No biomonitoring requirements are set forth within the current UPDES permit dated August 19, 1992. Statements within the UPDES permit related to this issue state that "Since Valley Camp of Utah has been conducting Whole Effluent Toxicity (WET) testing since 1988 with no indication of toxicity ... Valley Camp of Utah will not be required to conduct Whole Effluent Toxicity (WET) at this time."

No construction activities are planned for the Valley Camp mining operation. Should any begin, the applicant agrees to submit a monitoring plan which is agreeable to the regulatory agency. Such a plan would include weekly measurements for total suspended solids and total settleable solids. Other water quality parameters to be monitored during any future construction activities will be set by the applicant and the regulatory agency. The surface water quality monitoring program is outlined in detail in Table 731.211a. From the table, both the parameters to be monitored as well as the timing of monitoring can be identified.

UPDES Discharges

There are five UPDES discharge points located on the Valley Camp permit area. All five discharge points are associated with sedimentation and filter ponds used in conjunction with surface water and mine water containment facilities installed for the mining operation. The discharge points associated with the Valcam Loadout Facility include UPDES numbers 001A, 002A, and 003A which are associated with runoff and Sediment Control Ponds 001A, 002A, and 003A respectively as shown on Map 731.720a. Discharge points for all three ponds are at the outlets of each respective discharge spillway. UPDES discharge points located with runoff control and Sediment Pond 004A and Filter Pond 005A are found in the Belina mine area as shown on Map 731.720d. The discharge location for Pond 004A is to the east of the pond at the spillway outfall. The discharge location for Filter Pond 005A is the parshall flume located at the pond outfall located on the south side of the pond. Abbreviated specifics related to the UPDES permit are summarized on Table 731.221a. A complete copy of the permit is included in Appendix 750.

Water quality and flow data from each of the UPDES discharge locations is submitted monthly to the Utah Bureau of Water Pollution Control as required. A review of discharge data from each sampling location over the last five years (January 1985 through June 1990) indicates that Ponds 001A through 003A did not discharge. Pond 004A discharged continually from January 1985 until July 1986 whereafter it is recorded to have only discharged twice, once in May of 1988 and again in April of 1990. Filter Pond 005A (a mine discharge filter pond) discharged continually throughout the five year period.

A review of data shows that only once in the last four years have the ponds had a discharge parameter higher than specified in the UPDES discharge permit. The exceedence occurred in September of 1988 at which time a suspended solids value of 78 mg/l was recorded. The maximum amount allowed according to the permit is 70 mg/l. The cause of the exceedence is not known. Other exceedences did occur within both Ponds 004A and 005A prior to June of 1986 involving suspended solids, oil & grease, iron, and TDS. A review of statistical data for Ponds 004A and 005A is given in Table 731.221b.

A careful review of data shows some slight trends in the data that are worth noting for Filter Pond 005A. First, discharge flows generally dropped from an average monthly value of 200 gpm

during 1985 and 1986 to approximately 100 to 150 gpm in 1987. In 1988 and the first half of 1989 flows were recorded to again rise slightly, whereafter they again dropped to an average monthly value of approximately 100 gpm. Matching the period of high flows with other data shows that both suspended solids and oil and grease show their highest readings during these same time periods. Insufficient discharges have occurred from Pond 004A to make any similar data comparisons. Compiled data and associated statistics for the parameters discussed for Ponds 004A and 005A are submitted along with other water quality data for surface and ground water monitoring stations in Appendix 722.100a.

TABLE 731.221a
UPDES (UT-0022985) WATER QUALITY SAMPLING REQUIREMENTS

PARAMETER	30-DAY AVERAGE	7-DAY AVERAGE	DAILY MAXIMUM	MEASUREMENT FREQUENCY
Flow, gpd[1]	N/A	N/A	N/A	Twice Monthly
TSS, mg/L	25	35	70	Twice Monthly
Total Iron, mg/L	N/A	N/A	2.0	Monthly
TDS, mg/L	N/A	N/A	700	Monthly
Oil & Grease, mg/L	10	10	10	Monthly
pH	>6.5 & <9.0	>6.5 & <9.0	>6.5 & <9.0	Monthly
Floating Solids	Trace Only	Trace Only	Trace Only	N/A
Visible Foam	Trace Only	Trace Only	Trace Only	N/A
Sanitary Wastes	None	None	None	N/A
Acute Toxicity from 005A	None	None	None	As Required by Dept. of Health
Settleable Solids, mL/L	0.5	0.5	0.5	See Note 2

1. The flow measurement from discharge point 005A is taken via a reading from a discharge flume. Other discharge points may be measured via a depth of flow reading over the top of the respective discharge structure. Should safety considerations make these measurement locations nonaccessible, flows will be estimated by measuring the discharge depth exiting each pond spillway discharge pipe. The depths so taken will be converted to flow rates to comply with this requirement.

2. To be measured during any overflow or increase in discharge volume caused by precipitation or snowmelt of equivalent volume (including bypass systems) from an event less than or equal to a 10-Year 24-Hour event. This parameter is not applicable to Filter Pond 005A as per UPDES Permit Part I.B.4.

TABLE 731.221b
UPDES (UT-0022985) WATER QUALITY DISCHARGE STATISTICS
(Jan 1985 thru Jun 1990)

STATION	PARAMETER	UNITS	STATISTICS			
			MINIMUM	MAXIMUM	AVERAGE	STANDARD DEVIATION
Pond 004A	Flow	gpm	0	140	17	33
	pH	-	7.32	8.60	7.76	0.33
	Suspended Solids	mg/l	3.20	251.00	37.63	54.11
	Oil & Grease	mg/l	0.40	8.00	1.48	2.06
	Iron (Total)	mg/l	0.04	2.96	0.97	0.70
	TDS	mg/l	372	1340	655	235
Filter Pond 005A	Flow	gpm	45	382	191	76
	pH	-	6.70	8.70	7.69	0.24
	Suspended Solids	mg/l	1.50	81.00	19.51	20.23
	Oil & Grease	mg/l	0.40	15.40	2.57	2.85
	Iron (Total)	mg/l	0.05	4.38	0.56	0.63
	TDS	mg/l	349	680	501	76

As requested, UPDES reporting will continue to be copied and submitted to UDOGM on a monthly basis as defined in the permit for the Utah Department of Health. Violations to the permit as given in the preceding table and as outlined in Appendix 750 which seriously endanger health or the environment must be reported to the EPA, Region VIII, Emergency Response Branch in Colorado as soon as possible but in no case longer than 24 hours. Other less serious violations, their timing and reporting requirements can be reviewed in the accompanying appendix material submitted with this permit as identified above.

731.222. DETERMINATION OF MINING IMPACTS.

Water quality data collected through the surface and ground water monitoring program outlined herein will be used to identify impacts resulting by mining through graphical and statistical analyses completed on a yearly basis as described herein. Selected data will be plotted on time graphs for individual water samples over a moving five year period of record to identify the occupance of trends in the data. If an undesirable trend is believed to be occurring, further evaluations will be conducted including statistical trend analyses. Should the analyses completed indicate that trends do exist, a more in-depth study will be conducted to identify the source of the trend and whether the trend is acknowledging a condition outlined in the PHC.

Solutions will be investigated which may potentially decrease or reverse negative trends. Water quality parameters which are anticipated for use in these surface water trend analyses include Flow, Oil & Grease, pH, Iron, TDS, TSS and the Anions-Cations.

As an additional aid to monitoring the potential impacts due to mine dewatering or subsidence, spring depletion curves will be prepared for each spring on an annual basis. These curves will be plotted for at least the previous five years so that trends may be identified over time.

731.222.1 thru 222.2. ADDITIONAL MONITORING REQUIREMENTS.

The additional monitoring requirements for 731.222.1 are met as shown in Table 731.211a. Requirements of 40 CFR Parts 122 and 123, 751, and by the Utah Division of Environmental Health for National Pollutant Discharge Elimination System (referenced herein as UPDES) ~~(NPDES)~~ permits are being met as discussed in Section 751. Additional details related to the locations of UPDES discharge locations and water quality requirements are given in Section 731.221.

731.223. SURFACE WATER MONITORING SUBMITTALS.

Surface water quality and quantity data will be submitted regularly to UDOGM as required under this regulation on a quarterly basis. Data showing noncompliance of the permit conditions will continue to be brought immediately to the attention of UDOGM, with follow up action as required under 145 and 731. Annual reports will be submitted which will analyze any variance in flow and water quality characteristics.

731.224 thru 731.224.2. MONITORING THROUGH BOND RELEASE.

Water quality monitoring of surface water sampling locations will begin one year after the cessation of mining activities. The monitoring program will include those parameters shown in the Table 731.211a under the standard monitoring program. The monitoring program will include two samples per year, one during high flow and the other during low flow, and will continue until termination of bonding unless modified through subsequent permit renewals or through action by the regulatory agency.

731.225. INSTALLATION/REMOVAL OF MONITORING EQUIPMENT.

No permanent structures exist within the permit area, which are used in conjunction with monitoring the quality and quantity of surface water with the exception of the discharge flume for Filter Pond 005A. This pond is located in the Belina mine area and collects pumped discharge water from Belina mine workings. The parshall flume will be maintained throughout the period of mining in order to continue to obtain flow discharge data from the mine, and will be removed along with the sediment pond upon mine reclamation. All other flow or monitoring equipment is portable and is carried to and removed from each sampling site during monitoring periods.

Field and laboratory equipment utilized for water quality monitoring will include, but not be limited to pH, DO, conductivity, and other such meters as required to obtain certifiable results. An independent testing lab will provide documentation, upon request, that certified testing

procedures are used for off-site quality monitoring. Quantity monitoring of all surface water will be measured by the use of V-notch weirs and/or flow meters including Gurley, Pigmey or Magnetic Flow meters.

All monitoring equipment which would potentially be used for the purpose of measuring water quality and or quality of surface water will be properly installed, maintained, operated during the mining process, and will be removed when no longer needed.

731.300 thru 731.320. ACID AND TOXIC FORMING MATERIALS.

No known acid or toxic forming materials are known to exist within the Mine Permit or adjacent area. In an effort to document this, the applicant agrees to initiate a coal sampling program wherein loadout coal is sampled for acid-toxic forming potential as it is loaded onto the train for shipment. Should test results indicate that an acid and/or toxic forming potential exists, a program will be initiated in cooperation with the regulatory agency to address areas of concern as outlined in Sections 731.310 through 731.320.

731.400. TRANSFER OF WELLS.

The applicant agrees that all exploratory and monitoring well which may be installed prior to the time of celation of mining will be sealed in a safe and environmentally sound manner in accordance with Sections 631, 738, 765, and current State of Utah "Administrative Rules for Water Well Drillers" requirements. The applicant will obtain from UDOGM the permission to transfer existing wells to another party should it be desired to do so in the future. Such a transfer will comply with Utah and local laws and the applicant will remain responsible for the proper management of the well until bond release as outlined in Sections 529, 551, 631, 738, and 765.

731.500. DISCHARGES.

731.510 thru 731.513. DISCHARGES INTO AN UNDERGROUND MINE.

All mine portals and surface runoff facilities are situated such that discharges into the underground mines are not possible, and no discharges to underground works are proposed for this mining operation.

731.520 thru 731.522. GRAVITY DISCHARGES FROM AN UNDERGROUND COAL MINE.

All mine portals are situated upgradient from all mine workings, and are thereby protected from gravity mine wastewater discharges. A review of geologic cross sections indicates that both Belina coal seams (Upper and Lower O'Connor seams) dip to the west and south away from the mine portals. East-west cross sections available within the geologic section of this permit indicate that both coal seams drop in elevation from east to west an approximate 150 to 300 feet. In the area south of the Belina portals it is found that the coal seams dip to the south an approximate 200 feet. The presence of numerous cracks, fissures, and faults throughout the mine are believed to be extensive enough to convey all mine water into subsurface stratum.

Hydraulic heads required to discharge water from the mine portals are therefore not believed possible within the mine.

Any information related to post mining sealing of the mine portals will be discussed in Section 500 of this permit renewal.

731.600 thru 731.620. STREAM BUFFER ZONES.

Where possible, all coal mining facilities are located with at least the required 100 foot stream buffer zone. A few areas within the Mine Permit Area are not able to comply completely with this regulation due to prelaw conditions at the mine. Those areas not able to comply are prelaw and can be identified by inspection of the respective hydrologic surface mapping. The major area not able to meet this regulation is located near the entrance to the Valcam Loadout Facility at the point where Mud Creek crosses under the highway and infringes upon Sediment Pond 002A. A plan view of this area is shown on Valcam Sediment Control Facilities Map 731.720a.

Four stream buffer zone signs have been placed within the Valcam Permit Area, and four have been placed within the Belina Permit Area. The four signs placed at the Valcam Loadout Facility are all located east of Mud Creek along the western edge of mine accessible areas as shown on Map 731.720a. Those stream buffer zone markers placed within the Belina Permit Area are located along Whisky Creek. One is located at the road crossing at the west end of the mine area, two are placed along the upper reaches of the creek before it flows into Culvert C-40-42, and the fourth is located along the embankment of Sediment Pond 004A. The locations of those placed at the Belina facilities can be identified on Map 731.720d.

731.700. CROSS SECTIONS AND MAPS.

731.710. LOCATIONS OF WATER SUPPLY USER INTAKES.

Only one water user supply intake is known to exist for current surface water users which flows into, out of and within the Mine Permit Area. This diversion is a relatively new diversion located within the northern reaches of the Valcam Permit Area as shown on Map 731.720a. The diversion is owned by Robert Radakovich of Price, Utah, and is diverted via a diversion structure and corrugated metal pipe. The diverted water is used for downstream pasture irrigation purposes.

Other diversions exist downstream of the Mine Permit Area and are used by local land owners to irrigate fields and pasture land. The location of each water right diversion can be identified by reference to Map 724.100a which shows the locations of water rights for the general vicinity. Specific diversion locations between the Valcam Loadout Facility and Scofield Reservoir are identified by small triangles along with the associated water right number. Specific information related to each water right, including owner, use, location, etc., is found in Appendix 722.100c.

731.720. LOCATIONS OF SURFACE RUNOFF/CONVEYANCE AND TREATMENT FACILITIES.

Maps showing all surface water diversion, collection, conveyance, treatment, storage and discharge facilities are included as Sediment Control Facilities Maps 731.720a through 731.720d. Map 731.720a includes the runoff conveyance facilities for the Valcam Loadout Facility and General Office Area. Maps 731.720b and 7731.720c include areas associated with the Belina Haul Road between Eccles Canyon and the Belina Mines. Map 731.720d covers the area associated with the Belina Mines. Additional surface water information related to runoff, conveyance, and treatment facilities is given in Section 742. Locations of water diversions, collection, conveyance, treatment, storage and discharge facilities related to other facilities (not a part of the surface water hydrologic control facilities such as sewage treatment, mine discharge, bypass lines, yard drains, etc.) are discussed within Section 500 of this permit.

