Preliminary Draft Negotiated Rule (Draft No. 1), Docket No. 58-0119-2001
Dated March 25, 2020

Written comment deadline for this draft – April 28, 2020

IDAPA 58
TITLE 01
CHAPTER 19

(NEW CHAPTER)

58.01.19 – RULES FOR THE DESIGN AND CONSTRUCTION OF PHOSPHOGYPSUM STACKS

000. LEGAL AUTHORITY.
Under Sections 39-105, 39-107, and 39-176A through 39-176F, Idaho Code, the Idaho Legislature has granted the Board of Environmental Quality the authority to promulgate these rules.

001. TITLE, SCOPE AND APPLICABILITY.

01. **Title**. These rules are titled IDAPA 58.01.19, "Rules for the Design and Construction of Phosphogypsum Stacks."

02. **Scope**. In accordance with Section 39-176B, Idaho Code, these rules establish minimum design and construction requirements for new phosphogypsum stack systems or lateral expansions of phosphogypsum stack systems in Idaho to ensure that phosphogypsum stack systems meet critical safety standards and do not cause unplanned releases into the environment.

a. Nothing in these rules supersedes, amends, or modifies the mineral processing waste exemption provided in 40 CFR 261.4(b)(7) and IDAPA 58.01.05, "Rules and Standards for Hazardous Waste," Section 005, for process wastewater and phosphogypsum from phosphoric acid production.

b. Nothing in these rules is intended to supersede or modify any existing agreement with or approvals from the Environmental Protection Agency or the Department relating to the construction of a phosphogypsum stack, phosphogypsum stack system, or component thereof.

c. The requirements in Sections 42-1710 through 42-1721, Idaho Code, do not apply to phosphogypsum stacks and phosphogypsum stack systems.

002. ADMINISTRATIVE PROVISIONS.
Persons may be entitled to appeal agency actions authorized under these rules pursuant to IDAPA 58.01.23, "Rules of Administrative Procedure Before the Board of Environmental Quality."

003. CONFIDENTIALITY OF RECORDS.
Information obtained by the Department under these rules is subject to public disclosure pursuant to the provisions of Title 74, Chapter 1, Idaho Code, and IDAPA 58.01.21, "Rules Governing the Protection and Disclosure of Records in the Possession of the Idaho Department of Environmental Quality."

004. – 009. (RESERVED)

010. DEFINITIONS.

01. Auxiliary Holding Pond. A lined storage pond typically used to hold process wastewater for the purpose of increasing system storage above that otherwise provided by a collection pond or ponds.

02. Board. Idaho Board of Environmental Quality.

03. Department. Department of Environmental Quality.

04. Intermediate Liner. A composite liner system placed on top of an existing phosphogypsum stack in such a manner as to enable continued use of the existing phosphogypsum stack by stacking and vertical expansion on top of the liner while cutting off infiltration to, and therefore facilitating consolidation and drainout of, the portion of the phosphogypsum stack already constructed beneath the liner.

05. Lateral expansion. A horizontal expansion of the waste boundaries of an existing phosphogypsum stack system.

06. Leachate. Liquid or drainable pore water that has passed through or emerged from phosphogypsum and that may be collected within the phosphogypsum stack or in a seepage collection drain.

07. Operator. Any person or persons, any partnership, limited partnership, corporation, or any association of persons, either natural or artificial, that own, control, or direct the management of a phosphogypsum stack.

08. **Perimeter Dike**: The outermost earthen dike surrounding a phosphogypsum stack system that has not been closed, or any other earthen dike the failure of which could cause a release of process wastewater outside the phosphogypsum stack system.

09. Phosphogypsum. Calcium sulfate and by-products produced by the reaction of an acid, such as sulfuric acid or fluoride acid, with phosphate rock to produce phosphoric acid.

10. Phosphogypsum Stack. Any defined geographic area associated with a phosphoric acid production facility in which phosphogypsum and process wastewater from phosphoric acid production are disposed of or stored, other than within a fully enclosed building, container, or tank.

11. Phosphogypsum Stack System. The defined geographic area associated with the phosphoric acid production facility in which phosphogypsum and process wastewater are disposed of or stored together, including all components, such as pumps, piping, ditches, drainage, conveyances, water control structures, collection ponds, cooling ponds, decant ponds, surge ponds, auxiliary holding ponds, and any other collection or conveyance system associated with the transport of phosphogypsum from the plant to the phosphogypsum stack, its management at the stack, and the process waster return to the phosphoric acid production to the phosphogypsum stack. This includes toe drain systems and ditches and other leachate collection systems, but does not include conveyances within the confines of the fertilizer production plant or emergency diversion impoundments used in emergency circumstances caused by power outages or rainfall events.

12. Process Wastewater. Process wastewater from phosphoric acid production operations.

13. Vertical Expansion. An expansion, vertically, of phosphogypsum or process wastewater storage capacity beyond the approved dimensions of the phosphogypsum stack. A vertical expansion may also include a lateral expansion component.

