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A0/057/012 #2

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To:	Sharon Falvey	Fax:	801-359-3940
From:	Steve Traweek	Date:	September 23, 1997
Re:		Pages:	8 (including fax cover sheet)
CC:		Fax #:	801-359-3940

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Notes: Sharon,

Here's the paperwork that I received from Dan Guy. Please review. Should you have any questions, please feel free to call me at 801-637-4155.

Thank You,

Steve

7.42 SEDIMENT CONTROL MEASURES (R614-301-742)

A discussion of the sediment control measures at the Wellington Preparation Plant is contained below.

742.100 through 742.126 Sediment Control Measures

Appropriate sediment control measures have been designed, constructed, and maintained; or proposed, using appropriate technology to minimize erosion and additional contributions of sediment to runoff outside the permit area. Sediment control measures incorporated within the permit area include: 1) retaining sediment within disturbed areas, 2) diverting runoff away from disturbed areas, 3) use of protected channels through disturbed areas, and 4) using straw dikes, riprap, silt fences, vegetative sediment filters, and dugout ponds.

742.200 through 742.214 Siltation Structures

Additional contributions of suspended solids and sediment to streamflow or runoff outside the permit area will be largely prevented through the use of various siltation structures. Certifications regarding the design and construction of the sediment control ponds are discussed in Section 733.110. The existing and proposed sediment control ponds will be maintained in accordance with the referenced sections in Section 742.213 of the Regulations. There are no underground mine workings within the permit area from which point-source water discharges can emanate. The design of the sediment ponds located on the permit area is provided in Section 742.220, below.

742.220 through 742.221 Sedimentation Ponds

Six existing ponds are included in the proposed sediment control plan. These ponds include the existing Plant Sediment Pond, Refuse Basin Sediment Pond, Slurry Pipeline Sediment Pond, Road Pond, Auxiliaty Pond and the Dryer Sediment Pond. The Road Pond, Auxiliary Pond and the Dryer Sediment Pond are used in series. The Plant Sediment Pond, Slurry Pipeline Sediment Pond, and the Refuse Basin Sediment Pond are used independently with respect to each other. The sediment ponds are located near the disturbed area, and will be maintained to provide adequate sediment storage volume as described below.

The Road Pond, Auxiliary Pond and the Dryer Sediment Pond are connected in series; however, the Dryer Pond was enlarged in 1994, and will contain the entire runoff from the 10-year 24-hour precipitation event. The computed 10-year 24-hour runoff to the series of ponds is presented in Table 742-1 along with available stotage between proposed decant elevations and spillway elevations. Stage capacity curves are presented in the Hydrologic Appendix. The peak 25-year 6-hour storm event discharges from the ponds was computed assuming the ponds full to the spillway elevation prior to start of storm.

The Dryer Sediment Pond will serve as the final treatment facility for Watershed No. 4. The Dryer Sediment Pond will provide dead storage (i.e. storage below the decant level) for approximately 10 times the computed 3-year sediment volume (see computations in Hydrologic Appendix).

TABLE 742.1. Watershed No. 4 Sediment Ponds, Design Capacities and Available Volumes

Sediment Pond	Drainage Area (acres)	Weighted CN	10-yr 24-hr Storm Runoff (acre-feet)	Available Storm Storage Volume (acre-feet)	25-yr 6-hr Storm Peak Discharge (cfs)
Road Pond	6.5	88.3	0.45	0.48	1
Auxiliary Pond	35.7	88	2.45	0.79	11
Dryer Sediment Pond	8.3	92.7	0.78	4.61	13
Total Watershed No.4	50.5	89	3.68	5.88	13

The plant Sediment Pond, Slurry Pipeline Sediment Pond, and the Refuse Basin Sediment Pond will contain the entire estimated 10-yr 24 hr precipitation event (see Table 742-2). The Plant Sediment Pond has a valved, dewatering device with a skimmer to maintain the detention time required under R614-301-742.221.32. The Refuse Basin Sediment Pond outlet structure will be modified to include a dewatering device. The dewatering plan for the Slurry Pipeline Sediment Pond includes a floating pump intake and pump. Excessive settlement has not appeared to be any problem with the existing sediment ponds.

TABLE 742.2. The Plant Sediment Pond, Slurry Pipeline Sediment Pond, and the Refuse Basin Sediment Pond Design Capacities.

Sediment Pond	Drainage Area (acres)	Weighted CN	10-yr 24-hr Runoff (acre-feet)	3-year Sediment Load (acre-feet)	Peak Discharge (cfs)	
					25-yr 6-hr	100-yr 6-hr
Plant Sediment Pond	20.5	87	1.41	0.02	2.9	N/A
Lower Refuse Basin Sediment Pond	589	91	48.6	0.72	N/A	NONE
Slurry Pipeline Sediment Pond	7.35	85	0.4	0.006	2.25	N/A

Stage-capacity curves are presented for each of the three existing sediment ponds in Volume II - Hydrology Appendix.