MAP 731.720a
MAP 731.720b
MAP 731.720c
MAP 731.720d

731.730. LOCATIONS OF WATER MONITORING STATIONS.

A map identifying water monitoring locations and elevations as required under this regulation was shown previously as Map 722.100a.

731.740. LOCATIONS OF PONDS, IMPOUNDMENTS, COAL WASTE BANKS AND EMBANKMENTS.

The only existing and/or proposed facilities requiring identification under this regulation are Sedimentation Ponds 001A, 002A, 003A and 004A already presented on Maps 731.720a and 731.720d.

731.750. CROSS-SECTIONS OF PONDS, IMPOUNDMENTS, COAL WASTE BANKS AND EMBANKMENTS.

Cross sectional details related to Sedimentation Ponds 001A, 002A, 003A, and 004A are shown on Figures 731.750a and 731.750b.

FIGURE 731.750a
FIGURE 731.750b

731.760. OTHER RELEVANT CROSS-SECTIONS AND MAPS.

No other relevant cross sections and maps have been required by UDOGM.

731.800. WATER RIGHTS AND REPLACEMENT.

A contingency plan has been accepted by the applicant for the replacement of water supply to an owner of interest in the event that the water supply becomes adversely impacted

by contamination, diminution, or interruption proximately resulting from the mining activities. Under such conditions, the potential alternative means of water supply listed previously in Section 728.100 would be utilized to replace the interrupted supply of any legal owner of such rights.

It is believed that the overall mining impacts upon the local water supply are, and will remain minimal, and that the two methods of water replacement discussed above for potentially affected existing water supplies will never have to be utilized or implemented.

732. SEDIMENT CONTROL MEASURES.

732.100. SILTATION STRUCTURES.

Information requested within this regulation is discussed fully in Sections 733 and 742.

732.200 thru 732.220. SEDIMENTATION PONDS.

Requirements given by this section are discussed and covered within the specific sections referenced by the regulation.

732.300. DIVERSIONS.

Diversion requirements specified by this regulation are discussed and met in Section 742.300.

732.400 thru 732.420. ROAD DRAINAGE.

Information related to road drainage characteristics which deal with the physical design, certification, and other related information can be found in Sections 300 and 500. Information related to surface runoff hydraulics and associated ditch design is presented within Section 742.300. Comments related to reclamation are found in Section 762.

Measures to be taken to protect the inlet end of ditch relief culverts within the permit area include riprap and drop box inlets. Flows applicable to runoff control ditches are generally small and inlet protection is not required to protect against erosion. However, in some areas inlet drop boxes have been installed to aid in the collection and rediversion of runoff water. Drop box inlets located in conjunction with runoff ditches and culverts are found along the concrete ditch sections of the coal haul road between Eccles Canyon and the Belina mines, and at the inlet to culvert C-33-24. ~~Should it be found through site inspection or through calculations that additional erosion protection is required at inlets to culverts, riprap protection will be provided.~~

733. IMPOUNDMENTS.

733.100. GENERAL PLANS.

General requirements of this section not discussed herein can be found within Section 742.

733.110. CERTIFICATION.

Certification as required under this regulation is provided to the best degree possible at either the head of the appropriate calculation section or on the specific design detail sheet. It must however be understood that general plans for impoundments were developed prior to the implementation of the State and Federal regulations and therefore certification as to their design and construction is limited. Certifications provided in such cases are given with respect to existing structural dimensions and visual conditions to the best degree possible. Certification related to hydraulic or hydrologic conditions or calculations are provided on respective maps, maps or appendices.

733.120. MAPS AND CROSS SECTIONS.

Sediment pond locations are identified on Maps 731.720a and 731.720d. Sediment pond cross sections and resurveyed contours are shown on Figures 731.750a and 731.750b.

733.130. POND DESCRIPTION.

All four sedimentation ponds collecting runoff within the Mine Permit Area ~~were constructed pre-law and~~ are not subject unto 30 CFR 77 because of size. However, as required in the regulations, all four ponds are inspected quarterly. Extensive data related to the four ponds was compiled earlier in a report prepared by Hansen, Allen & Luce, Inc. in the spring of 1989 entitled "Analysis of Sediment Pond Design and Hydrologic Analysis of Undisturbed Area Bypass Channels and Small Exemption Areas". The information available within said report as required under this section has been incorporated into this permit renewal.

Three of the referenced sedimentation ponds (001A, 002A and 003A) are located within the Mine Permit Area utilized for the Valcam Loadout Facility. The fourth pond (004A) is located at the downstream end of the Belina Permit Area. All four sediment ponds have been constructed with 18 inch diameter vertical standpipes for both the principal and emergency spillways except for Pond 004A which uses an open channel design for the emergency spillway. A summary of design criteria is provided in Table 733.130a with design flow and energy dissipation design check calculations being presented in Appendix ~~Appendices~~ 742.221a. ~~and R614-301-742.310 respectively.~~

It was noted during the spring of 1989 that the principal spillway discharge pipes for all four ponds have been fitted with a short reduction section and bolted closed so as to prevent discharge. The applicant was apprised of the situation wherein it was understood that the reduction and bolted sections of the spillway outfalls would be removed by the date that this submittal was to be made to conform to the design as documented in Hansen, Allen & Luce, 1989.

An additional design change has been made to the dewatering devices for all sedimentation ponds as a result of problems caused by winter ice buildup. Freeze-thaw and icing of pond spillways has historically damaged dewatering valves which were installed on the standpipes for pond evacuation. In order to eliminate continued maintenance and the potential for discharge violations if a valve were to crack and leak, the dewatering device is to be changed. In place of a valve, all principal standpipes ~~will~~ have be fitted with a manual dewatering device

to consist of a short pipe sleeve and screw cap which will remain in place except when the pond is to be evacuated. The screw cap ~~will be~~ has been installed on the inside of the standpipe to help protect it from ice damage. When required, the cap will be removed, and the pond will be allowed to drain. Unless emergency conditions exist, no decant cap will be removed for a minimum of 24 hours and/or until effluent limitations are met. In the event of an emergency requiring pond evacuation, UDOGM will be notified of the action and the reasons for which the action was taken. Additional descriptions related to each of the ponds is given below.

TABLE 733.130a
SEDIMENT POND SPILLWAY DATA SUMMARY

SED POND	EMBANKMENT CREST ELEVATION		PRINCIPAL SPILLWAY					EMERGENCY SPILLWAY				
	EXISTING MINIMUM FT.	PROPOSED MINIMUM FT.	PIPE SPILLWAY TYPE	OUTFALL+ CREST DIA. FT.	INVERT ELEV. FT.	OUTFALL++ ELEV. FT.	PIPE LENGTH FT.	SPILLWAY TYPE	OUTFALL+ CREST DIA. FT.	INVERT ELEV. FT.	OUTFALL++ ELEV. FT.	LENGTH FT.
001A	7822.0	7820.4	Standpipe	1.5	7816.1	7809.39	60	Standpipe	1.5	7818.8	7809.41	60
002A	7838.0	7837.7	Standpipe	1.5	7835.4	7826.51	74	Standpipe	1.5	7836.3	7826.43	74
003A	7868.0	7867.5	Standpipe	1.5	7863.2	7854.60	74	Standpipe	1.5	7865.5	7854.22	74
004A	8878.0	8877.9	Standpipe	1.5	8874.9	8861.35	80	Open Channel	-	8875.9	-	-

\+ Outfall length scaled from 1 inch = 50 foot scale maps for Ponds 001A through 003A and a 1 inch = 100 foot scale map for Pond 004A.

SEDIMENT POND 001A

Sediment Pond 001A is located toward the north end of the disturbed Valcam Permit Area as shown on Map 731.720a. In general, the pond collects surface runoff from the extreme north and eastern ends of the Mine Permit Area. Runoff originating within the eastern half of the Mine Permit Area is collected via two convenience ditches (D-1 and D-2) which run parallel to the railroad tracks. In addition to the convenience ditches, the railroad tracks themselves provide a hydrologic barrier. The railroad facility and associated ditches generally bisect the Mine Permit Area in a north and south direction as shown on the map.

Pond 001A is an irregularly shaped sedimentation pond located along the eastern edge of the Mud Creek flood plain with a cross dimension of approximately one fifth its length as shown on Map 731.720a, and Survey Detail Map 731.750a. The new interior and exterior contours shown on the survey detail map were prepared shortly after sediment was removed in October of 1988. Newly prepared Stage-Capacity and Discharge Rating Curves are shown in Figure 731.750c.

FIGURE 731.750c

Sediment Pond 001A is fitted with both a principal and an emergency spillway which are capable of meeting the flow and storage requirements of the regulations. During a site visit in the spring of 1989, and in response to this permit renewal, a staff engineer for Hansen, Allen &

Luce made a visual survey of the pond related to historic hydraulic performance. It was noted that at that time, both the principal and emergency spillways, outlet onto a riprap apron containing an average rock size of approximately four to six inches. It was also noted that no erosion was evident at the outlets to either discharge pipe. Site evidence helps verify the calculations made which ~~would~~ indicate that adequate erosion protection has been provided for the maximum historical event passing through the pond.

Subsequent to the removal of sediment from Pond 001A in the fall of 1988 it was noted that water was being collected within the pond. A survey of water elevations within the pond and along the adjacent creek bed was conducted in November of 1989 and again in September of 1990 to determine the possible source of the water. Survey results indicated at that time that the water level within the pond was at the same elevation as that in the creek along the south end of Pond 001A (recorded at an elevation of 7808 feet in 1989 and at 7809 feet in 1990). It is believed that the water reflects the natural local ground water table as connected to the adjacent creek system. The water contained within the pond is not anticipated to have any negative effects upon pond operation since the volume of water contained therein is well within the volume specified for sediment storage. Water now found within the volume reserved for sediment storage will be replaced by inflowing sediments through time. This process will continue until sediment levels rise above local ground water tables.

SEDIMENT POND 002A

Sediment Pond 002A is located at approximately the mid section of the disturbed Valcam Permit Area, and immediately north of the entrance to the facility as shown on Map 731.720a. In general, the pond collects surface runoff from the western side of the railroad tracks and Mine Permit Area including the area in the vicinity of the Valcam bathhouse and Western Coal Carriers Shop (on the north) to the northern half of the stockout tube on the south as shown on the map. Runoff originating within the disturbed area is collected via small convenience ditches which enter the pond from the east and south. The railroad tracks located east of the pond provide a hydrologic barrier thereby preventing runoff from areas tributary to Ponds 001A or 003A from intermixing with Pond 002A inflows.

Pond 002A is a small triangular shaped sedimentation pond located adjacent to State Highway 96. New interior and exterior contours (shown on Survey Detail Figure 731.750a) were prepared shortly after sediment was removed in October of 1988. Newly prepared Stage-Capacity and Discharge Rating Curves are shown in Figure 731.750d.

FIGURE 731.750d

Sediment Pond 002A is fitted with both a principal and an emergency spillway which are capable of meeting the flow and storage requirements of the regulations. During a site visit in the spring of 1989, and in response to this permit renewal, a staff engineer for Hansen, Allen & Luce made a visual survey of the pond related to historic hydraulic performance. As with Pond 001A, it was noted that both the principal and emergency spillways outlet onto a riprap apron. The average rock size contained within the apron is approximately five inches. It was also noted that no erosion was evident at the outlets to either discharge spillway. Local vegetation surrounding the spillways likewise indicates the absence of erosion, and the adequacy of design

based upon the maximum historical event passing through the pond, and based upon design calculations provided in Appendix 742.221a.

One area of concern related to Pond 002A is the potential for erosion to occur on the western outer embankment adjacent to Mud Creek. Flows within Mud Creek are diverted from the west side of State Highway 96 to the east side via a culverted creek crossing. Both the road crossing and sediment pond have been in place for a number of years without incident, however recent modifications made to the creek by non mining personnel (believed to be associated with the fish and game department) appear to be having some negative impacts upon the pond. Concrete road barriers have been placed within the creek at the outlet of the highway culvert. It is understood that these barriers were an attempt to provide for a more suitable fish habitat by 1) slowing culvert velocities sufficiently to allow small fish to migrate upstream through the culvert, and 2) provide a pool habitat at the outlet to the highway culvert. Both wildlife objectives have apparently been met by the installations, however hydraulic consequences may be realized.

The road barriers were placed in Mud Creek through the use of a small crane which lifted the barriers out into the creek. It is understood that in an attempt to place one of the barriers on the far side of the creek, the crane being used became unstable, and the barrier had to be dropped to prevent the crane from tipping over. The dropped barrier ended up in such a position that it redirects a portion of the creek flows into the embankment rather than protecting it. During high flow periods, this situation could result in unnecessary erosion damage to Pond 002A. Valley Camp of Utah has planned to relocate any questionable concrete road barriers placed by non mining personnel in order to reduce existing erosion potentials.

In order to protect the embankment from additional erosion, large diameter riprap has also been placed along the stream side embankment of Pond 002A at the locations directly impacted by Mud Creek flows. Subsequent to installation of the riprap, the embankment will be visually inspected quarterly to monitor its effectiveness as a deterrent against creek erosion. Should erosional problems become evident, UDOGM will be notified, and corrective actions will be taken to remedy the situation.

SEDIMENT POND 003A

Sediment Pond 003A is a small rectangularly shaped sedimentation pond located adjacent to State Highway 96 at the far south end on the disturbed Valcam Permit Area immediately south of the Valcam stockout tube as shown on Map 731.720a. In general, Pond 003A collects surface runoff from the small disturbed area south of the stockout tube and crusher building as shown on the referenced map. Runoff originating within the disturbed area is collected via small convenience ditches which enter the pond from the north. Runoff originating along the eastern side of the railroad tracks is diverted to the pond via a 24 inch CMP culvert located north of the conveyor belt as shown. The new interior and exterior contours shown on Survey Detail Figure 731.750b was prepared shortly after sediment was removed in October of 1988. Newly prepared Stage-Capacity and Discharge Rating Curves for Pond 003A are shown in Figure 731.750e.