011. -- 099. (RESERVED)

100. DESIGN AND CONSTRUCTION PLAN SUBMITTAL.

01. Design and Construction Plan Components. Before beginning any construction activities of a new phosphogypsum stack, a material component of a phosphogypsum stack, a lateral expansion of an existing phosphogypsum stack, or an intermediate liner, the operator will submit to the Department for review and approval in accordance with Section 170 a design and construction plan that addresses all of the following:

a. Siting criteria;

b. Site preparation;

c. Run-on and run-off control;

d. Liner and leachate control system design consisting of plans and technical specifications;

e. Liner and leachate control system construction quality assurance/quality control plan;

f. Seepage test procedures for lined ponds that are part of the phosphogypsum stack system;

g. Perimeter dike site preparation, design consisting of plans and technical specifications, and construction quality assurance/quality control plan;

h. Stability study;

i. Seismic study; and

j. Groundwater monitoring plan.

02. Items Not Applicable. If items listed in Subsection 100.01 are not applicable to a particular design, then the operator shall specify in the design and construction plan which item(s) are not applicable and state the reason why.

101. -- 109. (RESERVED)

110. SITING CRITERIA

01. Set Back Distances. The phosphogypsum stack system will maintain set back distance from the property boundary of sufficient width to allow for vehicle access as necessary and location of groundwater monitoring wells in a manner that will enable detection of groundwater quality changes to the underlying aquifer(s) beyond the footprint of the phosphogypsum stack before any contaminant transport beyond the property boundary.

02. Flood Plain. No part of a phosphogypsum stack system shall be located in the 100-year flood plain where it will restrict the flow of the 100-year flood, reduce the temporary water storage capacity of the flood plain unless compensating storage is provided, or result in a washout of any part of the system.

03. Waters of the State. Phosphogypsum stack systems may not discharge pollutants to a water of the state without the appropriate authorizations under IDAPA 58.01.25, "Rules Regulating the Idaho Pollutant Discharge Elimination System Program," or IDAPA 58.01.17, "Recycled Water Rules," and in compliance with IDAPA 58.01.11, "Ground Water Quality Rule."

04. Water Supply Wells. New phosphogypsum stacks or lateral expansions of existing phosphogypsum stacks must be constructed in locations that allow for the protection of existing or approved water supply wells used for drinking water.

111. -- 119. (RESERVED)

120. SITE PREPARATION.

01. Subgrade Preparation. The subgrade shall be constructed to resist consolidation, excessive differential settlement that comprises liner performance, and uplift resulting from pressures inside or outside the phosphogypsum stack system to prevent distortion of overlying components. Clearing, grubbing, and stripping will consist of cutting, removing, and properly disposing of all objectionable materials (e.g., trees, stumps, compressible detritus or debris) within the designated construction area of the area to be lined. All earthen foundation surfaces on which fill is to be placed shall be scarified, or moistened and compacted, prior to the spreading of the first course of fill material. The subgrade on which the composite liner is to be installed will be prepared through fill placement to alter the contours of the site to the lines and grades indicated on the Department-approved design drawings. Sources for subgrade material shall be free from rocks, debris, organic material, sharp objects, and other deleterious material that could damage the liner. The subgrade shall be reviewed and approved by the engineer or his qualified designee prior to placement of the composite liner.

02. Preparing a rock face. Prior to lining, a rock face will be prepared by grading to a maximum of two (2) to one (1) slope and removal of sufficient rock outcrop to protect the liner. A slope cut and fill plan will be submitted with the design package. Prior to any liner installation within the rock face area, the slope will be prepared as far up as the planned extent of the liner. A layer of conditioned soil fill will be placed over the graded rock face and covered with a reinforcing woven geotextile fabric to stabilize the slope and provide a protective surface for lining.

03. Liner Subgrade Compaction. Prior to lining, the liner subgrade shall be compacted to the appropriate density specified in the construction quality assurance/quality control plan required under Subsection 140.03.

121. -- 129. (RESERVED)

130. RUN-ON AND RUN-OFF CONTROL.

01. Run-On Control. The facility shall install and maintain a run-on control system capable of preventing the greater of flow during peak discharge calculated using precipitation from a twenty-four (24) hour, twenty-five (25) year rainfall event or from a combined peak precipitation and snow-melt event over a twenty-four (24) hour period using snowfall, precipitation and other meteorological data from the historical record.

02. Run-Off Control. The operator shall maintain a run-off management system to collect and control at least the water volume resulting from a twenty-four (24) hour, twenty-five (25) year rainfall event or from a combined peak precipitation and snow-melt event over a twenty-four (24) hour period using snowfall, precipitation and other meteorological data from the historical record.

