously mentioned, each Dinwoody layer would be sampled after each treatment. The test sample locations would be based on a 75' x 75' grid, starting approximately 75 feet inside the outer edge of the test plot. A total of 12 locations would be sampled on each 1-foot layer. Each sampling location would be tested utilizing a Guelph permeameter modified to allow measurement of low permeabilities and a nuclear densometer. Four sand cone tests would be conducted within 1-foot of four of the nuclear densometer test locations for each layer. Shelby tube samples would be taken within the proximity of each sample location for laboratory measurement of K_{sat} with a triaxial cell permeameter. Disturbed samples would be collected from each location for gravimetric water content analysis and particle size distribution. **Table 2** includes additional information on the testing and sampling protocols to be used.

An objective of this extensive testing on the test plots is to develop relationships between particle size distribution, in-place density, moisture content and permeability of the as-built Dinwoody layers utilizing the different construction techniques (i.e. treatment methods). In terms of the entire test pad area the appropriate mean, based on data skewness, of field permeability measurements is proposed for comparison because values obtained during the test program would vary (e.g. from 1×10^{-5} cm/s to 1×10^{-7} cm/s). Each field permeability value would be assumed to represent a 75 x 75 foot area from which the measurement was obtained in the test pad area. Hence, the total bulk volume of water that would "pass across" the cover system could be calculated for the entire test pad foot print, on the basis of the permeability values for each 75 x 75 foot area. This would be compared to the net percolation targets established by the groundwater modeling studies for protection of water quality.

Table 2 - QA Testing for Each 1-foot As-built Dinwoody Layer, for each Treatment.

Test or Sample	Number of Tests or Samples	Key Details of Testing or Sampling	Reference for Testing Procedure
Guelph permeameter (with modification to measure lower than $1X10^{-6}$ cm/sec)	12	• Auger hole to 8 inches below top of layer and perform a dual-head test (heads of 2" and 4")	SoilMoisture Equipment (1986)
Shelby tube (for triaxial permeameter testing)	12	• Collect a sample proximate to GP test locations • Push tube from surface in a vertical manner with the dozer's blade • Double-bag the sample and duct-tape to prevent moisture loss	ASTM D5084
Nuclear densometer	12	• Test proximate to GP test locations, • Record dry density and water content at probe depths of 8 inches and 12 inches at each location	ASTM D2922 and D3017
Sand-cone	4	• Test within 1-foot of four (4) of the nuclear densometer test locations	ASTM D1556
Bag sample for gravimetric water content analysis	12	• Collect ~2 kg of sample immediately below each nuclear densometer test location for drying in an oven	ASTM D2216
Bag sample for PSD and gravimetric water content analysis	12	• Collect 5-gallon pail sample (3/4 full pail) for PSD analysis • Material shall be sampled such that entire 1 foot thickness is obtained • Gravimetric water content shall be determined on entire 5-gallon sample	ASTM D422

Another objective is to demonstrate the appropriate construction techniques that would produce a cover that would uniformly comply with the design requirements. In the event the required permeability measurements are not achieved under any of these treatment methods, Simplot would evaluate other alternative approaches such as placing each Dinwoody layer in 1-foot lifts and/or discing the Dinwoody material. Such alternative approaches would be explored until an approach is demonstrated that would comply with the target net percolation rates required by the Agencies. Construction of additional store and release cover, on either Phase II or the Panels F and G full production scale, would not occur until a successful alternate approach is approved by the Agencies.

Following construction and testing of the test plots all data obtained during construction would be provided to the Agencies in a Phase I QA/QC Test Program Report in a format acceptable to the Agencies. A proposed QA/QC plan for construction of the Panels F and G cover, based on the lessons learned from the test plots would also be provided for agency review and approval before construction of the Panel F cover is commenced.

Phase II QA/QC Test Program

After the Pit E-0 backfill is completed, approximately 30 acres on top of this backfill would be covered with the Alternative D store and release cover using chert, Dinwoody, and topsoil obtained from the initial mining of Panel F. This cover would be constructed using methods and QA/QC procedures developed in the Phase I testing program. An objective of this large-scale test is to demonstrate feasibility of constructing a large area of Alternative D store and release cover with methods shown to be effective from the Phase I test program. Another objective is to demonstrate the practicality and effectiveness of the QA/QC testing program that was also developed from the Phase I testing. Simplot would immediately report to the Agencies any significant difficulties in complying with the QA/QC program during construction of the Phase II test cover. All data obtained from this test would be provided to the Agencies in a Phase II QA/QC Test Program Report.