FIGURE 731.750e

Sediment Pond 003A is fitted with both a principal and an emergency spillway which are capable of meeting the flow and storage requirements of the regulations. During a site visit in the spring of 1989, and in response to this permit renewal, a staff engineer for Hansen, Allen & Luce made a visual survey of the pond related to historic hydraulic performance. As with Ponds 001A and 002A, it was noted during the site visit that both the principal and emergency spillways exit onto a riprap apron containing an average rock size of approximately two to four inches. It was also noted that no erosion was evident at the outlets to either discharge spillway. The absence of erosion indicates the adequacy of design based upon the maximum historical event passing through the pond, and based upon design calculations provided in Appendix 742.221a.

SEDIMENT POND 004A

Sediment Pond 004A is a small roughly square shaped sedimentation pond located at the eastern end of the Belina Permit Area as shown on Map 731.720d. Pond 004A collects surface runoff from all disturbed areas at the Belina Mines. Runoff originating within the disturbed area is collected via numerous small convenience ditches which enter the pond along its southwest corner. Undisturbed area runoff bypasses the pond and eventually ends up in Whisky Creek. New interior contours as shown on Survey Detail Figure 731.750b are based upon conditions shortly after sediment was removed in October of 1988. Newly prepared Stage-Capacity and Discharge Rating Curves for Pond 004A are shown in Figure 731.750f.

FIGURE 731.750f

Sediment Pond 004A is fitted with both principal and emergency spillways. The principal spillway consists of a vertical standpipe, the emergency spillway consists of a channel overflow. Combined, they are capable of meeting the flow and storage requirements of the regulations. During a site visit in the spring of 1989, and in response to this permit renewal, a staff engineer for Hansen, Allen & Luce made a visual survey of the pond related to historic hydraulic performance. At the time of the site visit, the applicant was in the process of reconstructing the emergency spillway in response to wildlife damage noted in the structure. A subsequent site visit confirmed that the spillway repairs had been completed by the applicant. Both the principal and emergency spillways exit onto the downstream slope of the sediment pond onto a riprapped embankment.

FILTER POND 005A

Filter Pond 005A is located south of the Belina Mine portals adjacent to the fan portal and is used exclusively for the improvement of mine discharge water. The pond is a five cell concrete unit with a design capacity of 250 gallons per minute. It provides primary settling, three stages of filtration, and a final clarifier. Design details were submitted to both the Utah Division of Oil, Gas & Mining; and the Utah State Department of Health in 1981, and after having received approval, the pond was constructed in the third quarter of 1983. The discharge structure associated with the pond is a Parshall Flume and corrugated metal pipe which discharges mine waters into Whisky Creek above the inlet to Culvert C-40-42. The location of Filter Pond 005A and the discharge culvert are shown on Map 731.720d. Plan and section views of Filter Pond 005A are included in Appendix 742.221a.

In October, 1986, approval was given for the installation of a 6 inch abandoned section water bypass line. This line discharges at the same location as Filter Pond 005A beyond the Parshall Flume. This line originates at the seals in the First East Mains section of the Belina No. 1 Mine. Water collected behind these seals originates from shallow seepage at the mine entrance and is pumped to the point of discharge.

733.140. SUBSIDENCE SURVEY.

None of the four sediment ponds located within the Mine Permit Area lie above mine workings, nor are they in the zone of influence of subsidence and therefore are not susceptible to the potential effects of subsidence.

733.150. HYDROLOGIC AND GEOLOGIC INFORMATION.

Preliminary hydrologic and geologic information as required by this section is found within the geologic and hydrologic impacts sections of this permit.

733.160. FUTURE DESIGN PLAN CERTIFICATION STATEMENT.

No future designs are anticipated for the Mine Permit Area beyond those submitted with this permit renewal.

733.200. PERMANENT AND TEMPORARY IMPOUNDMENTS.

733.210. CONSTRUCTION REQUIREMENTS.

All four sedimentation ponds located within the Mine Permit Area are small in nature and are exempt from the requirements of 30 CFR 77. Certification of the hydrology and hydraulics of the ponds is given in a general statement at the beginning of Section 700. Certification related to the construction methods is not available as required in 514.300, however, general certifications statements for each of the ponds is given on Figures 731.750a and 731.750b. Each pond is inspected quarterly as required in 514.300, and available geotechnical information related to the ponds is presented in Appendix 742.221b.

733.220 thru 733.226 PERMANENT IMPOUNDMENTS.

No permanent impoundments are planned for the Valley Camp permit area or mining operation.

733.230. AUTHORIZATION OF TEMPORARY IMPOUNDMENTS.

All temporary impoundments and or detention basins have been authorized as required by UDOGM.

733.240. POTENTIAL HAZARD NOTIFICATION.

The applicant agrees to notify UDOGM according to 515.200 should a potential hazard to the impoundment be disclosed.

734. DISCHARGE STRUCTURES.

Information related to discharge structures is provided in Section 742.

735. DISPOSAL OF EXCESS SPOIL.

No excess spoil exists within the ~~Valley Camp~~ Mine Permit Area. Should any be developed in the future, the disposal area will be constructed and maintained to comply with 745.

736. COAL MINE WASTE.

~~All coal mine wastes generated are returned to the mines for disposal.~~No coal mine wastes exist within the Mine Permit Area as defined by UDOGM definitions.

737. NON-COAL MINE WASTE.

See information provided in Section 747.

738. TEMPORARY CASING AND SEALING OF WELLS.

The casing and sealing of wells is discussed in Sections 631 and 748.

740. DESIGN CRITERIA AND PLANS.

741. GENERAL REQUIREMENTS.

742 thru 742.126. SEDIMENT CONTROL MEASURES.

Sediment control measures incorporated within the Mine Permit Area include the 1) diversion of disturbed and undisturbed area waters, 2) the construction of straw pits which collect and control runoff, 3) the use of natural depressions located within the Permit Area, 4) the continued growth of natural vegetation, 5) the paving of dirt roadways, 6) the revegetation of disturbed areas, and 7) ~~and~~ the installation of riprap, rock gabions, sediment basins, straw bales and silt fencing. ~~2) paved roadways, 3) concrete ditch sections, 4) runoff conveyance ditches, 5) road culverts, and 6) sedimentation ponds.~~ Throughout much of the Mine Permit Area, the ditch and culvert installations consist of what the applicant considers convenience ditches and culverts. These convenience structures have been installed to maintain relatively dry road conditions, and to prevent runoff from concentrating at truck crossings. Additional details related to these structures is provided in Sections 742.200 through 742.423.5 and in Section 750.

742.200 thru 742.214. SILTATION STRUCTURES.

Applicable regulations as required in these sections are met through the information provided in Section 742.220. The sediment ponds located on the Mine Permit Area are not subject to 30 CFR 77.

742.220. SEDIMENTATION PONDS.

742.221 thru 742.221.39. GENERAL REQUIREMENTS.

Presented below are the methodologies used in the analysis of Sediment Ponds 001A through 004A, the analysis and design of runoff conveyance facilities, and the results of the analyses pertaining to the regulatory requirements. Information available in the 1988 report prepared by Hansen, et. al, 1989 has been incorporated into this permit to facilitate the presentation of material applicable to the mine permit renewal application. Survey details for each pond (including pond contours and critical cross sections) are shown on Figures 731.750a and 731.750b.

DESIGN METHODOLOGY

Runoff Volume

The storage volume in each existing sedimentation pond was analyzed to determine if there is sufficient storage to contain runoff from the 10-year 24-hour event without resulting in discharge through the principal or emergency spillways. The technique used to calculate the required volume is described below.

The runoff depth resulting from a given rainfall depth was determined using the runoff curve number technique, as defined by the U.S. Soil Conservation Service (1972). According to the curve number methodology, the relationship between storm rainfall, soil moisture storage, and runoff can be expressed by the equations:

$$Q = \frac{(P - 0.2S)^2}{P + 0.8S} \qquad (1)$$

$$CN = \frac{1000}{10 + S} \qquad (2)$$

where:

Q = direct runoff depth, inches;
P = storm rainfall depth, inches;
S = maximum infiltration depth (defined as the maximum possible difference between P and Q), inches; and
CN = curve number, dimensionless.

Use of Equations 1 and 2 requires the selection of a curve number, which is a function of vegetative cover and the hydrologic soil groups. Curve numbers for the study area were selected from information provided by the USDA Soil Conservation Service (1972), by U.S. Bureau of Reclamation (1977), and from personal hydrologic judgment following field observation. Volume weighted curve numbers were used for heterogeneous areas.

Values of precipitation (P) were selected for the design return periods from Richardson (1971), using the Clear Creek precipitation frequency data based on a 24-hour storm. A rainfall return period of 10 years was used for pond design, and a return period of 6 years was used for ditch and culvert design.

Equation 1 is based on the assumption that Ia = 0.2S, where Ia is the initial abstraction from storm rainfall, defined as the rainfall which must fall before runoff begins (i.e., to satisfy interception, evaporation, and soil-water storage). Therefore, determination of runoff from Equation 1 is valid only when Precipitation is greater than 0.2S. Below this point, no runoff can occur. Once Q was determined from the above equation, the runoff volume for sediment pond design was calculated by multiplying the runoff depth by the drainage area.

Flow Hydrographs and Peak Discharge

The peak discharge from a given design storm was calculated for the mine area utilizing a computer program developed by Hansen, Allen, and Luce Inc. entitled "HYDRO." "HYDRO" implements the SCS Unit Hydrograph method as presented in Chapter 10 of NEH-4.

The Unit Hydrograph methodology utilizes the runoff depth equations presented earlier (Equations 1 and 2) as well as the relationships shown on Figure 742.221a, "Dimensionless Curvilinear Unit Hydrograph and Equivalent Triangular Hydrograph". A hydrograph of a single block of rainfall excess with duration D is shown in the upper portion of the above mentioned map. The lower portion of the map contains the resultant runoff hydrograph. For runoff from excess rainfall, the area under the hydrograph curve and the area enclosed by the rainfall hydrograph represent the same volume of water (Q) as calculated using equation 1.

FIGURE 742.221a

The peak flow rate for the dimensionless unit hydrograph is represented by q_p, while t_p represents the time to peak, which is defined as the flow from the start of the hydrograph to q_p. The base time (t_b) is the duration of the hydrograph. The time from the center of mass of rainfall excess to the peak of the runoff hydrograph is the lag time (t_L). The time of concentration (t_c) is defined as the time required for flow from the hydraulically most remote point in a basin to reach the basin outlet. According to the U.S. Soil Conservation Service (1972), the watershed lag is equal to 0.6 t_c and the time of concentration (t_c) is equal to 1.5 t_p. By combining these two expressions, one can see that $t_p = 1.11t_L$ where both variables are as previously defined. The watershed lag (t_L) is defined as:

$$t_L = \frac{(h_l^{0.8})(S+1)^{0.7}}{1900\,Y^{0.5}} \qquad (3)$$

where:

t_L = watershed lag, in hours;
h_l = hydraulic length, or the length of the mainstream to the farthest divide, in feet;
S = is as previously defined; and Y = average watershed slope, in percent.

Values of Y were obtained from methods outlined by Craig and Rankl (1977). The hydraulic length was taken from an appropriate topographic map, and S was determined from Equation 2 once the runoff curve number was estimated.

The peak discharge of the dimensionless unit hydrograph is defined as:

$$q_p = \frac{484\ A\ Q}{T_p} \tag{4}$$

where:

q_p = peak discharge constant, in cfs;
A = drainage area, in square miles;
Q = direct runoff depth, inches;
T_p = time elapsed from the beginning of runoff to the hydrograph peak, in hours; and
484 = a conversion factor.

The 24-hour rainfall distribution used in the analysis was the NOAA type II storm as shown in Figure 742.221b, "Twenty-Four Hour Rainfall Distributions".

FIGURE 742.221b

Dimensionless unit hydrographs are developed by simulating many natural unit hydrographs using the time to peak and the peak discharge constant. Haan and Barfield (1978) proposed a dimensionless unit hydrograph based on the gamma function:

$$\frac{q(t)}{q_p} = \left[\frac{t}{t_p}\right]^{e(1-t/tp)]C3tp} \tag{5}$$

where:

q(t) = hydrograph ordinate at time t, cubic feet per second; and

the parameters q_p and t_p are as previously defined, and C_3 is a parameter defined by:

$$Q = q_p\ t_p\ (e/C_3t_p)^{(C_3t_p)}\ G(C_3t_p) \tag{6}$$

where:

Q = runoff volume (one inch for a unit hydrograph),
G = gamma function,

and all other variables are as previously defined.

Figure 742.221c, "Variation in Hydrograph Shape with Variation in C_3t_p", shows how shape of the hydrograph defined by Equation 5 changes as C_3t_p changes. The higher the value of C_3t_p, the sharper the peak of the hydrograph.

FIGURE 742.221c

Estimates of the peak discharge to be expected from various precipitation events were made using the dimensionless hydrograph procedure illustrated on Figure 742.221a. The dimensionless unit hydrograph method involves the development of a runoff hydrograph from a complex rainstorm. The storm is divided into blocks of uniform intensity of duration D and distributed in accordance with the 24-hour rainfall distribution illustrated on Figure 742.221c. Values of D must be less than or equal to t_p. Practically, the selection of D as a multiple of t_p will ensure that the peak will be encountered.

Rainfall excess is generated from the rainfall depths of duration D, and the rainfall-runoff relationship expressed in Equation 1. The rainfall excess (runoff) from each time increment of duration D is then multiplied by the unit hydrograph ordinates to produce a component hydrograph. Each of the component hydrographs are then lagged by a time increment D and are consecutively summed to produce the synthetic runoff hydrograph.

Because individual hydrographs were not routed through conveyance structures or ponds, the synthetic peak is considered conservative. Calculated flow rates for each pond or conveyance structure using the above described methods are shown and discussed later.

Pond Spillway Capacity

Spillway capacity requirements for the ponds were based on runoff from the 25-year, 24-hour storm. This design event is conservative based upon the new Federal guidelines allowing the use of the 25-year, 6-hour storm. The 6-hour storm event is more applicable to those storm events experienced in Utah as a result of overall climate and topography. Spillway capacity requirements were determined according to the peak discharge methodology presented above.

The stage-discharge relationship of the corrugated metal risers and conduits used in the pond spillway design was determined from methods outlined by Haan and Barfield (1978), who indicate that the discharge of the spillway is calculated as the smallest of the possible flows due to weir flow, orifice flow, or pipe flow at any stage. The coefficients suggested by Haan and Barfield (1978) were used in the appropriate equations.

Weir flow is determined by the equation:

$$q = CLH^{3/2} \tag{7}$$

where:

- q = flow rate in cfs;
- C = coefficient determined by entrance conditions;
- L = length of the weir crest, in feet, or the circumference of the riser; in feet; and
- H = head of water above the riser inlet, in feet.