131. -- 139. (RESERVED)

140. LINER AND LEACHATE CONTROL SYSTEMS.

01. General Liner Requirements. Phosphogypsum stacks shall be constructed with composite liners and leachate control systems. Cooling/surge/decant ponds shall be constructed with composite liners. Process wastewater conveyances shall be constructed with composite liners or pipes. Composite liners shall consist of a synthetic and non-synthetic component as described in Section 140.02. The liner shall be:

a. Constructed of materials that have appropriate physical, chemical, and mechanical properties to prevent failure due to physical contact with the phosphogypsum, process wastewater or leachate to which they will be exposed, pressure gradients (including static head and external hydrogeologic forces), climatic condi-

tions, the stress of installation, and other applied stresses and hydraulic pressures that are anticipated during the operational and closure period of the liner system. The operator shall obtain from the supplier of materials for the liner components test information accepted by the engineer that supports the capabilities of the materials to meet these needs;

b. Constructed so that the bottom of the liner system is not subject to fluctuations of the groundwater as would adversely impact the integrity of the liner system;

c. Designed to resist hydrostatic uplift if the liner is located below the seasonal high groundwater table; and

d. Installed to cover all surrounding earth that could come into contact with the phosphogypsum, process wastewater or leachate.

02. Composite Liner Design Standards. Composite liners shall consist of a synthetic component and a non-synthetic component. The composite liner system plans and specifications must provide for all of the following:

a. A synthetic component:

i. Constructed of a geomembrane consisting of one of the following:

(1) A high-density polyethylene (HDPE) geomembrane that meets the properties contained in the Geosynthetic Research Institute's (GRI's) standard specification GRI-GM13 and has factory and field seams whose shear strengths during testing are at least ninety percent (90%) of the specified minimum yield strength;

(2) A linear low-density polyethylene (LLDPE) geomembrane that meets the properties contained in GRI's standard specification GRI-GM17 and has factory and field seams whose shear strengths during testing are in conformance with the seam strengths specified in GRI's standard specification GRI-GM19a; or

(3) An equivalent to 140.02.a.i(1) or 140.02.a.i(2) approved by the Department.

ii. Having a minimum thickness of sixty (60) milli-inches (1.5 mm) and a maximum water vapor transmission rate of 0.24 grams per square meter per day as determined by the American Society for Testing and Materials (ASTM) Method E96-80, procedure BW, "Test Methods for Water Vapor Transmission of Materials"; and

iii. Subject to all of the following:

(1) Both HDPE and LLDPE geomembranes shall have factory and field seams whose shear and peel strengths during testing are in conformance with the seam strengths specified in method GRI GM19(a) or GM19(b). For all geomembranes, any seam failure shall occur in the lining material outside the seam area

(2) For all field seams, visual inspection and pressure or vacuum test for seam continuity using suitable non-destructive techniques;

(3) Interface shear strength of the actual components that will be used in the liner system tested with method ASTM D5321 or an equivalent test method; and

(4) Continuous spark testing or an industry-accepted equivalent test at the production facility prior to delivery to the site for installation. If the continuous spark or equivalent testing detects any defect, the tested material must be rejected and not used at the site.

b. The non-synthetic component of the composite liner shall consist of either of the following:

i. A layer of compacted soil at least twenty-four (24) inches thick compacted to ninety-five percent (95%) of maximum dry density according to Standard Proctor Test ASTM D698 or Modified Proctor Test ASTM D1557, placed below the geomembrane. The soil layer must be placed in a minimum of three (3) lifts that each have a compacted thickness of six (6) inches and a hydraulic conductivity less than or equal to 1×10^{-7} centimeters per second. The geomembrane component shall be installed in direct and uniform contact with the compacted soil component to retard leachate migration if a leak in the geomembrane should occur. Soil materials used within the uppermost lift of the compacted soil layer immediately below the geomembrane shall not contain particles in excess of point seven five (0.75) inches (nineteen (19) mm) in the largest dimension. Angular, sharp material is not allowed regardless of diameter. This layer shall be placed within two percent (2%) of optimum moisture content to achieve the specified compaction and hydraulic conductivity. The soil component may consist of in-situ soils or compacted imported soils provided they meet the specifications in Subsection 140.02.c. for soil components of composite liners; or

ii. A layer of mechanically compacted phosphogypsum at least twenty-four (24) inches thick, placed above the HDPE geomembrane, with a hydraulic conductivity of 1×10^{-4} centimeters per second. No rigid or sharp objects that could damage the liner may be placed within this compacted layer of phosphogypsum. A layer of compacted gypsum is not required for any vertical expansion or natural ground slopes steeper than 2.5H:1V abutting a vertical or horizontal expansion where phosphogypsum slurry is discharged into the expansion area within one year of completion of construction.

c. If the non-synthetic component of the composite liner is a compacted soil layer, it shall include all of the following:

i. The soil layer shall be constructed to preclude, to the greatest extent practicable, lenses, cracks, channels, root holes, pipes, or other structural inconsistencies that can increase the hydraulic conductivity of the soil component. The design shall illustrate and describe those instances in which over-excavation of permeable areas and backfilling may be necessary to seal the permeable areas. The design will include requirements for use of woven reinforcing geotextile to stabilize larger cracks or voids prior to placing the liner;

ii. The hydraulic conductivity shall not be increased above the values specified for the component as a result of contact with leachate from the phosphogypsum stack system. Compatibility of the soil component and leachate shall be demonstrated by testing the soil component with actual or simulated leachate in accordance with EPA Test Method 9100 or an equivalent test method approved by EPA; and

iii. The soil layer shall be placed using construction equipment and procedures that achieve the required hydraulic conductivity and thickness. A field test section shall be constructed using the proposed construction equipment that will be used to install the soil liner and tested to document that the desired hydraulic conductivity and thickness is achieved in the field.