The mean annual sediment yield to each sediment pond was estimated as described in Volume II - Hydrology Appendix. Tributary areas were subdivided based on characteristics of the subareas that would affect erosion, such as vegetation type and soil type. Decant elevations are set to be at least two feet higher than the elevation represented when 60 percent of the 3-year sediment lead is presentin the ponds (as determined from the elevation-capacity curves in Volume II - Hydrology Appendix. The decant elevations are listed in Table 742-3.

TABLE 742-3. Sediment Pond Design Elevations.

Sediment Pond	60% Cleanout Elevation	Decant Elevation	Primary Spillway Elevation	Emergency Spillway Elevation
Road Pond	5334.5	5336.5	5338.5	5339.3
Auxiliary Pond	5333.5	5335.9	5339.1	5340
Dryer Sediment Pond	5330.3	5331.6	5336.9	5336.9
Plant Sediment Pond	5336	5337	5338	5339
Slurry Pipeline Sediment Pond	5334	5336	5360.1	5360.1
Refuse Basin Sediment Pond	5370.1	5374	5376	5376

742.221.34 Nonclogging dewatering device.

PLANT SEDIMENT POND. The plant Sediment Pond has a valved, dewatering device with a skimmer to maintain the detention time required under R614-301-742.221.32.

REFUSE BASIN SEDIMENT POND. The Refuse Basin Sediment Pond outlet structure will be modified to include a dewatering device. The minimum decant elevation is two feet above the 60% sediment cleanout level. Three-year sediment level would be about 5370.1 feet (based on 3-year sediment volume estimate of 0.72 acre-feet and the stage-volume curve). Setting the decant elevation at 5374 feet provides about 150 acre-feet of storage. The pond is normally dry with present operating conditions. Annual potential evaporation far exceeds annual runoff volumes. The 100-year 24-hour runoff volume (88.8 acre-feet) could easily be contained in the proposed dead storage (150 acre-feet), therefore it is expected that the pond will fill to the decant level only in very rare events.

The adequacy of the Refuse Basin Sediment Pond for the design treatment event (10-year 24-hour rainfall event) was analyzed using the Army Corps of Engineers Flood Hydrograph Package computer program HEC-1 (see printouts in Hydrologic Appendix). The analysis predicts that with the Refuse Basin full to the decant level at the beginning of a storm a detention time between inflow and outflow hydrographs much greater than 24 hours would be provided using a 3 inch diameter dewatering orifice. Therefore the Refuse Basin Sediment Pond with the proposed automatic decant will provide adequate detention time to allow effluent to meet Utah and Federal effluent limitations.

SLURRY PIPELINE SEDIMENT POND. The existing Slurry Pipeline Sediment Pond has a total capacity to the existing grouted riprap spillway of about 0.7 acre-feet (see stage-capacity curve in Hydrologic Appendix). This is more than adequate to contain the runoff from a 10-year 24-hour runoff event (0.4 acre-feet) plus expected sediment volume (0.006 acre feet, see computations in Hydrologic Appendix).

Storm runoff waters which collect in the Slurry Pipeline Sediment Pond will be retained until UPDES discharge limitations can be achieved (24 hours minimum) and then discharged by pumping either to the grouted riprap spillway or directly to the Price River.

A floating pump intake will be utilized in conjunction with a staff gauge to allow dewatering of the contents of the pond. The intake will include an oil skimmer (down turned pipe elbow. See Drawing 712c). The steel post will be painted with a red stripe set at the lowest dewatering level (i.e. 5356.0 feet, about 3 feet above pond bottom elevation). The portable gasoline powered pump will be manually operated to assure pump shutoff at the appropriate level (i.e. red stripe). The pump will have a minimum capacity of 270 gpm with 12 feet of head requiring a minimum 2 horsepower engine.

ROAD POND, AUXILIARY POND, & DRYER SEDIMENT POND. The Road Pond, Auxiliary Pond and the Dryer Sediment Pond are connected in series and will contain the entire runoff from the 10-year 24-hour precipitation event from Watershed No. 4 (see Drawing P9-177 rev.). The computed 10-year 24-hour runoff to the series of ponds is presented in Table 742.1 along with available storage between proposed decant elevations and spillway elevations. Stage capacity curves are presented in the Hydrologic Appendix. The peak 25-year 6-hour storm event discharges from the ponds was computed assuming the ponds full to the spillway elevation prior to start of storm (see HEC-1 printout in Hydrologic Appendix).