The entrance coefficient (C) is determined by:

$$C = 3.27 + 0.4\ H/W \tag{8}$$

where C and H are previously defined and W is the height of the weir crest above the channel bottom, in feet.

Orifice flow occurs when the flow is restricted by the opening. It can be determined as:

$$q = CA\ (2gH)^{1/2} \tag{9}$$

where:

- q = as previously defined;
- C = coefficient dependent upon the orifice geometry (0.6 in this case);
- A = cross-sectional area of the opening, in square feet;
- g = gravitational constant (32.2 ft/s^2); and
- H = head above the orifice inlet, in feet.

Pipe flow occurs when the friction of the pipe controls the flow. According to Haan and Barfield (1978), this flow type can be described by:

$$q = \frac{A\ (2gh)^{1/2}}{(1 + K_e + K_b + K_c\ L)^{1/2}} \tag{10}$$

where q, A, g, and H are as previously defined and:

- K_e = entrance loss coefficient (1.0 in this case);
- K_b = correction factor for energy loss in bends (0.5 in this case);
- K_c = friction factor; and
- L = pipe length, in feet.

K_c can be determined by the equation:

$$K_c = \frac{5087\ n^2}{d^{4/3}} \tag{11}$$

where:

- n = Manning's roughness coefficient; and
- d = inside diameter of the pipe, in inches.

The rating curve for the open channel flow spillway for Sediment Pond 004A was developed by using the weir flow equation (equation 7) with the coefficient (C) determined from tables presented in Brater and King (1976) for broad crested weirs and for weirs of trapezoidal cross-section.

The stage-discharge relationship for the emergency spillway for Pond 004A was determined from the broad crested weir equation which is defined as:

$$q = CLH^{3/2} \tag{12}$$

where:

q = Flow rate, cfs
C = Entrance coefficient
L = Width, feet
H = Water Depth, feet

Calculations related to the design capacity of the emergency discharge spillway are included within Appendix 742.221a.

Sediment Storage Volume

The storage volume in each sediment pond was analyzed to determine if there was sufficient storage to contain the accumulated sediment volume from a three-year period. The amount of sediment to be yielded to the sediment ponds was determined from the Universal Soil Loss Equation (Israelsen et al., 1984). In accordance with this equation, soil erosion caused by water is determined from:

$$A = R \cdot K \cdot LS \cdot VM \tag{13}$$

where:

A = computed amount of soil loss, in tons/acre/year;
R = rainfall factor, in foot-tons/acre/hour;
K = soil erodibility factor, in tons/acre/year/unit of R;
LS = topographic factor (length and steepness of slope), dimensionless; and
VM = erosion control factor, dimensionless.

Values for R and K were determined from Israelsen et al. (1984). The topographic factor (LS) was determined from:

$$LS = \frac{65.41\ S^2}{S^2 + 10{,}000} + \frac{4.56\ S}{(S^2 + 10{,}000)^{0.5}} + 0.065\ (L/72.6)m \tag{14}$$

where:

L = average overland flow length, in feet;
S = average steepness of slope, in percent; and
m = an exponent dependent upon the steepness of slope (0.3 for slopes less than 0.5%, 0.5 for slopes 0.51% to 10%, and 0.6 for slopes greater than 10%).

Values for VM were determined from the Israelsen et al. (1984).

All four sediment ponds are capable of storing at least the three year accumulated sediment requirements, and are designed so as to be cleaned when 60% of the design storage volume has

been reached. The design elevations for the 60% sediment cleanout requirements are shown on Figures 731.750a and 731.750b. Table 742.221a has been inserted to summarize the sediment storage volume requirements as well as the projected time to 60% cleanout. The last column in the table indicates the number of years projected before the 60% cleanout elevation is reached. This value was obtained by dividing the required 60% cleanout volume by the projected 1-year sediment volume shown in column three of the table.

Based upon data shown in Table 742.221a, the applicant agrees to survey the ponds contained within this permit renewal every two years, unless time projections indicate that the 60% sediment storage volume will be exceeded within the two year projection, whereupon the pond will be surveyed annually. Survey data obtained will indicate the required timing for cleaning of each respective pond. As an aid to determining sediment storage, the applicant will also provide an appropriate method of determining approximate sediment storage volume. Such aids may include (but not be limited to) markings on a standpipe spillway indicating depth to 60% sediment storage, or some other post or marker placed within or adjacent to the pond. Since pond conditions vary, the method of identifying the approximate estimate of cleanout elevation must be flexible.

TABLE 742.221a
TIME PROJECTIONS TO 60% SEDIMENT CLEANOUT VOLUME

SED POND CLEANOUT NO.	THREE-YEAR SEDIMENT VOL. AC-FT	ONE-YEAR SEDIMENT VOL. AC-FT	AVAILABLE SEDIMENT VOL. AC-FT	60% SEDIMENT VOL. AC-FT	TIME TO 60% SEDIMENT YEARS
001A	0.93	0.31	1.35	0.81	2.6
002A	0.10	0.033	0.30	0.18	5.5
003A	0.51	0.17	0.78	0.47	2.8
004A	0.75	0.25	1.81	1.09	4.4

REQUIRED POND VOLUMES AND DETENTION STORAGE

Runoff Storage Requirements

Runoff volumes from tributary areas to the sediment ponds were determined from the SCS curve number methodology presented above. Tributary areas for Sediment Ponds 001A through 004A are illustrated on Maps 731.720a and 731.720d. Tributary areas were subdivided and classified in accordance with vegetation type and surface condition and a separate curve number was estimated for each separate classification. Tributary subareas to the sediment ponds were classified as disturbed areas for which a curve number of 90 was assumed, paved areas for which a curve number of 98 was assumed, reclaimed areas for which a curve number of 85 was assumed, sage/grass areas for which a curve number of 75 was assumed, low density forested/aspen areas for which a curve number of 70 was assumed, and high density

forested/aspen areas for which a curve number of 40 was assumed. A breakdown of areas contributing to pond runoff is presented in Table 742.221b.

TABLE 742.221b
TRIBUTARY AREAS TO SEDIMENT PONDS

SED POND NO.	DISTURBED AREA AC	PAVED AREA AC	FORESTED /ASPEN AREA AC	SAGE/GRASS AREA AC	RECLAIMED AREA AC	TOTAL AREA AC
001A	8.13	-	-	3.4	-	11.53
002A	6.3	0.82	-	-	-	7.12
003A	4.0	0.18	1.65	1.0	0.25	7.08
004A	17.3	-	15.1	-	4.7	37.1

Based on a precipitation depth of 2.45 inches for the 10-year, 24-hour precipitation event (the design event) and the curve numbers for the various subareas presented above, a weighted curve number based on runoff volume was determined for the total tributary area for each sediment pond. Using this volume weighted curve number and the precipitation depth for the 10-year, 24-hour storm, the estimated runoff depth for each pond was predicted using equations 1 and 2 as presented in the methodology section. The runoff volume to each pond from the 10-year, 24-hour event was then predicted by multiplying the runoff depth by the tributary area to the sediment pond. The results of the estimated runoff volume to each pond from the design precipitation event are presented in Table 742.221c. This becomes the required runoff storage volume that must be present in the sediment ponds in order to totally contain the runoff from the design precipitation event.

Sediment Storage Requirements

The mean annual sediment yield to the sediment ponds was estimated using the modified universal soil loss equation as presented in the methodology section of this report. Areas were again subdivided based on characteristics of the subareas that would affect erosion, such as vegetation type and steepness of slope. Calculations for sediment yield to each pond are presented in Appendix 742.221a. The estimated 3-year sediment yield to the ponds are presented in Table 742.221c along with the runoff projections for the ponds.

A summary of sediment criteria is given in Table 742.221d. A column has been included within the table indicating the 60 percent (of available storage) cleanout elevation as requested by UDOGM.

TABLE 742.221c
ESTIMATED RUNOFF VOLUME TO SEDIMENT PONDS FROM THE 10-YEAR, 24-HOUR PRECIPITATION EVENT AND 3-YEAR SEDIMENT YIELD TO PONDS

SED POND	AREA ACRES	VOLUME WEIGHTED CURVE NUMBER	RUNOFF DEPTH INCHES	10-YEAR, 24-HOUR RUNOFF VOLUME AC-FT	3-YEAR SED YIELD AC-FT
001A	11.53	86.4	1.23	1.18	0.93
002A	7.12	91.2	1.57	0.94	0.10
003A	7.08	85.0	1.13	0.67	0.51
004A	37.1	83.0	0.98	3.15	0.75

TABLE 742.221d
SEDIMENT STORAGE CHARACTERISTICS

SEDIMENT POND NO.	REQUIRED 3 YEAR SEDIMENT STORAGE (AC-FT)	AVAILABLE SEDIMENT STORAGE AC-FT	DECANT ELEVATION (FEET MSL)	60 PERCENT CLEANOUT ELEVATION (FEET MSL)
001A	0.93	1.35	7812.0	7809.7
002A	0.10	0.30	7829.0	7827.6
003A	0.51	0.78	7860.0	7858.2
004A	0.75	1.81	8870.25	8868.9

Available Pond Storage

A pond storage survey was conducted after the cleaning of Sediment Ponds 001A through 003A in October and November of 1988. A survey of Sediment Pond 004A was conducted in August of 1988. The surveys were conducted by mine personnel and certified by a qualified registered professional engineer. Certified survey details are shown on Figures 731.750a and 731.750b.

Survey plats showing contour data were used to prepare stage-capacity relationships for each pond during the hydraulic analysis phase of previous permit renewals. The contours presented on the plats were planimetered, from which an area for each contour was determined. Volumes

were then computed by using the average end area method. The stage-capacity curves for Sediment Ponds 001A through 004A developed as a result are shown in Figures 731.750c through 731.750f. Also illustrated are the elevations of the primary and emergency spillways, the proposed elevation of the decants for the ponds, the available versus required runoff storage volume of each pond between the elevation of the primary spillway and the proposed decant level, and an indication of the available sediment storage volume below the proposed decant elevation versus the estimated 3-year accumulated sediment yield to the ponds.

As is indicated by the details presented in Figures 731.750c through 731.750f, there is sufficient storage capacity in each pond to provide for at least the estimated 3-year sediment yield to the ponds and to provide for total containment of the runoff volume from the 10-year, 24-hour precipitation event.

Pond Detention Time

The decants, which will be the dewatering devices for the ponds, will be manually operated. The ponds have sufficient storage capacity to totally contain the runoff volume from the 10-year, 24-hour precipitation event between the proposed decant elevations indicated above and the primary spillways. The water level in the ponds will be maintained at or below the decant level in anticipation of a runoff producing event. The decants will also be maintained in a closed position such that during a runoff producing event (of equal or lesser magnitude to that of the design event) the runoff from the event would be totally contained by the pond. The runoff from a precipitation event will be maintained in the pond for a period of at least 24 hours and then released in accordance with the UPDES permit for the pond.

SPILLWAY CAPACITY

As indicated previously, the sediment ponds are to have a combination of a principal and an emergency spillway with the capacity to safely discharge the runoff from a 25-year, 24-hour precipitation event. The elevation of the crest of the emergency spillway is to be a minimum of 1.0 foot above the crest of the principal spillway and the minimum elevation of the top of the settled embankment is to be at least 1.0 foot above the water surface in the pond under design flow conditions for the 25-year, 24-hour precipitation event.

All of the sediment ponds have principal and emergency spillways. A summary of the physical characteristics of the principal and emergency spillways for the sediment ponds is presented earlier in Table 733.130a. The principal and emergency spillways for Sediment Ponds 001A through 003A consist of 18-inch diameter corrugated metal standpipe type spillways. The principal spillway for Sediment Pond 004A consists of an 18-inch diameter corrugated metal standpipe type spillway and the emergency spillway consists of an emergency overflow open channel type spillway.

Peak flow projections from the 25-year, 24-hour precipitation event of 2.92 inches were made using a computer watershed model based on the USDA Soil Conservation Service's unit hydrograph curve number methodology. Watershed characteristics, which are input parameters to the model, include the tributary areas to the ponds, volume weighted curve numbers, average watershed slope, and the hydraulic length. Peak flow projections from the 25-year, 24-hour

precipitation event along with their respective watershed characteristics are presented for each pond in Table 742.221e.

Discharge rating curves were prepared for the principal spillway, the emergency spillway, and the combined spillway capacity of the principal and emergency spillways for each pond. The rating curves were derived in accordance with the methodology previously described for spillway standpipes and for the open channel spillway. Calculations and spillway rating curves for Ponds 001A through 004A can be found in Appendix 742.221a.

The peak flow projections presented in Table 742.221e were then superimposed on the spillway rating curves to determine the required water surface elevation in the pond to pass the design event. The design hydrograph from the 25-year, 24-hour precipitation event was not routed through the pond. Thus, the required head-water depth over the spillways to pass the peak flow from the design event is conservative.

TABLE 742.221e
WATERSHED CHARACTERISTICS AND PEAK-INFLOW TO SEDIMENT PONDS FROM THE 25-YEAR, 24-HOUR PRECIPITATION EVENT

SED POND	AREA ACRES	VOLUME WEIGHTED CURVE NUMBER	HYDRAULIC LENGHT FT.	WATERSHED SLOPE %	25-YR, 24-HR PEAK FLOW CFS
001A	11.53	86.4	2760	38.0	18.3
002A	7.12	91.2	860	17.8	13.7
003A	7.08	85.0	1100	32.0	11.0
004A	37.10	83.0	2040	40.0	52.0

As indicated on Figure 731.750c, the crest elevation of the emergency spillway in Sediment Pond 001A is 2.7 feet higher than the crest of the principal spillway. The combined spillways of Sediment Pond 001A can pass the peak discharge of 18.3 cfs at an elevation of 7819.35 feet. With the top of the embankment of Sediment Pond 001A set at elevation 7822.0 feet, the sediment pond can pass the design event with more than one foot of freeboard. Thus the spillway capacity of the pond is adequate as designed.

As indicated on Figure 731.750d, the crest elevation of the emergency spillway in Sediment Pond 002A is 0.9 foot higher than the crest of the principal spillway, which nearly meets the requirement for a one-foot separation between the two spillways. The combined spillways of Sediment Pond 002A can pass the peak discharge of 13.7 cfs at an elevation of 7836.7 feet, MSL.

With the minimum top of the embankment of Sediment Pond 002A set at elevation 7838.0 feet, the sediment pond can pass the design event with 1.3 feet of freeboard.