Full Production Cover QA/QC Program

Following their review of the Phase I and Phase II QA/QC Test Program Reports, the Agencies would determine if any changes or additions are required for the QA/QC program before it is implemented for the rest of the Panels F and G. Records of the QA/QC data collected during each year of operations would be provided to the Agencies in an annual report. Simplot would immediately report to the Agencies any significant difficulties in complying with the QA/QC program during construction of the full production cover.

Third Party Engineer Involvement

The Agencies would select a third party licensed engineer with experience in the QA/QC methods described above to assist them in providing compliance inspections for the QA/QC monitoring described in this monitoring plan. Simplot would provide funding to the Agencies through a cost-recovery agreement to pay for this outside assistance. An agreement between Simplot and the Agencies specifically describing the expectations for the engineering oversight engineer would be developed to guide the inspection, reporting, and recording of each inspection. The Agencies would cooperatively develop a scope of work for engineering oversight inspections.

Cover Performance Monitoring

Material testing results for Dinwoody resources available for use in constructing the Panels F and G cover and unsaturated zone modelling have indicated that the Alternative D store and release cover design should reduce net recharge to the water table to approximately 0.6-inch per year, on a long-term average basis. This recharge rate has been determined by the Agencies to be conservatively protective of groundwater and surface water quality down gradient of the Panels F and G. Given the inherent uncertainty in such numerical modelling, it is necessary to verify the VADOSE/W modelling predictions for hydraulic performance of the store and release cover through collection of field data from actual covers built at the Smoky Canyon Mine.

Significant laboratory effort has been expended analyzing the material properties of for the overburden that would be part of the proposed Deep Dinwoody cover. However, direct measurement of field performance of the cover system is the best method for demonstrating that the cover system would perform as designed. The main objectives of field performance monitoring using test cells are to:

- Develop a site-specific water balance for each cover;
- Obtain an accurate set of field data to calibrate the model;
- Develop confidence for all stakeholders with respect to cover system performance; and
- Develop an understanding for key characteristics (soil density, in situ permeability, etc.) and processes that control performance.

Test Cell Program

During the early stages of mining in Panel F initial overburden would be used to backfill Pit E-0. Roughly a 30-acre, Alternative D store and release cover would be constructed over run of mine overburden in this backfilled pit using chert, Dinwoody, and topsoil resources from Panel F. Within this cover, at least two test cells would be constructed to collect hydraulic performance data from the as-built cover. Detailed designs for construction and instrumentation of the test cells would be provided to the Agencies for review and approval before the store and release cover is constructed on the Pit E-0 backfill.

Material properties of the cover layers in the test cells would be determined including their thickness, initial moisture content, particle size distribution, bulk density, and hydraulic conductivity.

Monitoring the test cells would include:

- *Meteorological conditions:* An automated system to allow for measurement or calculation of potential evaporation; as well as measurement of rainfall. Measurement of snow-pack conditions would be conducted to determine the snow water equivalent (SWE), which is a fundamental component of developing a representative surface water balance.

- *Hydrologic conditions:* Monitoring of surface runoff is a fundamental component of developing a cover system water balance. This would be measured with the construction of a weir or direct measurement device to capture overland surface flow.

- *In Situ Moisture conditions:* The change in moisture storage within the cover system would be monitored at a “primary” monitoring location using a nest of automated water content sensors installed adjacent to a nest of automated soil suction sensors and a vertical moisture probe access tube. In general, a primary monitoring location would be installed at the mid-slope and center of a large-scale field trial. In order to obtain *in situ* moisture conditions along the sloping cover system surface, “secondary” monitoring locations would be established up-slope and down slope of the primary monitoring location. The secondary monitoring locations consist of a nest of automated water content sensors. Spatial moisture storage conditions would be monitored using “tertiary” monitoring locations, consisting of a vertical tube that provides access to the cover system profile using a portable moisture probe.