The Dryer Sediment Pond will serve as the final treatment facility for Watershed No. 4. The Dryer Pond provides dead storage (i.e. storage below the decant level) for approximately 10 times the computed 3-year sediment volume (see computations in Hydrologic Appendix).

The Dryer Pond has been fitted with an open channel spillway, and will be decanted by a portable pump and floating decant, as described in Appendix L.

742.222 through 742.223 Spillway Requirements

The Refuse Basin Sediment Pond meets the size criteria of the MSHA, 30 CFS 77.216(a), and is consequently required to have a single spillway or principal and emergency spillways that in combination will safely pass the runoff from a 100-year, 6-hour precipitation event.

The remaining five sediment ponds (Road Pond, Auxiliary Pond, Dryer Sediment Pond, Plant Sediment Pond, and Pipeline Slurry Pond) do not meet the qualifying criteria (i.e. are small in both storage volume and dike height). Consequently the spillways on these five structures must be able to pass the runoff from a 25-year, 6-hour precipitation event, and can utilize a single spillway if the spillway is an open channel of non-erodible construction where sustained flows are required or may be earth- or grass-lined with non-erosive velocities where sustained flows are not expected. The Slurry Pipeline Sediment Pond, Plant Sediment Pond and the Dryer Sediment Pond meet these requirements.

The estimated peak discharge during the 25-yr, 6-hr precipitation event calculated for the sediment ponds as well as the estimated peak flow from the 100-yr, 6-hr precipitation event for the Lower Refuse Basin Sediment Pond are shown in Tables 742-1 and 742-2. Backup calculations are described in Volume II - Hydrology Appendix.

The Road Pond and Auxiliary Pond are small ponds and do not meet the size qualifying criteria of MSHA, 30CFR 77.216(a). In accordance with R645-3010742.223 these ponds should have a combination of principal and emergency spillways that will safely discharge a 25-year, 6-hour precipitation event. Both of these ponds have primary spillways consisting of culverts and earth lined emergency spillways. The principal spillways of both ponds have capacity to pass the 25-year, 6 hour event without ever topping the emergency spillways. Analyses is provided in Volume II - Hydrologic Appendix Watershed #4 which demonstrate that the earthlined emergency spillways for the Road Pond and Auxiliary Pond have non eroding velocities even in the case when the primary spillways are plugged and the total design event (25-year 6-hour) is spilled.

The ponds have sufficient storage capacity to totally contain the runoff volume from the 10-year 24-hour precipitation event between the decant elevations and the primary spillway elevations as listed in Table 742-3. The water level in the ponds will normally be maintained at or below the decant level in anticipation of a runoff producing event.

742.230 through 742.232 Other Treatment Facilities

Other than the treatment facilities specified above, no other treatment facilities exist within the permit area.

742.300 Diversions

Flow from some undisturbed areas is diverted around disturbed areas. These diversions are discussed below.

742.310 through 742.314 General Requirements

Diversion UD-1 and its extension UD-1A of Watersheds #2 and #3, respectively, the so-called Permanent Diversion of Watershed #10, and the Siaperas Ditch of Watershed #9 divert runoff around disturbed areas within the permit area (see Dwgs G9-3504 and F9-177(rev.)).

UD-1 is a temporary diversion that diverts drainage from 226 acres of undisturbed hills on the west side of the permit area. Certified as-built drawings are shown in Dwg. G9-3501. Calculations show that the design appears to be adequate to safely pass the runoff from a 10-year, 6-hour precipitation event. Calculations also show that velocities within the channel during this design storm are within the recommended limits for the channel material to prevent serious erosion. These calculations are shown in Volume II - Hydrology Appendix. The ditch empties into a subsequently installed extension named UD-1A.

UD-1A is a temporary diversion that receives the discharge from UD-1, discussed above, as well as from an additional 231 acres of additional undisturbed area in the hills west of the permit area. Certified as-built drawings of the diversion are contained in Dwgs G9-3502 and G9-3503. Because UD-1A prevents run-on onto the Course Refuse Pile, R645-301-746.212 states that the ditch must be

designed to safely pass the runoff from a 100-year, 6-hour precipitation event. Calculations contained in Volume II - Hydrology Appendix show that the design of UD-1A adequately meets this requirement. Calculations contained in the appendix also show that velocities within the channel will be within the recommended limits for the channel material to prevent serious erosion.