d. If an intermediate liner is used to vertically expand a phosphogypsum stack the non-synthetic component of a phosphogypsum stack composite liner is not required under the following conditions:

i. Where it has been demonstrated to and approved by the Department that a geomembrane, alone or in contact with sedimented gypsum placed in slurry form, is equivalent or superior to a composite liner designed and installed in accordance with the requirements of Subsection 140.02; or

ii. Where it has been previously demonstrated to and approved by the Department that a geomembrane in contact with sedimented gypsum placed in slurry form is equivalent or superior to a composite liner with twenty-four (24) inches of compacted phosphogypsum placed above the geomembrane.

03. Liner Systems Construction Quality Assurance/Quality Control. A quality assurance/quality control plan must be developed and carried out for the construction of composite liners.

a. This plan shall provide personnel with adequate information to achieve continuous compliance with the liner construction requirements and shall include project specifications and construction methods that use established engineering practices to construct a liner system and provide for quality control testing procedures and sampling frequencies. Sampling and testing shall be conducted in the field by trained personnel during construction and after construction completion. Such personnel shall be under the direction of an Idaho licensed professional engineer to assure the liner system will comply with the standards in Section 140. The engineer or his qualified designee shall be on-site at all times during construction to monitor construction activities. Construction activities include the time during which the protective layer is installed over the geomembrane to ensure that the placement techniques do not cause damage to the liner system materials. The quality assurance/quality control plan shall include all of the following:

i. Responsibility and authority of all organizations and key personnel involved in permitting, designing, constructing, and providing construction quality assurance of the phosphogypsum stack liner, phosphogypsum stack system liners, or component liners shall be described fully;

ii. Minimum qualifications of the engineer, his qualified designee(s) and supporting personnel shall be in the plan to demonstrate that they possess the training and experience necessary to fulfill their identified responsibilities;

iii. Procedures and tests that will be used to monitor the installation of the liner system components shall be described in detail;

iv. Description of sampling activities, sample size, sample locations, minimum frequency of testing, acceptance and rejection criteria, and plans for implementing corrective measures that may be necessary; and

v. Description of reporting requirements for construction quality assurance/quality control activities, including daily summary reports, observation data sheets, problem identification and corrective measures, and final documentation. The engineer shall provide all such documents in a final report to the operator.

b. A laboratory experienced in the testing of geomembranes, independent of the liner manufacturer and installer, shall perform the required testing that must include, at a minimum, conformance testing for all geomembranes and testing of seam shear and peel strength for geomembranes.

c. The engineer in charge of construction quality assurance shall provide to the Department a signed, sealed final report and record drawings detailing how the liner system has been installed in conformance with the plans and specifications set out in the construction quality assurance/quality control plan for the liner system and identifying any deviations.

04. Soil Layer Construction Quality Assurance/Quality Control. In addition to the requirements of Subsections 140.02.b. and 140.02.c., the following requirements apply to construction of the soil component of liner systems. All required testing and analysis shall be performed in accordance with generally accepted engineering procedures, such as those promulgated by the ASTM. Parenthetic references to ASTM methods are intended as guidance only. The specific methods utilized are to be provided in the construction quality assurance/quality control plan.

a. The construction quality assurance/quality control plan shall include a section specifying performance criteria for the soil liner and providing quality control testing procedures and minimum sampling frequencies. In addition, the plan shall define the responsibilities of the parties that will be involved in soil liner construction, and shall present minimum qualifications of each party to fulfill his identified responsibilities.

b. Field and laboratory testing during soil liner construction shall be conducted by a qualified soil testing laboratory representing the operator. A qualified field technician representing the owner/operator shall provide full-time, on-site inspection during soil liner construction. The field technician shall work under the supervision of an engineer with experience in soil liner construction.

c. Prior to soil liner installation, an appropriate borrow source shall be located. Suitability of the soil liner construction materials from that source shall be determined in accordance with the following:

i. If demonstrated field experience is available to document that a given borrow source can meet the requirements of the project specifications, then extensive laboratory testing of the borrow source will not be required. Additionally, the source of material shall be geologically similar to, and the methods of excavating and stockpiling the material shall be consistent with, those used on the prior projects. Furthermore, representative samples from the appropriate thickness of the in-situ stratum or from stockpiles of the borrow material proposed for soil liner construction shall be submitted to an independent soil testing laboratory to document through index testing that the proposed material is consistent with the material used on prior successful projects. At a minimum, index testing shall consist of percent fines, Atterberg limits and moisture content determinations;

ii. If demonstrated field experience as defined in Subsection 140.04.c.i. is not available or cannot be documented, then the following requirements shall be met:

