CHAPTER 7
HYDROLOGY

been designed with a sediment storage capacity of 0.40 acre-foot. The elevation of the maximum sediment level will be 6954.84 feet. The 60% sediment clean-out volume of 0.24 acre-foot will have an elevation of 695~~2.2~~1.7 feet.

Detention Time. An adequate detention time will be provided in the pond to allow the effluent to meet UPDES and 40 CFR Part 434 limitations. The decant water will be sampled and discharged from the pond in accordance with the above referenced effluent limitations.

Design Event. The sedimentation pond has been designed to fully contain runoff resulting from the 10-year, 24-hour precipitation event.

Pond Description. Several drainage areas, identified on Plates 7-7 and 7-8, will contribute runoff to the sedimentation pond. The disturbed drainage areas contributing to the pond will be DWS-1 through DWS-7 and the pond itself. The undisturbed drainage areas contributing to the pond will be WS-1, -3, -5, -6, -7, -8, -9a, and -11, as well as portions of the above-mentioned "disturbed" watersheds. These undisturbed drainage areas will discharge to the pond because construction of diversion ditches along the top of cut slopes may create cut-slope stability problems. Also, constructing ditches on steep slopes is expensive and disturbs a larger area. The selected course of action was to allow undisturbed runoff to flow onto the disturbed area and be treated in the sedimentation pond.

The curve numbers used to determine the runoff volumes were based on information presented in Appendix 7-8 and Appendix 7-9. The curve number for the pond area was assumed to be 100. Refer to Table 7-6 for a list of all disturbed and undisturbed watershed areas contributing to the sedimentation pond and their associated curve numbers.

The storm runoff volume to the sedimentation pond resulting from the 10-year, 24-hour storm event was calculated to be 69,913 cubic feet (1.60 acre-feet). The calculations, presented in Appendix 7-8, are based on hydrologic design methods described in Appendix 7-10. As presented above, the maximum sediment storage volume is 0.40 acre-foot (17.424 cubic feet). Thus, the capacity of the pond at the elevation of the primary spillway is 87,337 cubic feet (2.00 acre-feet), assuming the spillway does not spill during the 10-year, 24-hour storm.

In order to fully contain the runoff from the 10-year, 24-hour storm event and the maximum sediment storage, the primary spillway on the sedimentation pond will be set at an elevation

of 6964.0~~4~~ feet. The stage-capacity curve for the sedimentation pond is contained in Appendix 7-8 and summarized in Table 7-7.

The sedimentation pond has been designed with a 24-inch diameter primary spillway CMP riser attached to a 24-inch diameter CMP pipe barrel that is together capable of safely discharging the peak flow resulting from the 25-year, 6-hour precipitation event. The 25-year, 6-hour storm event was routed through the sedimentation pond to determine an adequate primary spillway. The computer software SEDCAD+ was used to design the primary spillway. SEDCAD assumes that the pond is full to the spillway elevation at the beginning of the storm event. The SEDCAD input and output for the sedimentation pond is contained in Appendix 7-8.

From the final analysis of the 25-year, 6-hour storm event, the maximum inflow rate to the sedimentation pond from storm runoff under design conditions was calculated to be 5.90 cubic feet per second (cfs), with a maximum outflow rate of 3.93 cfs. The corresponding high water elevation in the sedimentation pond will be 6964.3 feet, 1.7 feet below the top of the embankment and 0.2 foot below the crest of the emergency spillway. Hence, the pond has been designed with adequate freeboard.

An open-channel emergency spillway has been designed for the pond to allow discharge from the pond in the event that the primary spillway becomes plugged. Details regarding this emergency spillway are discussed in Appendix 7-8. As noted in that appendix, the emergency spillway was designed assuming that the primary spillway is nonfunctional. Under this scenario, the peak discharge from the pond will be 4.12 cfs, with a peak stage elevation of 6964.7 feet (0.2 foot above the crest of the emergency spillway and 1.3 feet below the crest of the pond embankment). Hence, freeboard on the pond will remain adequate even if the primary spillway plugs and becomes nonfunctional.

The emergency spillway has been designed with a median riprap diameter of 3 inches along the crest and 6 inches down the slope of the spillway. This riprap will be underlain with a geofabric liner. The maximum velocity exiting from the emergency spillway under design

conditions will be 5.0 feet per second, which velocity is not considered to be erosive of the adjacent Dugout Creek channel.

Dewatering Device. A valved dewatering device will be installed on the riser of the primary spillway as indicated on Plate 7-4. The inlet to this device will be down turned to preclude the entry of oil from the surface of the pond. The inlet to the non-clogging dewatering device on the sedimentation pond will be at the elevation of the maximum sediment level (elevation 6954.8~~8~~4 feet). Water will be discharged from the pond in accordance with UPDES guidelines.

Short Circuiting. Short circuiting will be minimized in the sedimentation pond because the pond will fully contain the runoff from the 10-year, 24-hour precipitation event. Also, the sedimentation pond spillway will be approximately 150 feet from the primary inlet of the pond when the pond is at discharge stage, thereby increasing the residence time for storms which are larger than the 10-yr 24-hr event.

Sediment Removal. Sediment removal from the sedimentation pond will occur when the sediment level reaches the 60% clean-out level. From the stage-capacity curve presented ~~in Appendix 7-8~~ on Plate 7-4, the 60% clean-out elevation is approximately 6951.7~~2.2~~ feet. The sediment will be transported and disposed of as discussed in Chapter 5, **and Chapter 7, Section 732.200** of this M&RP. **Water that meets the quality standards set forth in the UPDES permit will be discharged to Dugout Creek before sediment cleanout begins. Water not meeting the standards will either be used for dust suppression on mine roadways or be pumped into the sealed, abandoned, "Gilson West - Old Working" as shown on the MSHA approved map (Waste Water Disposal Appendix 5-3A). The Gilson seam is a closed system and does not discharge to the surface. Adding relatively small volumes of surface runoff water will not cause a disturbance in the hydrologic balance in the permit area. Water stored in the "Gilson West - Old Working" is planned to provide process and fire fighting water for the Dugout Canyon Mine.**

When the pond is cleaned out potentially 87,120 cu. ft. or 651,657 gallons of water and sediment will be pumped underground. Samples of the slurry will be taken before pumping begins and will be tested using Table 6 of the Division's approved Soil and Overburden Handling Guidelines. This will be done to eliminate the potential of a hazardous substance entering the Gilson seam. A water sample will be obtained and analyzed for the UPDES discharge parameters. The only UPDES effluent limitation that should be exceeded will be the amount of total suspended solids. Since the water will not be discharged to Dugout Creek or off the mine site, no violation of the mines various permits will occur.

sediment level will be 6954.4 feet. The 60% sediment clean-out volume of 0.24 acre-foot will have an elevation of 6951.7 feet.

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Short Circuiting. Short circuiting will be minimized in the sedimentation pond because the pond will fully contain the runoff from the 10-year, 24-hour precipitation event. Also, the sedimentation pond spillway will be approximately 150 feet from the primary inlet of the pond when the pond is at discharge stage, thereby increasing the residence time for storms which are larger than the 10-yr 24-hr event.

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