- *In Situ Temperature conditions:* A nest of temperature sensors would be installed at the primary monitoring location.

- *Net Percolation:* Direct measurement of net percolation through the cover would be conducted through the use of large-scale pan lysimeters. Care must be taken to ensure that the presence of the net percolation monitoring system does not influence the measurements.

- *Pore-Water Quality (near surface):* Monitoring of near surface pore-water quality would allow for the opportunity to determine whether changes in bioavailable selenium concentrations are occurring within the cover material and the underlying CWS.

- *Vegetation Cover conditions:* The type and cover density of vegetation growing on the cover would be recorded through standard transect approaches.

Data collected from the test cells would be analysed annually by Simplot for quality assurance. Field data on material properties and hydraulic conditions would then be used by Simplot annually to prepare calibration runs of the VADOSE/W model for the test cell conditions that existed during each monitoring year. The model results would be compared to the measured conditions in the test cells and variances between predicted and measured values would be interpreted. All data, model runs, and interpretations of results would be provided to the Agencies on an annual basis in a summary report and electronically, in a format acceptable to the Agencies.

Following a number of years of monitoring (estimated 3 to 5 years) all monitoring and modeling data collected to date would be critically evaluated by Simplot in one report comparing the overall hydraulic performance of the test cells with the design studies for the store and release cover. If the variance between the design and monitored performance is significant, additional investigations would be made into the reasons for these variances by Simplot and estimates of the potential, long-term environmental effects of these variances to groundwater and surface water quality would be prepared by Simplot and submitted to the Agencies. If the long-term environmental effects of the variances were considered to be significant, the Agencies and Simplot would determine what changes, if any, are required to the mitigative measures for Panels F and G to maintain compliance with applicable water quality standards.

Monitoring of the test cells would continue for the duration of mining and reclamation activities in Panels F and G and a period of time continuing past the completion of reclamation at least until the phosphate leases are relinquished by Simplot or as authorized by the Agencies.

<u>Production Cover Performance Monitoring</u>
A production (Panels F and G) cover performance monitoring program would be provided by Simplot for evaluation and acceptance prior to construction of this cover. In terms of field performance monitoring for a full-scale cover system, the level of monitoring would at least include:

- Meteorological monitoring (i.e. determination of the potential evapotranspiration);
- Site-specific precipitation (including snow survey measurements);
- Cover material moisture storage and hydraulic conductivity changes;
- Watershed or catchment area surface runoff (calculated);
- Vegetation type and cover conditions;
- Erosion observations;
- In place hydraulic conductivity; and
- Net percolation (calculated).

Monitoring of the full production cover would continue for the duration of mining and reclamation activities in Panels F and G and a period of time continuing past the completion of reclamation at least until the phosphate leases are relinquished by Simplot or as authorized by the Agencies.

Following a number of years of monitoring (estimated 3 to 5 years) for each backfilled pit area or external overburden fill of the proposed mine panels all monitoring and modeling data collected to date for each such overburden area would be critically evaluated by Simplot and the Agencies in the same manner as that described above for the test cells.

Third Party Engineer Involvement

The Agencies would select a third party licensed engineer with experience in the QA/QC methods described above to assist them in providing compliance inspections for the QA/QC monitoring described in this monitoring plan. Simplot would provide funding to the Agencies through a cost-recovery agreement to pay for this outside assistance. An agreement between Simplot and the Agencies specifically describing the expectations for the engineering oversight engineer would be developed to guide the inspection, reporting, and recording of each inspection. The Agencies would cooperatively develop a scope of work for engineering oversight inspections.

Penalties

Where non-compliance with state and federal standards or the approved Mine & Reclamation Plan/ROD is noted, BLM may issue an order to the operator (43 CFR 3598). If the non-compliance does not present an imminent threat of serious or irreparable damage to the environment a Notice of Non-Compliance may be issued by BLM, which notes the corrective actions required. Small matters are typically handled through a process of inspections and correspondence. The operator would notify BLM when those actions are completed. If there is a failure to comply with an order or there is an imminent threat of serious or irreparable damage to the environment a cessation of mining order may be issued by the BLM.