(1) A field exploration and laboratory testing program shall be conducted by an independent soil testing laboratory to document the horizontal and vertical extent and the homogeneity of the soil strata proposed for use as liner material. A sufficient number of index tests from each potential borrow stratum shall be performed to quantify the variability of the borrow materials and to document that the proposed borrow material complies with project specifications. At a minimum, the index tests shall consist of percent fines, Atterberg limits and moisture content determinations;

(2) Laboratory hydraulic conductivity tests shall be conducted on samples representative of the range in variability of the proposed borrow source (ASTM D-5084). For each such sample, test specimens shall be prepared and tested to cover the range of molding conditions (moisture content and dry density) required by project specifications. The hydraulic conductivity tests shall be conducted in triaxial type permeameters. The test specimens shall be consolidated under an isotropic consolidation stress no greater than ten (10) pounds per square inch and permeated with water under an adequate backpressure to achieve saturation of the test specimens. The inflow to and outflow from the specimens shall be monitored with time and the hydraulic conductivity calculated for each recorded flow increment. The test shall continue until steady state flow is achieved and relatively constant values of hydraulic conductivity are measured (ASTM D-5084); and

(3) The borrow source shall only be considered suitable if the hydraulic conductivity of the material, as documented on laboratory test specimens, can be shown to meet the requirements of the project specifications at the confidence level identified in the quality assurance/quality control plan;

iii. Prior to full-scale soil liner installation, a field test section or test strip shall be constructed at the site above a prepared sub-base. The field test section or test strip will only be considered acceptable if the measured hydraulic conductivities of undisturbed samples from the field test section or test strip meet the requirements of the project specifications at the confidence level identified in the quality assurance/quality control plan. Field test sections or test strips shall be constructed in accordance with the following requirements:

(1) The field test section or test strip shall be of sufficient size such that soil liner installation procedures can be duplicated within the field test section or test strip; and

(2) The field test section or test strip shall be constructed using the same equipment for spreading, kneading and compaction and the same construction procedures (e.g., number of passes, moisture addition and homogenization, if needed) that are anticipated for use during soil liner installation;

iv. At a minimum, the field test section or test strip shall be subject to the following field and laboratory testing requirements at frequencies specified in the quality assurance/quality control plan:

(1) Random samples of the soil liner construction material delivered to the site during test section or test strip installation shall be tested for moisture content (ASTM D-2216), percent fines (ASTM D-1140) and Atterberg limits (ASTM D-4318);

(2) Field density and moisture determinations shall be performed on each lift of the compacted soil liner test section or test strip;

(3) Upon completion of the field test section or test strip, the thickness of the lift shall be measured at random locations to check for thickness adequacy; and

(4) Shelby tube or drive cylinder (ASTM D-2937) samples shall be obtained from each lift of the field test section or test strip for laboratory hydraulic conductivity testing. Laboratory hydraulic conductivity testing shall be conducted in triaxial type permeameters (ASTM D-5084). The test specimens shall be consolidated under an isotropic consolidation stress no greater than ten (10) pounds per square inch and permeated with water under an adequate backpressure to achieve saturation of the test specimens. The inflow to and outflow from the specimens shall be monitored with time and the hydraulic conductivity calculated for each recorded low increment. The test shall continue until steady state flow is achieved and relatively constant values of hydraulic conductivity are measured (ASTM D-5084). Alternatively, a sealed double-ring infiltration field test (ASTM D3385) may be used as an alternative to taking drive or Shelby tube samples; and

v. Full scale soil liner installation may begin only after completion of a successful soil liner field test section or test strip. Documentation of quality control testing shall be maintained and made available to the Department upon request, to document that the installed soil liner conforms to engineer-approved project specifications. The testing frequencies for quality control testing are specified within the approved quality assurance/quality control plan. Samples shall be obtained from random locations selected by an independent soil testing laboratory. If there are indications of a change in material properties, product quality or construction procedures during soil liner construction, additional tests shall be performed to determine compliance.

d. The following field tests shall be performed during liner system installation at a minimum test frequency specified in the approved quality assurance/quality control plan:

i. Density tests;

ii. Moisture content and field density determinations. The degree of compaction shall be checked using the one-point field proctor test or other appropriate test procedures; and

iii. Thickness measurements.

e. The following laboratory tests shall be conducted during liner installation at a minimum test frequency specified in the approved quality assurance/quality control plan:

i. Percent fines (ASTM D-1140) of the liner construction material;

ii. Atterberg limits determinations; and

iii. Hydraulic conductivity testing of Shelby tube or drive cylinder (ASTM D-2937) samples of the compacted liner. Laboratory hydraulic conductivity tests shall be conducted in triaxial type permeameters (ASTM D-5084). The inflow to and outflow from the specimens shall be monitored with time and the hydraulic conductivity calculated for each recorded flow increment. The test shall continue until steady state flow is achieved and substantially constant values of hydraulic conductivity are measured.