The so-called Permanent Diversion is a permanent diversion that diverts runoff from 680 acres of undisturbed hills to the east of the permit area. The Permanent Diversion was constructed approximately 10-years ago. The ditch was originally designed to have a 10 foot wide bottom width with 1.5 horizontal to 1 vertical side slopes and a 4 inch thick layer of riprap in selected locations (see Dwg. E9-3427). Field examination (June 19, 1993) and analysis of the 1991 mapping reveals that the channel is well vegetated and is stable when compared to surrounding channels. In accordance with R645-301-746.212, this diversion must be designed to safely pass the runoff produced for a 100-year, 6-hour precipitation event since it prevents run-on into the Upper Refuse Basin. Calculations contained in Volume II - Hydrology Appendix show that the design of the Permanent Diversion adequately meets this requirement.

The Siaperas Ditch is an old ditch that collects runoff from agricultural and undisturbed lands northwest of the permit area as shown on Dwg. G9-3504. The tributary area includes as much as 1266 acres in addition to the flow from the 680-acre drainage area diverted by the Permanent Diversion that empties into the Siaperas Ditch, for a total tributary area of 1946 acres. In accordance with R645-301-746.212, the Siaperas Ditch must safely pass the runoff produced from a 100-year, 6-hour precipitation event since it prevents run-on into the Upper Refuse Basin. Calculations contained in Volume II - Hydrology Appendix show that the Siaperas Ditch can adequately meet this requirement.

To demonstrate the Siaperas Ditch was designed to minimize adverse impacts to the hydrology balance, the Utah Division of Oil, Gas & Mining recommended that water samples be taken from the Siaperas Ditch and ground water monitoring stations GW-2 and GW-3 at the same time for comparisons (letter from J. Helfrich, 8/30/96.) These samples were collected on September 26, 1996. The sample was taken from the Siaperas Ditch about 100 ft upstream from the county road when the ditch was full or at level to near overflow at the outlet culvert.

Water surface elevation measured September 26, 1996 indicated a small gradient from the slurry basin toward the Siaperas Ditch. The water chemistry was significantly different between that measured in the Siaperas Ditch compared with the monitoring wells suggesting very little mixing of the water between the Siaperas Ditch and the slurry basin (see data in Watershed #9 - Hydrology Appendix). We believe the pool in the Siaperas Ditch does not have a significant effect on ground water beneath the slurry basin and does not have a significant negative environmental consequence. However, because a significant storm event occurred prior to the September 26 sample date, the sample may have been a reflection of the rainfall rather than the irrigation waters as was intended. Therefore, the sampling will be repeated during the irrigation season of 1997 as an attempt to demonstrate whether or not the design of the Siaperas Ditch minimizes adverse impacts to the hydrologic balance.

The ditches located at the Pipeline Slurry Pond are used to collect runoff from the tributary disturbed area and convey the runoff to the pond. Hydrologic and hydraulic computations for these ditches are provided in the Volume II - Hydrology Appendix Watershed #8. The 1991 mapping indicates that the channels are approximately V-shaped with 2 horizontal to 1 vertical side slopes.

Hydraulic analysis of the Pipeline slurry south ditch indicates that the steepest section has a design velocity (with the 10-year, 6-hour storm event) of about 5.2 fps. Erosion control blankets are proposed to be used in all reaches of the south ditch which have bottom slopes exceeding 4%. These erosion control blankets will be installed in accordance with the manufacturer recommendations.

The Pipeline Slurry north ditch has a small tributary area (about 1.1 acres) and hydraulic analysis with the 10-year, 6-hout design flow rate indicates that the ditch is stable.

742.320 through 742.324 Diversion of Perennial and Intermittent Streams

The Siaperas Ditch is an old ditch that collects runoff from agricultural and undisturbed lands northwest of the permit area as shown on Dwg. G9-3504. The tributary area includes as much as 1266 acres in addition to the flow from the 680-acre drainage area diverted by the Permanent Diversion that empties into the Siaperas Ditch must safely pass the runoff produced from a 100-year, 6-hour precipitation event since it prevents run-on into the Upper Refuse Basin. Calculations contained in Volume II - Hydrology Appendix show that the Siaperas Ditch can adequately meet this requirement.

The so-called Permanent Diversion is a permanent diversion that diverts runoff from 680 acres of the undisturbed hills to the east of the permit area. The Permanent Diversion was constructed approximately ten years ago. The ditch was originally designed to have a 10 ft bottom width with 1.5 horizontal to 1 vertical side slopes and a 4 inch thick layer of riprap in selected location (see Dwg. E9-3427). Field examination (June 19, 1993) and analysis of the 1991 mapping reveals that the channel is well vegetated and stable when compared to surrounding channels. In accordance with R645-301-746.212, this diversion must be designed to safely pass the runoff produced for a 100-year, 6-hour precipitation event since it prevents run-on into the Upper Refuse Basin. Calculations contained in Volume II - Hydrology Appendix show that the design of the Permanent Diversion adequately meets this requirement.