

**OTTER CREEK MINE**  
**EXHIBIT 315A: PONDS AND EMBANKMENTS**  
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Appendix A: Ponds and Embankments, Drainage Control Hydrology and Sedimentology Report (attached as a separate PDF)

# **OTTER CREEK MINE**

## **EXHIBIT 315A: PONDS AND EMBANKMENTS**

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### **1.0 Introduction**

Surface drainage and sediment control at Otter Creek Mine will utilize a system of incised ponds to capture, detain and route surface runoff for control of sediment and protection of surface water quality. This exhibit provides information on pond design, operation and reclamation. The requirements of performance standards contained in ARM 17.24.639, 640, 642 and 650 are addressed.

### **2.0 Drainage Control Plan**

Pond locations and designations are shown on Map 11 – Operational Drainage Control. Detailed information on watershed boundaries; pond sizing, operation and reclamation; routing of surface runoff and pit dewatering; and ditch and culvert sizing is included in Appendix A – Ponds and Embankments, Drainage Control Hydrology and Sedimentology Report. All sediment ponds will be excavated ponds identified by the prefix EP- and the watershed number.

#### **2.1 Operational Drainage Control**

Operational sediment ponds will be constructed in two distinct phases. Sediment ponds EP-1, EP-1B, EP-2, EP-3, EP-4, and EP-5 will be constructed along the Drainage Control Service Road to control drainage from initial mine development. Ponds EP-6, EP-7, EP-8, EP-9, EP-9A, EP-10, EP-11, EP-12, EP-13, EP-14 and EP-15 will be constructed as soil salvage advances into each new watershed. These ponds are sized to contain runoff from the 10-year, 24-hour storm event plus three times the average annual sediment yield, based on “worst case” hydrologic conditions.

During initial mine pit development, a central sump will be constructed to store one year’s worth of water pumped from the pit. As the pit advances to the east and spoils are backfilled, second phase sediment ponds will be constructed in the spoils. Ponds EP-1A, EP-2A, and EP-3A will be established in the box cut above ponds EP-1, EP-2 and EP-3, respectively. Mining of the box cut will remove Phase 1 ponds EP-5, EP-6 and EP-7, and these will be re-established as second

phase ponds in the backfilled box cut; these ponds will intercept runoff from spoils and reclaimed areas as the pit advances. At the north end of the pit, EP-10 also will be constructed on backfilled spoils as the pit advances. Pond EP-15 will be constructed when drainage is restored during final pit closure. These ponds are sized to contain runoff from the 100-year, 24-hour storm event plus three times the average annual sediment yield, based on the “worst case” hydrologic condition. Pit water will be routed to EP-1A, EP-2A, EP-3A and EP-10. Additional pit water will be managed within the pit. The system is designed to operate with zero discharge from the coal removal area unless the 100-year, 24-hour storm runoff volume is exceeded.

Sediment ponds will include incised spillways in case pond capacity is exceeded. Spillways are designed to pass the 10-year, 24-hour runoff flow, without considering routing through the pond. Culverts located immediately downstream of ponds will be used as discharge sampling points.

Culverts sizes are determined by the peak runoff from a 10-year, 24-hour storm, despite the fact that sediment ponds will contain runoff upstream of most culvert locations. The Main Access road Otter Creek crossing is sized for a 100-year flood discharge. Ditches convey runoff along roads and route it between watersheds when required. Ditches along Ramp 1 and Ramp 3 will convey runoff and pit water to ponds EP-10 and EP-6 respectively. Any pit dewatering from the south end of the mine will be routed to EP-3 via EP-5 or EP-6 so that EP-7 only receives surface runoff. Appendix A contains designs including runoff calculations and sizing for all sediment ponds.

## **2.2 Reclamation Drainage Control**

At the conclusion of mining and final reclamation including removal of roads and facilities and completion of the PMT, ponds will be reduced in size to control sediment from the reclaimed area until revegetation is established, or converted to permanent ponds to replace pre-mining features in watersheds 1, 5, 7, 12 and 15. In either case, reclaimed ponds will serve as wildlife habitat enhancement features by establishing seasonal water sources and promoting wetland vegetation communities.