05. Leachate Control System Standards.

a. A perimeter underdrain system designed to stabilize the side slopes of the phosphogypsum stack shall be installed above the geomembrane liner.

b. Perimeter drainage conveyances used in the leachate control system shall either consist of covered or uncovered ditches that are lined continuously with the phosphogypsum stack liner, or of chemically compatible leachate collection pipes. Covered ditches shall have maintenance manholes installed at appropriate intervals. Piped systems shall have manholes or appropriate cleanout structures at appropriate intervals.

c. All toe drain or leachate collection systems must be constructed within the lined system.

d. Leachate control systems shall meet the liner system construction quality assurance/quality control requirements in Subsection 140.03 and the soil layer construction quality assurance requirements in Subsection 140.04.

06. Liquid Containment and Conveyance Systems

a. Composite liners shall be used on all liquid containments and conveyances associated with phosphogypsum transport, cooling water, and return of process wastewater. Exceptions are pumped flow systems contained in pipes or alternative systems that provide an equivalent degree of protection as certified by an engineer.

b. Pump and piping systems associated with the transport of phosphogypsum or process wastewater and that cross surface waters of the state must be double contained with chemically compatible

materials in a manner that assures that all materials under pumped flow are contained within a lined system in the event of a leak or piping system failure.

c. Lined ponds that are part of the phosphogypsum stack system shall be seepage tested prior to use by an Idaho licensed professional engineer, an Idaho licensed professional geologist, or by individuals under the direct supervision of the engineer or geologist. The design and construction plan shall include a schedule for submittal of a procedure identifying site specific testing methods, equipment, and quality control processes for Department review and approval. The schedule will also identify submittal and review of a report presenting seepage test results.

d. Liquid containment and conveyance systems shall meet the liner system construction quality assurance/quality control requirements in Subsubsection 140.03 and the soil layer construction quality assurance requirements in Subsection 140.04.

141. -- 149. (RESERVED)

150. CONSTRUCTION OF NEW PERIMETER DIKES.

01. Design.

a. The general area desired for construction of a perimeter dike shall be carefully inspected by an engineer prior to selection of the exact location for the perimeter dike. Areas of uneven natural subsidence, sinkholes, pockets of organic matter, or other unstable soils shall be avoided unless special provisions are made for their mitigation.

b. The operator will develop a program of soil sampling and testing adequate to determine the characteristics of the foundation material that will support the proposed perimeter dike and of the material to be used for construction of the perimeter dike. Sampling shall include borings, test pits, or in-place samples from the associated exposed excavation face. All borings and/or test pit explorations shall be logged using a recognized engineering soil classification system with location and depths of all samples recorded on the log. Tests to determine in-place densities, shear-strength, and permeabilities of the foundation and embankment soils shall be performed. Tests on foundation soils shall be performed either on undisturbed samples or on the in-place soil. Tests on embankment soils shall be performed on samples remolded to the densities and moisture contents to be used in construction.

c. The crest on the top of the perimeter dike shall be graded toward the inside slope or the outside slope. If the perimeter dike exceeds ten (10) feet in height and crest run-off is directed toward the outside slope, run-off controls shall be used to protect the outside slope against erosion. Both inside and outside slopes shall be no steeper than as determined in Subsection 150.01.e. Seepage control shall be provided by means of a liner constructed in accordance with Section 140 placed on the inside slope of the perimeter dike and suitably connected to the remainder of the liner system.

d. The freeboard of an above-grade perimeter dike shall not be less than five (5) feet unless a freeboard of less than five (5) feet is justified based on results of seepage and stability analyses and wave run-up analyses. The use of less than five (5) feet must be approved by the Department. In no event shall the freeboard of an above-grade perimeter dike be less than three (3) feet.

e. Slope Stability and Design Factors of Safety of Perimeter Dikes.

i. A stability analysis shall be performed. A seepage or flow net analysis shall be made, when applicable, for use in the stability analysis. The stability analysis shall consider the minimum fluid level as well

as the fluid level at the freeboard on the upstream slope of the perimeter dike and possible fluctuations of the tail water level.

ii. The engineer shall use the following minimum safety factors for perimeter dikes: 1.75 for horizontal shear at base of fill; 1.5 for horizontal shear within the fill due to seepage through the outer face; 1.5 for horizontal shear or circular arc failure through the foundation soils; 1.5 for protection against shear failure of any circular arc in either inside or outside slope. In determining design safety factors, water pressure distribution must be addressed. The review shall include a seismic stability analysis.

02. Site Preparation. In accordance with specifications provided by the engineer, ground that will become the foundation of perimeter dikes shall be stripped of vegetation and organic detritus or residue, including muck, mud, slimes, or other material which would flow or undergo excessive consolidation under heavy loading. All earth foundation surfaces on which fill is to be placed shall be scarified, or moistened and compacted, prior to spreading of first course of fill material, and the perimeter dike base shall be well drained during construction except when placing hydraulic fill.