As indicated on Figure 731.750e, the crest elevation of the emergency spillway in Sediment Pond 003A is 2.3 feet higher than the crest of the principal spillway. The combined spillways of Sediment Pond 003A can pass the peak discharge of 11.0 cfs at an elevation of 7864.87 feet, MSL. With the top of the embankment of Sediment Pond 003A set at elevation 7868.0 feet, the sediment pond can pass the design event with more than one foot of freeboard. Thus the spillway capacity of the pond is adequate as is.

The rating curve presented on Figure 731.750f for Sediment Pond 004A includes both the rating curves for the principal spillway, and the open-channel emergency spillway for the pond. Valley Camp personnel have surveyed the emergency channel spillway, and indicate that the channel is trapezoidal in cross-section with a bottom width of approximately 13 feet, a top width of 21.5 feet and a channel depth of 2.1 feet. The existing spillway crest for the principal spillway in Sediment Pond 004A is at 8874.93 feet and the existing crest of the emergency spillway is at elevation 8875.9 feet, a difference of one foot. The 25 year, 24 hour combined flow capacity of both spillways is 52 cfs with a flow depth of 2.1 feet over the crest of the primary spillway. An embankment height under these conditions for Pond 004A of 8878.0 feet allows for the one foot of freeboard required under the regulations. Questions related to downstream spillway erosion protection have resulted in a review of flow requirements for Pond 004A. If the 6 hour runoff event is used in lieu of the 24 hour event, the combined runoff flow rate is reduced from 52 cfs to 13.2 cfs, a substantial decrease. Under this flow condition, a 10 foot wide trapezoidal channel would safely carry the flow at a depth of less than 0.3 feet (See Appendix 742.221a for flow calculations). Because all ponds have been designed and constructed using the 24 hour runoff event, Pond 004A has not been modified to show the decreased embankment requirements using the 6 hour runoff event. All pond plans and details contained within this permit utilize data consistent with the 24 hour storm runoff event.

Pond Stability Analysis

Since the slopes of Sediment Ponds 001A through 003A do not meet the criteria that the combined upstream and downstream slopes be less than 1v:5h, with neither slope steeper than 1v:2h, a stability analysis was conducted for Ponds 001A through 003A as requested by UDOGM. Chen-Northern, Inc., a geotechnical engineering consulting firm was contracted to perform stability analyses for Sediment Ponds 001A through 003A. Chen-Northern's report of their stability analysis is presented in Appendix 742.221b. A summary of the results of their analysis is presented below.

Chen-Northern used soil strength values for Sediment Pond 001A from a report by Garco Testing Laboratories dated December 2, 1988. In-place density, direct shear, soil classification and cohesion properties were determined by Garco Testing laboratories from samples taken from the embankment of Sediment Pond 001A. Soil strength values for Ponds 002A and 003A were taken from a report prepared by Rollins, Brown and Gunnell, Inc. dated November 16, 1988. Tests were conducted by Rollins, Brown and Gunnell, Inc. on soil samples taken from one test pit each excavated into the embankment of Sediment Ponds 002A and 003A. These two reports by Garco and Rollins, Brown and Gunnell, as well as the summary report completed by Chen-Northern, Inc. are presented in Appendix 742.221b.

The geometry of the embankments of the ponds were scaled from the 1-inch equals 50-foot scale mapping provided by Valley Camp. From this mapping Chen-Northern reported that the steepest upstream and downstream slopes for these ponds appeared to be 2.2h:1v upstream to 2.8h:1v downstream for Pond 001A, 1.9h:1v upstream to 1.7h:1v downstream for Pond 002A, and 1.5h:1v upstream to 1.8h:1v downstream for Pond 003A. Chen-Northern determined the safety factors for each slope of these three ponds under rapid-drawdown conditions. In their analysis they assumed the soil beneath the elevation of the principal spillway to be saturated. Their minimum calculated safety factor under rapid-drawdown conditions was 1.3 for the 1.9h:1v upstream slope of Sediment Pond 002A. Chen-Northern reported that the safety factors under rapid-drawdown conditions should be greater than 1.1. Thus, the minimum safety factor computed by Chen-Northern is in excess of that required under rapid-drawdown conditions.

Chen-Northern also assessed the stability of the worst case condition, which appeared to be Sediment Pond 003A, under static and dynamic conditions. They reported the safety factors calculated for Sediment Pond 003A to be 2.0 for static and 1.6 for dynamic conditions. These safety factors correspond to the upstream slopes. They report that the safety factors for the downstream slope are slightly higher. These safety factors are greater than the required safety factors under static and dynamic conditions of 1.5 and 1.1, respectively. Chen-Northern indicates that "the safety factors obtained appear to be suitable for the purpose of the ponds."

Information related to the stability of Sediment Pond 004A is also found within Appendix 742.221b within a report prepared by Golder Associates entitled " Surface Facilities Grading Plan - Belina Mine Area". The Golder report prepared in 1980 indicates that the critical embankment failure plane is located within the lower sections of the pond embankment. The minimum factor of safety within the embankment was found to be 1.8. Also shown within the appendix following the Golder report is a copy of a computer plot of the critical cross section for Pond 004A and the associated data. The cross section and data were collected during the summer of 1990 and represent current pond conditions.

The Golder report includes a discussion related to surface facilities and grading of the Belina Mine Permit Area. Information contained within the Golder report related to these facilities is considered dated, and is superseded by hydrologic and hydraulic information presented throughout the remainder of this permit submittal. Any conflicts in information between this submittal and the Golder report should be resolved in favor of information presented within this mine permit application.

Outlets

Preconstruction design details related to existing outlet energy dissipation structures for each of the four sediment ponds discussed above are not available. Site visits at each facility have identified the existence of small diameter rock and riprap aprons at Ponds 001A through 003A. The outlet to Pond 004A exits onto the northern edge of the embankment slope where it joins native hillside. The embankment at that point and downstream channel are heavily riprapped. An accurate determination of in place rock riprap at Ponds 001A through 003A is not possible without the excavation of a portion of each facility. Excavation at these sites would be required in order to verify the size and characteristics of in place riprap because of the presence of silt which has covered the majority of riprap placed. Only the upper tips of the in place rock and riprap is exposed. It is also noted that at some of the discharge points there are vegetative

stands which not only help in stabilizing the riprap base, but also indicate the lack of discharge and erosion.

In order to obtain an estimate of the effectiveness of the in place riprap in protecting against erosion, calculations were made using EPA, ~~and~~ OSM, and Denver Urban Storm Drainage Criteria design methods. Riprap calculations are presented in Appendix 742.221a. In summary of the calculations, it was found that the estimated in place riprap size of 6 inches was likely adequate to protect against ~~severe~~ erosion at all pond outlets where riprap was found to be required. As confirmation that the in place riprap is likely adequate, it is remembered that Ponds 001A through 003A have never discharged, even during the high runoff periods of 1983 and 1984. All three ponds were designed to handle the 25 year, 24 hour runoff event rather than the smaller runoff event consisting of the 25 year, 6 hour storm that is now accepted as a more realistic design criteria.

It is noted that the primary and emergency spillways for Pond 004A are located so as to exit onto the heavily riprapped slope along the northern edge of the pond embankment within the flow path of the discharge channel. Riprap size requirements for the primary spillway are estimated to be on the order of 1.5 feet with a maximum diameter of 2.25 feet. Checking steep slope channel design requirements, it was found that an emergency spillway with a six foot bottom width would require average and maximum riprap sizes of 1.75 and 2.25 feet respectively at the design flow rate. Riprap sizes as large as these do not lend themselves well to the calculation of runoff velocities. In reality, the flow will be broken up by the large diameter riprap, and a substantial volume of the flow will not be carried across the surface of the rock channel, but within the available pore spaces. According to the steep channel method of design provided by OSM, the factor of safety for the designed channel as shown in Appendix 742.221a should be approximately 1.5. In place riprap appears to be doing a reasonable job of controlling discharge erosion. Outlets will continue to be monitored for integrity as required under the regulations.

The design flow rate for Filter Pond 005A is 250 gpm or approximately 0.56 cfs. According to ~~EPA design charts~~ the design methodologies employed, this small flow rate does not require riprap protection.

Summary

None of the sedimentation ponds associated with the Mine Permit Area are located within a perennial stream, and all are located immediately downstream of disturbed mine areas. Each sedimentation pond has been designed with a non-clogging dewatering device and contains sediment storage volumes in excess of the three year storage requirements.

The decants, which will be the dewatering devices for the ponds, will be manually operated. The ponds have sufficient storage capacity to totally contain the runoff volume from the 10-year, 24-hour precipitation event between the proposed decant elevations and the primary spillways as documented herein. The water level in the ponds will be maintained at or below the decant level in anticipation of a runoff producing event. The decants will also be maintained in a closed position such that during a runoff producing event (of equal or lesser magnitude to that of the design event) the runoff from the event would be totally contained by the pond. Disturbed area

runoff originating from a precipitation event will be held within the pond for a period of at least 24 hours and then released in accordance with the UPDES permit for the pond.

The ponds used by the applicant have been in use for an extended period of time and information related to construction is not available, however, no problems related to short circuiting, or settlement have been noted. The embankment for Pond 004A was noted to be approximately 1.0 foot low as a result of the recent modifications which were made to the emergency spillway. The applicant makes a commitment to correct elevational discrepancies in this and like situations with spillways or embankments in response to this permit submittal during the 1990 construction period.

A thorough inspection of the sediment ponds and embankments will be done on a quarterly basis as required under Section 514.330. When examining for stability and performing a general inspection, the inspector will be looking for any of the following conditions:

* Seepage from the down stream side of the embankment.
* Erosion of embankment slopes.
* Continuity of emergency spillway.
* Erosion around entrance or exit of discharge pipe.
* Clogged principal or emergency spillway.
* A check of slope stakes for obvious slope movement (if utilized).
* Sediment level.
* Placement of wave erosion protection (if utilized).
* Erosion at spillway discharges.
* Clogging of the dewatering device.

742.222. PONDS MEETING MSHA AND 30 CFR REQUIREMENTS.

All existing ponds located on the permit area are less than 20 acre-feet and do not qualify for regulation under MSHA and 30 CFR. Should any be constructed in the future, they will be designed and constructed to safely pass the 100-year, 6-hour precipitation event.

742.223 thru 742.223.2. PONDS NOT MEETING MSHA AND 30 CFR REQUIREMENTS.

All four sedimentation ponds have combined spillways capable of carrying the 25-year, 6-hour precipitation runoff event. The designs for each pond were initially completed for the 25-year, 24-hour precipitation event in lieu of the 6-hour event. Runoff derived from a 24-hour precipitation event is higher than that for the 6-hour event. The designs as shown in the 1989 report prepared by Hansen, Allen & Luce., and as reproduced within this permit renewal application are therefore conservative.

742.230 thru 742.232. OTHER TREATMENT FACILITIES.

Other than those specified above and the ASCA's discussed within Section 750 thru 755 of this permit, no other treatment facilities exist within the Mine Permit Area.

742.240. EXEMPTIONS.

No exemptions are identified as part of this permit.

~~A total of six Alternative Sediment Control Structure areas (ASCA's) are identified within the Total Permit Area for which exclusion from further permitting is being requested. Two of these ASCA's (ASCA 1 and 2) are associated with the Valcam Loadout Facility, one (ASCA 3) is associated with the General Office west of the Valcam Loadout Facility, and three (ASCA 4 through ASCA 6) are associated with the Belina Mines. The locations of ASCA 1 through ASCA 3 are presented on Map R614 301 731.720a, and ASCA 4 through ASCA 6 are presented on Map R614 301 731.720d.~~

~~The three general qualifying criteria that must be met in order for an area to qualify as a ASCA are:~~

1. ~~The area cannot be tributary to a sediment pond.~~
2. ~~The area must have some form of a treatment structure to treat runoff from the area.~~
3. ~~The summation of the areas of the ASCA's must be less than fifteen percent of the total disturbed area.~~

~~Runoff from the ASCA's is not tributary to any of the sediment ponds and several alternative sediment treatment structures are already in place. A commitment by the applicant to complete those not yet in place prior to final approval of this mine re permit has been made. Table R614-301-742.240a is inserted to provide a breakdown of areas included within each ASCA. Table R614 301 742.240b provides a breakdown of total tributary area which impacts each ASCA. The total disturbed tributary areas (not including Forested/Aspen and Sage/Grass areas) to sediment ponds 001A through 004A is 41.43 acres, and as shown in the referenced tables the total tributary area to all ASCA'S is 6.7 acres. Thus, the total area of the proposed ASCA's is approximately 13.9 percent of the total disturbed area of the mines, meeting criteria No. 3 presented above. Maps R614 301 731.720a through 301 731.720d show the locations of sediment control facilities, and ASCA's found within the Mine Permit Area.~~

~~Runoff volumes from the 10 year, 24 hour precipitation event were determined for 1) ASCA areas, and 2) that area specific to ASCA areas including adjacent tributary areas. Calculated volumes of runoff derived from the 10 year, 24 hour precipitation event for both ASCA areas as well as ASCA plus adjacent tributary areas are shown in Table R614 301 742.240c. A comparison of the total runoff volume from the ASCA's themselves (0.83 acre feet) versus the runoff volume from the 10 year, 24 hour precipitation event to the sediment ponds (5.92 acre-feet) indicates that the runoff volume from the ASCA's is approximately 14 percent of the runoff volume controlled by the sediment ponds. Calculations are shown in Appendix R614 301-742.221a.~~

~~TABLE R614-301-742.240a~~
~~ASCA AREA BREAKDOWNS~~

ASCA No.	PAVED AREA (ac ft)	DISTURBED AREA (ac ft)	SAGE/GRASS AREA (ac ft)	FOREST/ASPEN AREA (ac ft)	TOTAL AREA (ac ft)
1		1.13			1.13
2	0.11	1.00			1.11
3	0.75	0.87		0.5	2.12
4		0.19			0.19
5		1.16			1.16
6		0.95			0.95

~~TABLE R614-301-742.240b~~
~~TOTAL ASCA PLUS TRIBUTARY AREA BREAKDOWNS~~

ASCA No.	PAVED AREA (ac ft)	DISTURBED AREA (ac ft)	SAGE/GRASS AREA (ac ft)	FOREST/ASPEN AREA (ac ft)	TOTAL AREA (ac ft)
1		1.13			1.13
2	0.60	1.00			1.60
3	0.75	0.87		0.50	2.12
4		0.19		0.37	0.56
5		1.16			1.16
6		0.95	1.00	1.34	3.29

~~Five undisturbed area bypass channels have been designed for the Mine Permit Area as shown on the maps referenced. These ditches aid in the control of sediment transport by preventing runoff from undisturbed areas from crossing over disturbed drainages where higher sediment transport rates are possible.~~