### **3.0 ARM 17.24.639 Sedimentation Ponds and Other Treatment Facilities**

(1) Sedimentation ponds, either temporary or permanent, will be used individually or in series and will:

(a) be constructed before any disturbance of an area that will drain into the pond takes place;

(b) be located as near as possible to the disturbed area, and out of major stream courses, unless another site is approved by the department;

(c) provide an adequate sediment storage volume equal to:

(i)(A) the accumulated sediment volume from the drainage area to the pond for a minimum of three years as determined by a method approved by the department; or

(B) not less than 0.02 acre-foot for each acre of disturbed area, excluding well-established reclamation, within the upstream drainage area.

(ii) Not applicable.

(d) Ponds will be accurately surveyed immediately after construction in order to provide a baseline for future sediment volume measurements; and

(e) be constructed as approved unless modified under ARM 17.24.642(7).

(2) Sedimentation ponds will be designed to contain runoff from a 10-year, 24-hour runoff event at a minimum, and therefore theoretical detention time requirements are not applicable.

(3) Incised ponds will not have dewatering devices.

(4) Because ponds will be designed to contain runoff from a 10-year, 24-hour runoff event at a minimum, short circuiting is not a concern.

(5) There will not be outflow through the emergency spillway during the passage of the runoff resulting from the 10-year, 24-hour precipitation event or lesser events through the sedimentation pond.

(6) Sediment will be removed from sedimentation ponds when the volume of sediment accumulates to 60% of the design sediment storage volume.

(7) Sedimentation ponds will not have embankments, and the requirements of this subparagraph are not applicable.

(8) Not applicable.

(9) Not applicable.

(10) Not applicable.

(12) Not applicable.

(13) Not applicable.

(14) Not applicable.

(15) Not applicable.

(16) Not applicable.

(17) Not applicable.

(18) Temporary erosion-control measures will be utilized as necessary during construction to control sedimentation and minimize erosion until long-term erosion-control measures can be established.

(19) Not applicable.

(20) Not applicable.

(21) Not applicable.

(22)(a) Not applicable.

(b) Not applicable.

(23) Not applicable.

(24)(a) Sedimentation ponds and other treatment facilities will not be removed:

(i) sooner than two years after the last augmented seeding within the drainage, unless otherwise approved by the department in compliance with ARM 17.24.633;

(ii) until the drainage entering the pond has met the applicable state and federal water quality requirements for the receiving stream; and

(iii) until evidence is provided that demonstrates that the drainage basin has stabilized to the extent that it was in the undisturbed state.

(25) When the sedimentation pond is removed, the affected land will be graded and revegetated in accordance with ARM 17.24.711, 17.24.713, 17.24.714, 17.24.716 through 17.24.718, 17.24.721, 17.24.723 through 17.24.726, and 17.24.731. If the department approves retention, the sedimentation pond will meet all the requirements for permanent impoundments of ARM 17.24.642 and 17.24.650.

(26)(a) Other treatment facilities will be designed to treat the 10-year, 24-hour precipitation event unless a lesser design event is approved by the department based on terrain, climate, other site-specific conditions and a demonstration by Otter Creek Coal, LCC (OCC) that the effluent limitations of ARM 17.24.633 will be met.

(b) Other treatment facilities will be designed in accordance with the applicable requirements of (1) through (21) of ARM 17.24.639.

(27) Not applicable.

(28)(a) Excavations which are sediment control structures during or after the mining operation will have perimeter slopes that are stable, with slopes of 3(H):1(V) or less. Where surface runoff enters the impoundment area, the sideslope will be protected against erosion.

(b) These excavations which are sediment control structures must be certified initially by a qualified licensed professional engineer. The department shall perform subsequent inspections. If any modifications are necessary, the department shall promptly notify the operator.

#### **4.0 ARM 17.24.640 Discharge Structures**

(1) Discharge from sedimentation ponds, impoundments, and diversions will be controlled by vegetation, energy dissipaters, riprap channels, and other measures, where necessary, to reduce erosion, to prevent deepening or enlargement of stream channels, and to minimize disturbance of the hydrologic balance. Discharge structures will be designed according to standard engineering-design procedures and be certified by a qualified, registered, professional engineer as meeting the performance standards of this subchapter and any design criteria specified by the department.