03. Material to be Used. Material used for perimeter dikes shall be free of extraneous matter that could affect the compactibility, density, hydraulic conductivity, or shear strength of the finished perimeter dike (e.g., stumps, vegetation, trees, and debris). Tailings may be used for perimeter dike fill when such a completed perimeter dike will meet all requirements for perimeter dikes.

04. Process Wastewater Control Design.

a. Conveyance ditches, pumps, pipes, and hydraulic structures located within a phosphogypsum stack system shall have adequate capacity:

i. To circulate the process wastewater stream(s); and

ii. To contain or transfer, while maintaining at the same time the freeboard of the perimeter dike, run-off from the process watershed upstream of the water control structures resulting from the greater of either:

(1) A storm event generating a twenty-five (25) year rainfall event in twenty-four (24) hours; or

(2) A combined peak precipitation and snow-melt event over a twenty-four (24) hour period using snowfall, precipitation, and other meteorological data from the historical record.

b. If provisions are made to contain all or part of the storm surge resulting from such event within the phosphogypsum stack system upstream from the conveyance system or water control structures, then the transfer capacity of the ditches, pumps, pipes, and related structures may be reduced accordingly.

05. Methods of Construction.

a. Each new perimeter dike shall be constructed to meet or exceed the minimum safety requirements of this Section and the specifications and design for that perimeter dike. Appropriate earthmoving equipment shall be used to place materials in perimeter dike construction. The soil shall be compacted and density tests shall be performed to ensure that the designed densities are obtained. The engineer's qualified designee shall be present on the site during construction of the perimeter dike and liner and during construction and installation of spillways and penetrations through the perimeter dike or liner. The Department shall be notified of the date on which construction of a new perimeter dike will begin.

b. Areas around any water level control structure pipe, any other conduit, or any surface of discontinuity between materials within the mass of the perimeter dike shall be carefully inspected and action taken

to avoid potential concentration of seepages and to ensure that soils under and around a culvert are uniformly compacted and are in continuous contact with the external culvert surface. All penetrations through the liner on the upstream slope of the perimeter dike shall be made using water tight joints or connections and shall be capable of maintaining their integrity under all in-use conditions. All pipes and joints in pipes or conduits extending through a perimeter dike shall be made leak-proof and shall be constructed of materials suitable for the fluids carried and the load imposed. In order to avoid leaks associated with differential settlement, conduits through perimeter dikes shall not be rigidly supported by piles or piers. Backfill around conduits shall be of a density that is equal to or greater than those of the surrounding embankment. Particular attention shall be devoted to the lower third of the conduit.

151. -- 159. (RESERVED)

160. GROUNDWATER MONITORING PLAN.

01. Groundwater Monitoring Plan Submittal. The operator is encouraged to submit the groundwater monitoring plan to the Department for review and comment during the initial stages of site characterization. The groundwater monitoring plan shall bear the imprint of an Idaho licensed professional engineer's seal that is both dated and signed by the engineer or signed and dated by a professional geologist.

02. Groundwater Monitoring Plan Components. The required components of the groundwater monitoring plan may vary based on site-specifics conditions and can include but are not limited to:

a. Description of existing groundwater conditions (including the quantity, quality, and direction(s) of groundwater flow underlying the phosphogypsum stack) prior to construction. The operator is encouraged to utilize a statistically based process for establishing background groundwater quality consistent with the Department's Statistical Guidance for Determining Background Groundwater Quality and Degradation available at www.deq.idaho.gov;

b. Establish water quality assessment and compliance criteria and any identify any other parameters to be monitored;

c. The monitoring plan shall be designed to detect statistically significant degradation of the underlying aquifer(s) and/or any interconnected surface waters from the operation of the phosphogypsum stack(s);

d. Identify the locations of the proposed monitoring and/or existing monitoring wells that will be used to establish background and determine compliance. The plan also will include proposed drilling and well construction details, and development procedures for any new wells that will be installed;

e. Identify the frequency with which monitoring will be conducted; and

f. Water sampling procedures and analytical methods including a quality assurance/quality control plan and sampling for data collection and analysis and any verification and/or confirmation sampling that will be necessary.

03. Reporting Requirements.

a. On a quarterly basis, or other frequency directed by the Department, the operator shall submit reports to the Department on all monitoring wells that include the following:

i. Monitoring well location, the collection methods, and testing methods of samples;

ii. The type, number, concentration and analyses of constituents or parameters;

iii. Groundwater monitoring data displayed in graphic form for analyzing trends in water quality;

iv. Groundwater quality and water level data submitted in tabular as well as graphical form as concentrations of key contaminants of concern or elevations versus time. An analysis of the data is not needed to support the quarterly reports but explanations should be provided to that describe deviations from normal sampling, laboratory, or quality assurance/quality control procedures that may be affecting the data;

v. A summary of any data collected from monitoring devices installed on or within the phosphogypsum stack to measure drainout (such as nested piezometers), detect significant leakage through the liner (such as horizontal vibrating-wire piezometers installed beneath the liner), or consolidation (such as settlement plates);

vi. If the facility operates a groundwater collection/containment system with or without groundwater treatment, to hydraulically control degraded groundwater, the quarterly reports shall include a summary of operating performance of the extraction wells, including the percentage of time online and average extraction rates during the reporting period; and

vii. If treatment of extracted water is performed, the quarterly reports shall summarize the effectiveness of contaminant removal during the reporting period.