~~TABLE R614-301-742.240c~~
~~10 YEAR, 24 HOUR RUNOFF VOLUMES FROM ASCA'S AND FROM ASCA'S PLUS TRIBUTARY AREAS~~

~~ASCA No.~~	~~10 Year, 24 Hour Runoff Volume From ASCA Areas Only (ac ft)~~	~~10 Year, 24 Hour Runoff Volume From ASCA Plus Tributary Areas (ac ft)~~
~~1~~	~~0.14~~	~~0.14~~
~~2~~	~~0.14~~	~~0.23~~
~~3~~	~~0.27~~	~~0.27~~
~~4~~	~~0.02~~	~~0.03~~
~~5~~	~~0.14~~	~~0.14~~
~~6~~	~~0.12~~	~~0.22~~
~~Total~~	~~0.83~~	~~1.03~~

~~Depressions throughout the Mine Permit Area collect and retain surface runoff from small disturbed drainage areas where it either infiltrates to the ground water system, or is evaporated. These depressions help collect and retain moving sediment, as well as reduce total runoff thereby reducing erosion.~~

~~Where practical, natural vegetation is allowed to grow into runoff conveyance facilities in order to reduce overall erosion rates. Vegetative stands and the associated root network aid in holding soil in place thereby reducing sediment transport. An example of this type of erosion prevention is found in the ditch sections near the General Office within the Valcam Permit Area.~~

~~Paved roadways also aid in reducing erosion within the Mine Permit Area. They also aid in reducing the amount of air pollution through dust and particulate matter caused by motor vehicles. Concrete ditch sections located along the Belina Haul Road to the Belina Mines, and along selected road sections at the mine itself act in the same manner as paved roadways and reduce erosion.~~

~~Revegetation of disturbed areas and ditch sections reduce erosion rates by re-establishing vegetative growth. The additional water holding and water retention capacity of vegetated areas acts in conjunction with root zones to reduce soil movement.~~

~~The great majority of surface runoff conveyance facilities within the Mine Permit Area have been in place for an extended period of time. The amount of erosion evident at each of the facilities is therefor indicative of the type and amount of erosion that is anticipated to occur as a result of runoff characteristics. In some locations, the placement of riprap has been a successful deterrent to continued erosion.~~

~~Rock gabions have been placed within some small channel sections to prevent upstream erosion. In cases where erosion would normally exist, this type of control prevents undercutting and forces the water to back up behind the gabion until water can flow over the top of the structure. When this happens, the slope and runoff velocity of the channel remains constant thereby maintaining controlled sediment load rates. An example of ditch sections using rock gabions successfully can be seen in the ditches located at the entrance to the Valcam Loadout Area.~~

~~Sediment traps or basins are located at selected sites within the Mine Permit Area to reduce the amount of sediment being carried to downstream locations. These traps reduce local ditch runoff velocities thereby allowing the larger sediment to be dropped out.~~

~~Straw bales placed within the ditch section act as small filter dams which have two effects. First, they create a damming effect which reduces flow velocity (thereby reducing sediment loadings), and second, they filter out larger sediment particles. These straw bales are placed perpendicular to the ditch channel, and are kept in place through the use of steel rebar or other similar device which is driven through the bale and anchored securely into the ground.~~

~~Each of the sediment control measures outlined above were considered for use at each of the ASCA's located within the Mine Permit Area. Table R614-301-742.240d provides a summary of the proposed treatment facilities for each ASCA.~~

~~**TABLE R614-301-742.240d**~~
~~**PROPOSED ASCA TREATMENT FACILITIES**~~

~~Facility~~	~~ASCA 1~~	~~ASCA 2~~	~~ASCA 3~~	~~ASCA 4~~	~~ASCA 5~~	~~ASCA 6~~
~~Bypass Channel~~	~~X~~	~~X~~			~~X~~	~~X~~
~~Depressions~~		~~X~~			~~X~~	~~X~~
~~Nat. Vegetation~~	~~X~~	~~X~~	~~X~~		~~X~~	~~X~~
~~Paved~~		~~X~~	~~X~~			
~~Revegetation~~			~~X~~		~~X~~	~~X~~
~~Riprap~~	~~X~~	~~X~~			~~X~~	~~X~~
~~Rock Gabion~~						
~~Sediment Basin~~	~~X~~	~~X~~		~~X~~	~~X~~	~~X~~
~~Straw Bale(s) (Loose)~~	~~X~~	~~X~~		~~X~~	~~X~~	~~X~~
~~Total Acres~~	~~1.1~~	~~0.4~~	~~2.3~~	~~1.0~~	~~0.2~~	~~0.8~~

~~UDOGM has requested that the applicant prepare a monitoring plan which samples collectable drainage for water quality from each ASCA when practical. As a minimum, each sample is proposed by the regulating agency to be analyzed for total suspended and settleable solids.~~

~~Local conditions make it difficult to collect and monitor runoff from ASCA areas within the permit area because of 1) variability in climatic conditions within during early spring, late fall and winter, 2) the amount of runoff noted or expected from the ASCA's (if any) is relatively small, and 3) the ability to collect samples from each ASCA prior to the end of a measurable runoff event developed from typical mountain storms is limited. In an attempt to comply with this request by the regulatory agency, the applicant agrees to collect periodic samples from ASCA's identified in the permit when they are determined collectable by the operator based upon the relative magnitude of the precipitation event. A record will be kept by the operator of visits made to each ASCA indicating runoff conditions found, and whether or not it was possible to collect a storm runoff sample.~~

742.300. DIVERSIONS.

742.310 thru 742.314. GENERAL REQUIREMENTS.

Surface runoff diversions in place within the Mine Permit Area consist of small ditches and culverts which carry water from various locations throughout the Mine Permit Area to downstream sedimentation facilities. In general, these conveyance ditches and culverts are considered convenience structures, used to aid in the conveyance of excess water thereby preventing the accumulation of water and the creation of muddy or boggy areas. By collecting and conveying the water to the sedimentation ponds in this manner, mine traffic becomes more controlled and fewer travel problems exist.

Sediment control measures utilized in ditch and diversion sections include bypass channels, Straw Pits, depressions, paved roadways or ditch sections, riprap, rock gabions, sediment traps or basins, straw bales, and vegetation. A brief description of the sediment reducing characteristics of each of these control measures was presented in Section 742.24.

As required under the regulations, all ditch and culvert sections will be removed upon mine reclamation according to the reclamation plan provided by the applicant to the Utah Division of Oil, Gas & Mining. In general, mine reclamation will proceed in two phases. Phase I will include the removal of ditches and surface water facilities located upon either the Valcam or Belina Areas, and Phase II will include the removal of the Belina ~~Coal~~ Haul Road as well as the mine access road from the west. During Phase I, reclamation will generally proceed from downgradient to upgradient directions with culverts being removed as reclamation proceeds. Phase II reclamation will start at Eccles Canyon and proceed to the south with culvert removal and reclamation proceeding simultaneously. Additional details related to mine reclamation are found in Section 760.

Runoff conveyance facilities associated with the Mine Permit Area are shown on Sediment Control Facilities Maps 731.720a through 731.720d. Map 731.720a shows those facilities associated with the Valcam Loadout Facility (including the General Office Area), Maps 731.720b and 731.720c show runoff facilities along the Belina Haul Road between Eccles Canyon and the Belina Mines, and Map 731.720d shows those associated with the Belina Mines Area. Some drainage areas for these facilities are not shown completely on the 1 inch to 100 foot scale maps upon which they have been drawn, and detailed topography for them is not available. Drainage boundaries are shown however on Drainage Basin Boundary Map 742.310a for those runoff

facilities where drainages cover extensive areas not mapped in detail on the maps discussed above, such as Belina Haul Road culverts and undisturbed area bypass culverts and ditches.

MAP 742.310a

The numbering sequence used on the maps for both culverts and ditches is based upon a sequential numbering of culverts from north to south. All culverts start with a "C" designation, followed by a culvert number, thereafter followed by the culvert diameter. The culvert with the entrance farthest north carries therefore a designation of "C-1-diameter". The numbering sequence is consistent throughout the Valcam and Belina Permit Areas. The lowest culvert and ditch numbers occur at the far north end of the Valcam Permit Area and increase in a southern direction until the highest number is reached at the southern most end of the Belina Permit Area.

Ditch numbering is tied directly to the culvert associated with the ditch, or if no culvert exists, with the closest culvert. All disturbed area ditch sections carry a "D" designation, followed by a ditch number (which is tied to the closest culvert). In the event that two or more ditches are associated with any given culvert, the ditch number would be followed by a letter of the alphabet, indicating multiple ditch sections. For example, the five ditches associated with Culvert C-12-24 shown on Sediment Control Facilities Map 731.720a, are numbered D-12A through D-12E. Undisturbed area bypass ditches (one of which is located at the Valcam Loadout Facility, and four at the Belina Mine Site) are numbered UDD-1 through UDD-5.

The design methodology used in estimating the peak flows for all diversion facilities is presented in Section 742.220 of this permit renewal. The 10-year, 6-hour precipitation event (1.55 inches) was used for runoff design as obtained from Richardson (1971). The areas contributing runoff to each drainage system were subdivided in accordance with cover complex; i.e. paved area, disturbed area, sage/grass area, and forest/aspen area. A curve number of 98 was assumed for paved areas, a curve number of 90 was assumed for disturbed areas, a curve number of 75 was assumed for sage/grass areas, a curve number of 70 was assumed for low density forest/aspen areas, and a curve number of 40 was assumed for high density forest/aspen areas. A summary of curve numbers and hydrologic soil groupings are shown in the sediment pond analyses and calculations presented in Appendix 742.221a. Volume weighted curve numbers were determined to represent composite areas.

DISTURBED AREA DITCHES

A field reconnaissance of surface runoff characteristics of the Mine Permit Area was conducted by Hansen, Allen & Luce engineers in the spring of 1989. As part of their field investigation, data was collected related to ditch and culvert characteristics within the Mine Permit Area. Main ditch and culvert sections were identified at that time which were considered to be of major importance to the conveyance of disturbed area runoff. Data summaries showing the characteristics of these ditch and culvert sections are shown on Tables 742.310a and 742.310b respectively.

Because many of the ditch and culvert sections are dependent upon runoff flows from adjacent areas, the culvert and ditch analyses completed for this permit submittal include all those facilities located within the Mine Permit Area. However, only those considered to be of major importance to the runoff characteristics of the area are included within the tables referenced in

this section of the permit. Generally speaking, those ditches not listed in the tables referenced are classified by the operator as "Convenience" ditches ~~as not needing formal design,~~ and are installed using a generic triangular ditch design with a depth of between one half to one foot. In order to demonstrate that these ditches will meet minimum design criteria, the calculations shown in Appendix 742.310 have been modified to inlcude depth and velocity. Ditch sections along the Belina Haul Road are concrete lined thereby controlling erosion, and therefore are likewise not included in the design tables. However, design calculations have been generated as part of this permit renewal in order to determine the relative magnitude of flow anticipated in each concrete lined ditch section. Maps 731.720a through 731.720d show the layouts of each ditch and culvert section within the Mine Permit Area. Calculations for both ditches and culverts ~~(where required)~~ are presented in Appendix 742.310.

TABLE 742.310a
DITCH FLOW CHARACTERISTICS

DITCH NO.	RUNOFF AREA (AC)	WEIGHTED CN	PEAK FLOW (CFS)	MANNINGS N	SLOPE		SIDE	BOTTOM WIDTH (FT)	FLOW DEPTH (FT)	MAXIMUM VELOCITY (FPS)	RIPRAP D50 (FT)
					MAX (FT/FT)	MIN (FT/FT)					
D-1	8.2	85.9	3.9	.03	.03	.05	2	1	0.5	4.7	N/A
D-3	5.6	85.5	2.6	.03	.015	.10	2	0	0.7	2.7	N/A
D-5B	2.8	91.5	2.2	.03	.03	.11	2	0	0.3	4.8	N/A
D-7A	0.8	90.0	0.6	.03	.02	.08	2	0	0.9	3.5	N/A
D-7B	1.6	91.9	1.3	.03	.045	.11	2	1	0.3	4.5	N/A
D-12D	1.6	93.0	1.4	.03	.02	.02	2	0	0.5	2.6	N/A
D-13A	2.1	80.1	0.6	.03	.03	.18	2	0	0.4	4.8	N/A
D-13B	2.2	80.7	0.7	.03	.15	.35	2,15	2	0.2	4.6	N/A
D-16B	0.7	90.0	0.5	.03	.01	.10	2	0	0.4	3.7	N/A
D-30	2.3	82.8	4.5	-	.10	.13	Concrete Ditch Installed at Roadside				
D-33A	14.3	83.4	5.4	-	.04	.04	Concrete Ditch Installed at Roadside				
D-33B	13.4	86.0	6.6	.03	.04	.04	2,15	0	0.5	3.7	N/A
D-34A	1.3	85.0	0.6	.03	.02	.02	2	0	0.4	2.2	N/A
D-34B	3.0	88.2	1.9	.03	.02	.05	2	0	0.6	4.1	N/A
D-35	4.6	89.3	3.0	.03	.02	.02	2	0	0.7	3.2	N/A
D-37*	1.4	90.0	1.0	.03	.18	.18	2,15	0	0.2	4.0	N/A
	3.8	90.0	2.6	.03	.02	.10	2,15	0	0.8	4.1	N/A
	3.8	90.0	2.6	.04	.30	.30	2	2	0.2	5.9	0.75
D-44A	1.5	80.0	0.4	.03	.10	.10	2	0	0.3	3.6	N/A
D-44B	1.8	77.8	0.4	.03	.17	.21	2	0	0.2	4.5	N/A

* Values are for Upper, Middle and Lower sections respectively.

UNDISTURBED AREA BY-PASS DITCHES

Hansen, et. al. (1989) provided a hydrologic analysis of the undisturbed area by-pass channels and culverts within the Belina and Valcam Permit Areas. This hydrologic analysis included an estimate of the peak flowrate from the 6-hour precipitation event. There are two undisturbed area by-pass culverts (C-4-42 and C-14-42) and five open channels (UDD-1 through UDD-5) for which peak flows from the above referenced design events were estimated. The design check of bypass culverts was completed using the 100-year, 6-hour precipitation event, and the 10-year, 6-hour precipitation was used for the design check of undisturbed area drainage ditches. It is important to note that some renumbering of culverts was implemented in response to this permit renewal, and therefore caution is advised when comparing data shown herein with previous documentation. For example, the culvert listed as C-12-42 in the 1989 Hansen, et. al. report has been renamed C-14-42. Calculations for both undisturbed area bypass ditches and culverts are presented in Appendix 742.310.