## **5.0 ARM 17.24.642 Permanent Impoundments and Flood Control Impoundments**

(1) In order to mitigate removal of pre-mining impoundments by mining, permanent impoundments are proposed in watersheds 1, 5, 7, 12 and 15. Permanent impoundments will be constructed in accordance with ARM 17.24.504 and 17.24.639 and have open-channel spillways that will safely discharge runoff resulting from a 100-year, six-hour precipitation event, assuming the impoundment is at full pool for spillway design or larger event specified by the department. These impoundments will be constructed as excavated ponds, and the spillway will be the downstream drainage bottom. Impounded water will consist of snow melt and rainfall runoff from reclaimed watersheds.

(a) The quality of the impounded water will be suitable on a permanent basis for its intended use and, after reclamation, will meet applicable state and federal water quality standards.

(b) Discharge of water from the impoundment will not degrade the quality of receiving waters to less than the water quality standards established pursuant to applicable state and federal laws.

(c) The level of water will be sufficiently stable to support the intended uses of wildlife habitat enhancement.

(d) Adequate safety and access to the impounded water will be provided for proposed water users by utilizing gentle inlet and side slopes.

(e) Water impoundments will not result in the diminution of the quality or quantity of water used by adjacent or surrounding landowners for agricultural, industrial, recreational, or domestic uses.

(f) Because ponds will be constructed by excavations rather than embankment structures, the requirements of this subparagraph are not applicable.

(g) Impoundments will be suitable for the approved postmining land use.

(2) All permanent impoundments will meet the design and performance requirements of ARM 17.24.639.

(3) All permanent impoundments will be routinely maintained during the mining operations. Ditches and spillways will be cleaned.

(4) All permanent impoundments will be inspected and certified to the department by a qualified licensed professional engineer, immediately after construction and annually thereafter, as having been constructed and maintained to comply with the requirements of this section. Inspection reports will be submitted until phase IV bond release. Certification reports will be submitted to

the department annually, either concurrently with the annual report (ARM 17.24.1129) or with the second semi-annual hydrology report (ARM 17.24.645(8) and 17.24.646(2)). The operator will retain a copy of each report at or near the mine site. Certification reports will include statements on:

- (a) existing and required monitoring procedures and instrumentation;
- (b) the design depth and elevation of any impoundment waters at the time of the initial certification report or the average and maximum depths and elevations of any impounded waters over the past year for the annual certification reports;
- (c) existing storage capacity of the impoundment; and
- (d) any other aspects of the impoundment affecting stability.

(4) Not applicable.

(5)(a) Flood control impoundments located upstream of disturbance areas for the purpose of preventing or controlling flooding or discharge are not proposed at this time, but may be proposed at a later date. In that event, the requirements of this subparagraph will be followed.

(6) If such facilities are proposed and constructed in the future, permanent impoundments and flood control impoundments with embankments meeting the size or other criteria of 30 CFR 77.216(a) or the Class B or C criteria for dams in TR-60 will be routinely inspected by a qualified licensed professional engineer or by someone under the supervision of a qualified licensed professional engineer, in accordance with 30 CFR 77.216-3.

(7) Any plans for any enlargement, reduction in size, reconstruction, or other modifications of permanent impoundments and flood control impoundments will be submitted to the department and will comply with the requirements of this subchapter. Except where a modification is required to eliminate an emergency condition constituting a hazard to public health, safety, or the environment, the modification will not be initiated until the department approves the plans.

## **6.0 ARM 17.24.650 Post-mining Rehabilitation of Sedimentation Ponds, Diversions, Impoundments, and Treatment Facilities**

(1) Prior to application for final bond release, OCC will renovate all permanent sedimentation ponds, diversions, impoundments, and treatment facilities to meet criteria specified in the detailed design plan for the permanent structures and impoundments.



(2) All temporary sedimentation ponds, diversions, impoundments and treatment facilities will be graded to the approximate original contour and reclaimed prior to application for final bond release.