b. On an annual basis, the operator shall submit a report to the Department that includes a summary of all data collected to date with an emphasis on the past year of operations. The annual report shall include the following:

i. Data interpretations regarding groundwater quality and flow;

ii. Supporting mathematical and statistical calculations;

iii. Identification of any statistically significant groundwater degradation;

iv. Discussion of contaminant transport;

v. Description and summary of the effectiveness of any mitigation measures undertaken or planned to address adverse impacts to water quality; and

vi. Discussion of whether compliance criteria have been met. If compliance criteria have not been met, the report shall present and discuss progress made toward meeting the required compliance criteria.

c. The annual report and quarterly submittals shall be provided as hard copy and in electronic format. The data shall be submitted in electronic format accompanying the quarterly and annual reports. The required contents, format, and submittal schedules for the quarterly and annual reports will be described in the approved groundwater monitoring plan. The groundwater monitoring plan will also contain a schedule for submittal of any additional required plan deliverables such as a report establishing background conditions, or a monitoring well installation plan and report.

04. Department Notification. When requested by the Department, the operator must notify the Department at least thirty (30) days prior to the next scheduled sampling event so that a representative may be present to overserve sampling and/or obtain split samples.

161. – 169. (RESERVED)

170. DESIGN AND CONSTRUCTION PLAN REVIEW.

01. Receipt of the Design and Construction Plan. Upon receipt of a design and construction plan submitted by an operator, the Department will have ninety (90) days to review the plan.

02. Plan Approval. Upon determination by the Department that a design and construction plan submitted by an operator meets the requirements of Sections 100 through 160, the Department will deliver to the operator, in writing, a notice of approval of such plan. Thereafter, said plan shall govern and determine the nature and extent of the obligations of the operator for compliance with Sections 39-176A through 39-176F, Idaho Code, with respect to the phosphogypsum stack system for which the plan was submitted.

03. Plan Rejection. If the Department determines that a design and construction plan fails to fulfill the requirements of Sections 100 through 160, it shall deliver to the operator, in writing, a notice of rejection of the plan and explain the basis for rejection.

a. Upon receipt of the notice of rejection, the operator may submit amended plans within forty-five (45) days.

b. The Department will have ninety (90) days to review an amended plan. Upon further determination by the Department that the amended plan does not fulfill the provisions of Sections 100 through 160, it will deliver to the operator, in writing, a notice of rejection of the amended plan.

04. Time Periods. The time periods in this section may be adjusted if agreed to by both the Department and the operator.

171. -- 179. (RESERVED)

180. COST RECOVERY.
Prior to submittal of the construction and design plan the operator shall enter into an agreement with the Department for actual costs incurred for the review and approval of plans and associated documents.

181. -- 189. (RESERVED)

190. CONSTRUCTION REPORT AND FINAL INSPECTION.

01. Monthly Construction Report. A monthly construction report will be provided to the Department within ten (10) working days of the end of each month for which construction activities are performed. The monthly construction report will include a narrative of work performed during that period along with tables summarizing the various samples collected, indicating sample ID's and dates collected.

02. Final Inspection. Upon completion of construction, the operator's engineer shall conduct a final inspection. The operator shall notify the Department at least five (5) business days in advance of the final inspection so that the Department staff can attend the final inspection if desired. Upon successful completion of the final inspection, a "notice of substantial completion" letter will be provided to the Department indicating that the lined phosphogypsum stack cell(s) is/are ready to receive process water and phosphogypsum and/or that the lined ponds are ready to put into service and receive operational fluids.

03. Construction Completion Report. A construction completion report shall be submitted to the Department within ninety (90) days of completion of construction activities. Construction is considered complete at the issuance of the notice of substantial completion letter. The report shall include final record drawings and conformation of construction to the approved design and construction plan, including construction quality control plans for phosphogypsum stack components.

191. -- 199. (RESERVED)

200. DEVIATIONS FROM APPROVED DESIGN AND CONSTRUCTION PLAN SPECIFICATIONS.

01. Deviations from design and construction plan. Any deviations from design specifications that are outside a given range or differ from specifications in the approved design and construction plan will be communicated in writing to the Department.

02. **Timeline.** The Department will provide a determination on whether the proposed deviation is minor and will endeavor to provide that determination within one business day. Work may proceed during the determination.

a. If the Department determines that the proposed deviation is minor, work will be allowed to continue and the operator will document the deviation in the monthly construction report.

b. If the Department determines that the proposed deviation is not minor, this may cause a work-stop on that item of construction pending resolution of the deviation. In that event, all parties will work expeditiously to resolve the issues, which may include review and approval of a formal modification of the approved design and construction plan.

201. -- 999. (RESERVED)