TABLE 742.310b
CULVERT FLOW CHARACTERISTICS

CULVERT NO.	RUNOFF AREA (AC.)	WEIGHTED CN	PIPE DIA. (IN.)	PIPE SLOPE (FT/FT)	AVAILABLE HW/D RATIO	INLET CAPACITY (CFS)	PIPE CAPACITY (CFS)	DESIGN FLOW RATE (CFS)	COMMENT
C-1-32	8.2	85.9	32	.25	1.9	45.0	132.0	3.9	Flow from D-1
C-4-42	88.0	61.7	42	.03	1.9	90.0	94.4	4.0	Flow from Undisturbed Area
C-5-18	3.4	-	18	.03	1.5	9.0	16.9	2.6	Flow from D-5A,B
C-6-18	4.5	-	18	.025	2.7	13.0	9.0	3.4	Flow from D-6,C-5-18
C-7-24	2.4	-	24	.05	1.4	16.5	27.4	1.8	Flow from D-7A,B
C-8-18	1.6	-	18	.04	1.5	9.0	11.4	1.2	Flow from D-8,D-9A,B
C-10-18	12.8	75	18	.10	1.5	9.0	18.0	1.2	Flow from D-10
C-11-12	0.8	91.3	12	.08	1.0	2.0	5.5	0.6	Flow from Tributary Area
C-12-24	1.1	-	24	.02	2.0	22.0	17.3	0.9	Flow from D-12A,B
C-14-42	242.0	67.5	42	.03	1.9	90.0	94.4	21.9	Flow from Undisturbed Area
C-15-24	4.2	82.8	24	.05	1.6	18.5	27.4	1.6	Flow from D-15
C-19-48	1482.0	74.3	48	.06	2.1	130.0	190.6	77.0	Flow from Undisturbed Area
C-21-48	2072.0	73.0	48	.01	8.3	215.0	276.0	92.6	Flow from Tributary Area
C-22-24	22.0	70.5	24	.057	1.4	17.0	29.3	0.8	Flow from Tributary Area
C-23-24	22.0	70.5	24	.08	1.8	20.0	34.7	0.8	Flow from Tributary Area
C-24-24	20.0	75.0	24	.12	2.1	22.0	42.5	2.0	Flow from Tributary Area
C-25-36	151.0	72.7	36	.12	7.3	130.0	125.2	7.0	Flow from Tributary Area
C-26-24	14.0	75.0	24	.18	2.0	22.0	52.0	1.5	Flow from Tributary Area
C-27-24	14.7	71.0	24	.43	2.3	24.0	80.6	0.6	Flow from UDD-2

CULVERT NO.	RUNOFF AREA (AC.)	WEIGHTED CN	PIPE DIA. (IN.)	PIPE SLOPE (FT/FT)	AVAILABLE HW/D RATIO	INLET CAPACITY (CFS)	PIPE CAPACITY (CFS)	DESIGN FLOW RATE (CFS)	COMMENT
C-28-24	35.0	74.8	24	.30	4.3	35.0	67.1	3.3	Flow from UDD-2,Tributary Area
C-30-24	12.3	82.8	24	.04	2.0	21.0	24.5	4.5	Flow from D-30
C-32-36	5.9	73.8	36	.04	2.6	80.0	72.3	0.6	Flow from D-32A,B
C-33-24	27.7	-	24	.17	2.0	22.0	50.5	12.0	Flow from D-33A,B
C-34-24	4.3	-	24	.30	2.2	22.0	67.2	2.5	Flow from D-34A,B
C-36-12	4.9	-	12	.30	2.2	4.0	10.6	1.1	Flow from D-36,C-38-6
C-38-6	2.2	76.1	6	.07	3.0	1.3	0.8	0.4	Flow from Tributary Area
C-39-8	1.8	70.0	8	.08	2.8	2.0	1.9	0.1	Flow from D-39A,B
C-40-42	54.9	70.0	42	.30	4.3	140.0	265.3	5.3	Flow from C-41-12,C-44-24, and Tributary Area
C-41-12	-	-	12	.17	2.4	4.5	8.0	1.0	Flow from Mine Discharge
C-44-24	74.2	70.0	24	.08	3.2	29.0	34.7	2.5	Flow from Undisturbed Area

Undisturbed area bypass channel UDD-1 is associated with the Valcam Loadout Facility, and bypass channels UDD-2 through UDD-5 are associated with the Belina Mine Site. The locations and tributary areas of these culverts and channels are shown on Maps 731.720a through 731.720d, and on Map 742.310a.

Summary data for tributary areas to the undisturbed area by-pass channels are presented in Table 742.310c. Peak flow projections from the precipitation events referenced above along with the respective watershed characteristics are presented in Table 742.310d. Calculations and computer printouts of the hydrographs from the analysis, as well as hydraulic channel designs for culverts and ditches UDD-1 through UDD-5 are shown in Appendix 742.310.

Two intermittent ~~and one perennial~~ streams have been diverted within the Mine Permit Area, ~~all three~~ both of which have been in place for many years. Both intermittent streams are located within the Valcam Permit Area and are culverted. These culverted streams are identified as culverts C-4-42 and C-12-42 on Map 731.720a. ~~The perennial~~ A stream diversion located within Whisky Creek (identified as culvert C-40-42 on Map 731.720d) is also a culverted section which lies beneath the coal loadout pad of the Belina Permit Area. At one time UDOGM desired to classify Whisky Creek as a perennial stream due to continued mine discharges, however, no discharges have occurred for some time and therefore Whisky Creek should rightly be classified as an emphemeral stream.

Not Acceptable

TABLE 742.310c
TRIBUTARY AREA TO UNDISTURBED AREA BY-PASS CHANNELS

CHANNEL	FORESTED/ASPEN AREA ACRES	SAGE/GRASS AREA ACRES	TOTAL AREA ACRES
UDD-1	0.0	6.7	6.7
UDD-2	13.3	1.4	14.7
UDD-3	0.0	8.1	8.1
UDD-4	5.5	0.0	5.5
UDD-5	7.2	0.0	7.2

TABLE 742.310d
UNDISTURBED AREA WATERSHED CHARACTERISTICS AND PEAK FLOW

CHANNEL	AREA ACRES	VOLUME WEIGHTED CURVE NUMBER	HYDRAULIC LENGTH FT	WATERSHED SLOPE %	10-YR, 6-HR PEAK FLOW CFS
UDD-1	6.7	75	700	27	0.84
UDD-2	14.7	71	1900	37	0.57
UDD-3	8.1	75	1500	32	0.85
UDD-4	5.5	70	1250	31	0.19
UDD-5	7.2	70	1100	28	0.25

742.320 thru 742.324. DIVERSION OF PERENNIAL AND INTERMITTENT STREAMS.

The hydraulics (including inlet and pipe flow conditions) for all three culverts have been checked against the 100-year, 6-hour precipitation runoff event. Calculations and data summaries for these three culverts are presented with the remainder of Mine Permit Area culverts in Section 742.310.

742.330 thru 742.333. DIVERSION OF MISCELLANEOUS FLOWS.

All flow diversions within the Mine Permit Area are discussed in Section 742.310. Additional clarification however is warranted regarding diversion ditch D-1 located at the Valcam Loadout Facility. This ditch collects water from the disturbed area within the

northwestern portion of the permit area. A careful review of Map 731.720a will show that some of the upgradient undisturbed area drainage is diverted to the north around the collection area for the ditch. Topographic mapping and field verification indicate that a small roadway exists which effectively diverts upgradient runoff waters around the permit area. The roadway is owned and operated by Utah Power and Light Company and is used for power pole maintenance purposes. Because the applicant has no control over the diversion, no data, design or details are provided herein.

742.400 thru 742.423.5. ROAD DRAINAGE.

Roads located within the Mine Permit Area have been in place for a number of years, and no new roads are contemplated at this time. All existing roads are constructed with side slopes to facilitate surface drainage. In the future, should any new roads be required, UDOGM will be notified, and all roads will be constructed in such a manner so as to provide for proper drainage. Road drainage will be accomplished by 1) sloping the road surface towards the inner embankment and 2) constructing an accompanying drainage ditch paralleling the roadway when required to prevent excessive erosion, or to prevent spillage into another runoff drainage basin. After collecting surface runoff, the drainage ditch system diverts surface runoff to a downstream channel or sedimentation pond. When runoff is derived from undisturbed surface areas, the road drainage system redirects surface flows to natural channels. When runoff is derived from disturbed surface areas, the runoff is diverted through a sedimentation pond.

All roads have been constructed on the most stable available surfaces and no stream fords are used throughout the Mine Permit Area. Runoff calculations for culverts located beneath roadways are based upon the 10-year, 6-hour runoff event according to the SCS runoff prediction methodology presented earlier in this permit. Some concrete drop boxes and grated inlets have been installed at selected road culverts to aid in the protection against culvert plugging from runoff debris. For the most part, these grated inlets are located at undisturbed area bypass culverts, at the inlet of major culverts lying at the base of mine highwalls, and along the Belina Haul Road connecting Eccles Canyon with the Belina Mines.

Roadside or mine yard culverts identified as having grated inlets at the time of this submittal include C-23-24, C-24-24, C-26-24, C-26A-24, C-32-36, and C-33-24. Other undisturbed area bypass culverts for which grated inlets have been installed include C-4-42, C-14-42, and C-40-42. The locations of these grated inlets are shown on Maps 731.720a thru 731.720d. Small culverts found within the disturbed Mine Permit Area are generally not provided with grated inlets or inlet/outlet headwalls. These devices are not provided because should a failure occur, all runoff would be recollected within a downstream culvert and or ditch section, and carried to the appropriate sedimentation pond for water quality control. Repairs to, or replacements of damaged culverts will be completed by the applicant as required for efficient mine operation, and for the protection of the hydrologic balance.

743 thru 743.300. IMPOUNDMENTS.

The requirements of this section are discussed and met in Section 742.220 within the discussion on sedimentation ponds.

northwestern portion of the permit area. A careful review of Map 731.720a will show that some of the upgradient undisturbed area drainage is diverted to the north around the collection area for the ditch. Topographic mapping and field verification indicate that a small roadway exists which effectively diverts upgradient runoff waters around the permit area. The roadway is owned and operated by Utah Power and Light Company and is used for power pole maintenance purposes. Because the applicant has no control over the diversion, no data, design or details are provided herein.

742.400 thru 742.423.5. ROAD DRAINAGE.

Roads located within the Mine Permit Area have been in place for a number of years, and no new roads are contemplated at this time. All existing roads are constructed with side slopes to facilitate surface drainage. In the future, should any new roads be required, UDOGM will be notified, and all roads will be constructed in such a manner so as to provide for proper drainage. Road drainage will be accomplished by 1) sloping the road surface towards the inner embankment and 2) constructing an accompanying drainage ditch paralleling the roadway when required to prevent excessive erosion, or to prevent spillage into another runoff drainage basin. After collecting surface runoff, the drainage ditch system diverts surface runoff to a downstream channel or sedimentation pond. When runoff is derived from undisturbed surface areas, the road drainage system redirects surface flows to natural channels. When runoff is derived from disturbed surface areas, the runoff is diverted through a sedimentation pond.

All roads have been constructed on the most stable available surfaces and no stream fords are used throughout the Mine Permit Area. Runoff calculations for culverts located beneath roadways are based upon the 10-year, 6-hour runoff event according to the SCS runoff prediction methodology presented earlier in this permit. Some concrete drop boxes and grated inlets have been installed at selected road culverts to aid in the protection against culvert plugging from runoff debris. For the most part, these grated inlets are located at undisturbed area bypass culverts, at the inlet of major culverts lying at the base of mine highwalls, and along the Belina Haul Road connecting Eccles Canyon with the Belina Mines.

Roadside or mine yard culverts identified as having grated inlets at the time of this submittal include C-23-24, C-24-24, C-26-24, C-26A-24, C-32-36, and C-33-24. Other undisturbed area bypass culverts for which grated inlets have been installed include C-4-42, C-14-42, and C-40-42. The locations of these grated inlets are shown on Maps 731.720a thru 731.720d. Small culverts found within the disturbed Mine Permit Area are generally not provided with grated inlets or inlet/outlet headwalls. These devices are not provided because should a failure occur, all runoff would be recollected within a downstream culvert and or ditch section, and carried to the appropriate sedimentation pond for water quality control. Repairs to, or replacements of damaged culverts will be completed by the applicant as required for efficient mine operation, and for the protection of the hydrologic balance.

743 thru 743.300. IMPOUNDMENTS.

The requirements of this section are discussed and met in Section 742.220 within the discussion on sedimentation ponds.

744 thru 744.200. DISCHARGE STRUCTURES.

Information related to discharge structures for sedimentation ponds and diversions located within the Mine Permit Area is found in Sections 742.220 and 742.300 respectively. Erosion control calculations for these discharge structures are found for each respective structure or diversion within Appendix 742.310. As the calculations indicate, the great majority of structures require little or no additional protection beyond that found to naturally exist. In some instances calculations indicate that some protection is suggested, however, current conditions show that little erosion is occurring. Under these conditions, erosion protection will not be installed unless it is shown that active erosion is occurring at an unacceptable rate and that the erosion is degrading downstream water quality. With these considerations it is found that only a select few discharge structures require erosion protection.

745 thru 745.400. DISPOSAL OF EXCESS SPOIL.

No excess spoil is planned for placement on preexisting benches within the Mine Permit Area.

746. COAL MINE WASTE.

746.100 thru 746.120. GENERAL REQUIREMENTS.

Information related to coal mine wastes is given in Section 528.300 of the permit.

746.200 thru 746.222. REFUSE PILES.

No permanent impoundments are planned for placement on completed refuse piles.

746.300 thru 746.340. IMPOUNDING STRUCTURES.

No new or existing impoundments are or will be constructed of coal mine waste unless they meet the requirements of this section.

746.400 thru 746.430. RETURN OF COAL PROCESSING WASTES TO ABANDONED UNDERGROUND WORKINGS.

No coal processing wastes are generated by the applicant in its operation. The only material which has been disposed of within the mine which could be classified as waste consisted of ~~waste which is returned to the mine is~~ sediment which ~~has been~~ was removed from Pond 004A with the approval of UDOGM and MSHA. The sediment disposal site for Pond 004A within the mine is located in the West mains near First and Second South. Should coal mine wastes be identified in the future, and it be desired to return them to the underground workings, then the requirements of this section will be met in consultation with UDOGM.

747 thru 747.300. DISPOSAL OF NON-COAL MINE WASTES.

Information related to the disposal on non-coal mine wastes is presented within Section 528.330 of this permit ~~renewal~~.

748. CASING AND SEALING OF WELLS.

All water wells currently used within the Mine Permit Area have been cased as required, and those wells abandoned have been sealed as discussed in Section 631 according to the requirements of this section to:

1. Prevent acid or other toxic drainage from entering the ground or surface water.

2. Minimize the disturbance to the hydrologic balance of the Mine Permit Area.

3. Ensure the safety of people, livestock, fish and wildlife, and machinery.

Wells exposed by coal mining and reclamation operations, or other exploratory, monitoring and water wells will be permanently sealed unless otherwise approved by UDOGM as outlined in Section 731.400.

750 thru 755. PERFORMANCE STANDARDS.

All performance standards required within this section of the regulations with the exception of Alternate Sediment Control Alternatives (ASCA's) have been previously discussed within other sections of this permit renewal. A discussion of the ASCA's used within the permit area is provided later in this section. All discharges from the mines or disturbed mine areas are governed under UPDES discharge permit number UT-0022985 (included in Appendix 750 and discussed in Section 731.221), and efforts are being made to comply with all Utah and federal water quality laws. Efforts include the installation and maintenance of numerous runoff control ditches and culverts, the maintenance of four sedimentation ponds, the installation of numerous silt traps and silt fences, and the revegetation of disturbed areas. All disturbed areas will be reclaimed upon mine abandonment. Hydrologic reclamation details are included within Section 760.

All mine road drainage is controlled through the collection and treatment of disturbed area runoff in local sedimentation ponds with the exception of the Belina ~~Mines~~ Haul Road between Eccles Canyon and the Belina Mines. A concrete ditch system has been installed alongside the paved coal haul road up Whisky Creek which helps prevent the erosion of the downslope hillside and or road base, and allows for the diversion and bypass of natural waters without excessive impact. Erosion is reduced throughout the mine facility through regular grading and maintaining of the road system. Where possible, the applicant will continue to revegetate disturbed areas impacted during the operational phase of mining as soon as practical after the disturbance ceases. Revegetation efforts on disturbed area hillsides (at the Belina mine for example) have been very successful.

Other areas of concern raised through the regulations is the disposal of excess spoil, coal mine waste, and non-coal mine waste. These issues are likewise discussed earlier within Sections 745 and 746.

Casing and sealing of wells will be managed to comply with Sections 738, 748 and 765.

A total of six Alternative Sediment Control Structure areas (ASCA's) are identified within the Total Permit Area for which exclusion from further permitting is being requested. Two of these ASCA's (ASCA 1 and 2) are associated with the Valcam Loadout Facility, one (ASCA 3) is associated with the General Office Area west of the Valcam Loadout Facility, and three (ASCA 4 through ASCA 6) are associated with the Belina Mines. The locations of ASCA 1 through ASCA 3 are presented on Map 731.720a, and ASCA 4 through ASCA 6 are presented on Map 731.720d.

The three general qualifying criteria that must be met in order for an area to qualify as a ASCA are:

1. The area cannot be tributary to a sediment pond.
2. The area must have some form of a treatment structure to treat runoff from the area.
3. The summation of the areas of the ASCA's must be less than fifteen percent of the total disturbed area.

Runoff from the ASCA's is not tributary to any of the sediment ponds and several alternative sediment treatment structures are already in place. A commitment by the applicant to complete those not yet in place prior to final approval of this mine re-permit has been made. Table 750a is inserted to provide a breakdown of areas included within each ASCA. Table 750b provides a breakdown of total tributary area which impacts each ASCA. The total disturbed tributary areas (not including Forested/Aspen and Sage/Grass areas) to Sediment Ponds 001A through 004A is 41.43 acres, and as shown in the referenced tables the total tributary area to all ASCA'S is 6.7 acres. Thus, the total area of the proposed ASCA's is approximately 13.9 percent of the total disturbed area of the mines, meeting criteria No. 3 presented above. Maps 731.720a through 731.720d show the locations of sediment control facilities, and ASCA's found within the Mine Permit Area.

Runoff volumes from the 10-year, 24-hour precipitation event were determined for 1) ASCA areas, and 2) that area specific to ASCA areas including adjacent tributary areas. Calculated volumes of runoff derived from the 10 year, 24 hour precipitation event for both ASCA areas as well as ASCA plus adjacent tributary areas are shown in Table 750c. A comparison of the total runoff volume from the ASCA's themselves (0.83 acre-feet) versus the runoff volume from the 10 year, 24 hour precipitation event to the sediment ponds (5.92 acre-feet) indicates that the runoff volume from the ASCA's is approximately 14 percent of the runoff volume controlled by the sediment ponds. Calculations are shown in Appendix 742.221a.

Five undisturbed area bypass channels have been designed for the Mine Permit Area as shown on the maps referenced. These ditches aid in the control of sediment transport by preventing runoff from undisturbed areas from crossing over disturbed drainages where higher sediment transport rates are possible.

TABLE 750a
ASCA AREA BREAKDOWNS

ASCA No.	PAVED AREA (ac-ft)	DISTURBED AREA (ac-ft)	SAGE/GRASS AREA (ac-ft)	FOREST/ASPEN AREA (ac-ft)	TOTAL AREA (ac-ft)
1	-	1.13	-	-	1.13
2	0.11	1.00	-	-	1.11
3	0.75	0.87	-	0.5	2.12
4	-	0.19	-	-	0.19
5	-	1.16	-	-	1.16
6	-	0.95	-	-	0.95

TABLE 750b
TOTAL ASCA PLUS TRIBUTARY AREA BREAKDOWNS

ASCA NO.	PAVED AREA (ac-ft)	DISTURBED AREA (ac-ft)	SAGE/GRASS AREA (ac-ft)	FOREST/ASPEN AREA (ac-ft)	TOTAL AREA (ac-ft)
1	-	1.13	-	-	1.13
2	0.60	1.00	-	-	1.60
3	0.75	0.87	-	0.50	2.12
4	-	0.19	-	0.37	0.56
5	-	1.16	-	-	1.16
6	-	0.95	1.00	1.34	3.29

Straw pits as they are termed herein consist of small holes dug along side a mine road afterwhich they are filled with straw. These holes (approximately 2 feet by 3 feet in horizontal dimension) serve as small retention basins which help control the amount of sediment moving within and out of an ASCA.

Small depressions located at some points within the Mine Permit Area collect and retain surface runoff from small disturbed drainage areas. These depressions help collect and retain moving sediment, as well as reduce total runoff thereby reducing erosion.

TABLE 750c
10 YEAR, 24 HOUR RUNOFF VOLUMES FROM ASCA'S AND FROM ASCA'S PLUS TRIBUTARY AREAS

ASCA NO.	10 YEAR, 24 HOUR RUNOFF VOLUME FROM ASCA AREAS ONLY (AC-FT)	10 YEAR, 24 HOUR RUNOFF VOLUME FROM ASCA PLUS TRIBUTARY AREAS (AC-FT)
1	0.14	0.14
2	0.14	0.23
3	0.27	0.27
4	0.02	0.03
5	0.14	0.14
6	0.12	0.22
Total	0.83	1.03

Where practical, natural vegetation is allowed to grow into runoff conveyance facilities in order to reduce overall erosion rates. Vegetative stands and the associated root network aid in holding soil in place thereby reducing sediment transport. An example of this type of erosion prevention is found in the ditch sections near the General Office Area within the Valcam Permit Area.

Paved roadways also aid in reducing erosion within the Mine Permit Area. They also aid in reducing the amount of air pollution through dust and particulate matter caused by motor vehicles. Concrete ditch sections located along the Belina Haul Road to the Belina Mines, and along selected road sections at the mine itself act in the same manner as paved roadways and reduce erosion.

Revegetation of disturbed areas and ditch sections reduce erosion rates by re-establishing vegetative growth. The additional water holding and water retention capacity of vegetated areas acts in conjunction with root zones to reduce soil movement.

The great majority of surface runoff conveyance facilities within the Mine Permit Area have been in place for an extended period of time. The amount of erosion evident at each of the facilities is therefor indicative of the type and amount of erosion that is anticipated to occur as a result of runoff characteristics. In some locations, the placement of riprap has been a successful deterrent to continued erosion.

Rock gabions have been placed within some small channel sections to prevent upstream erosion. In cases where erosion would normally exist, this type of control prevents undercutting and forces the water to back up behind the gabion until water can flow over the top of the structure.

When this happens, the slope and runoff velocity of the channel remains constant thereby maintaining controlled sediment load rates. An example of ditch sections using rock gabions successfully can be seen in the ditches located at the entrance to the Valcam Loadout Area.

Sediment basins (or traps) are located at selected sites within the Mine Permit Area to reduce the amount of sediment being carried to downstream locations. These basins reduce local ditch runoff velocities thereby allowing the larger sediment to be dropped out.

Straw bales placed within the ditch section act as small filter dams which have two effects. First, they create a damming effect which reduces flow velocity (thereby reducing sediment loadings), and second, they filter out larger sediment particles. These straw bales are placed perpendicular to the ditch channel, and are kept in place through the use of steel rebar or other similar device which is driven through the bale and anchored securely into the ground.

Silt fencing is placed at the bottom of some disturbed hillslopes to help capture the small amount of sediment which may be moving on site. Typically these silt fences help control sediment while allowing the passage of runoff.

Each of the sediment control measures outlined above were considered for use at each of the ASCA's located within the Mine Permit Area. Table 750d provides a summary of the proposed treatment facilities for each ASCA.

TABLE 750d
PROPOSED ASCA TREATMENT FACILITIES

FACILITY	ASCA 1	ASCA 2	ASCA 3	ASCA 4	ASCA 5	ASCA 6
Bypass Channel	X	X			X	X
Straw Pits		X		X		X
Depressions		X				X
Nat. Vegetation	X	X	X	X	X	X
Paved		X	X			
Revegetation			X		X	X
Riprap	X	X			X	X
Rock Gabion		X				
Sediment Basin	X	X		X	X	X
Straw Bale(s)		X	X	X	X	X
Silt Fencing	X					
Total Acres	1.1	0.4	2.3	1.0	0.2	0.8

Because of the continued variability of mining operations it is not possible to locate on a map the exact location of each of the sediment control alternatives outlined within the previous table. However, general guides as to their use and their location is provided in Table 750e. Note in the table that only those sediment control devices which are currently used for a particular ASCA are noted.

TABLE 750e
GENERAL APPLICATION OF SEDIMENT CONTROL FACILITIES

DEVICE	LOCATION OF DEVICE
ASCA 1	
Bypass Channel	Consists of Ditch D-6
Natural Vegetation	Filling in on Slopes
Riprap	Located at outlet to C-4-42
Sediment Basin	Diversion ditches route water to Ponds 001A and 002A
Silt Fence	Located at toe of slope midway between Pond 001A and 002A
ASCA 2	
Bypass Channel	Consists of Ditches D-8, D-12E and D-16B
Depression	One located at the outlet to C-12-24, one midway down D-12D, and one near the end of D-12D.
Natural Vegetation	Filling in on Slopes
Paved Roadway	Part of Access Roadway to Loadout Facility
Riprap	Located at outlet to D-12D and along Creek
Rock Gabion	Located at bottom of Ditches D-12A and D-12C
Sediment Basin	Diversion ditches route water to Ponds 002A and 003A
Straw Bales	Straw bales located at downstream end of Ditches D-12A,B & C
ASCA 3	
Natural Vegetation	Filling in from surrounding area
Paved Roadway	Access roadway to office facilities
Regegetation	Grass in front of office
Straw Bales	Located at end of Ditch D-19B

DEVICE	LOCATION OF DEVICE
ASCA 4	
Straw Pits	Located along Ditch UDD-2
Natural Vegetation	Filling in on Slopes
Sediment Basin	Located at end of Ditch UDD-2
Straw Bales	Located at sediment basin outlet
ASCA 5	
Bypass Channel	Consists of Ditches UDD-4 and D-34A
Natural Vegetation	Filling in on Slopes
Regegetation	Entire slope
Riprap	Located at sediment basin outlet
Sediment Basin	Located at far northeast corner of area
Straw Bales	Located at sediment basin outlet
ASCA 6	
Bypass Channel	Consists of Ditch UDD-3
Straw Pits	Located along Ditch D-44A and D-44B
Natural Vegetation	Filling in on Slopes
Regegetation	Topsoil stockpile, Lower UDD-3, & slope above substation
Riprap	Located at outlet to UDD-3
Sediment Basin	Located at end of Ditch D-44A
Straw Bales	Located around topsoil pile and at end of Ditches D-44A & B

UDOGM has requested that the applicant prepare a monitoring plan which samples collectable drainage for water quality from each ASCA when practical. As a minimum, each sample is proposed by the regulating agency to be analyzed for total suspended and settleable solids. Local conditions make it difficult to collect and monitor runoff from ASCA areas within the permit area because of 1) variability in climatic conditions during early spring, late fall and winter, 2) the amount of runoff noted or expected from the ASCA's (if any) is relatively small, 3) the collection of a water quality sample under low flow conditions will likely be invalidated due to the unavoidable collection of bottom sediments resulting in the distortion of the analytical results, and 4) the ability to collect samples from each ASCA prior to the end of a measurable runoff event developed from typical mountain storms is limited. It is the applicants posture that

the collection of TDS and TSS samples from ASCA's is not possible nor practical and therefore no additonal sampling is planned. Not acceptable – method –

760 thru 764. CHANNEL RECLAMATION.

General mine reclamation to be completed for the Mine Permit Area is discussed within Sections 200 and 300, and only that information which is relevant to hydrology is discussed herein. Hydrologic aspects of mine reclamation pertain to the design of permanent runoff conveyance facilities which are capable of controlling the post mining 100 Year - 6 Hour precipitation event and the permanent closure of wells. As required under the regulations, all existing siltation structures (with the exception of Sediment Pond 004A) will be 1) maintained until removal is authorized by UDOGM and the disturbed area has been regraded, stabilized and revegetated, and 2) maintained for a minimum of two years following the last augmented seeding. It is not possible to retain Sediment Pond 004A in place until all other phases of reclamation have taken place because of its location and the requirement to remove valley fill material upon which it is located. It is also understood that all culverts within the Mine Permit Area are to be removed as part of the reclamation plan unless approval is given by the regulatory agency that their retention meets post mining land use requirements. Culverts proposed to remain following reclamation are bolded as appropriate on reclamation mapping. Additional information related to timing of reclamation activities will follow.

Mapping and design details associated with hydrologic mine reclamation is included within this permit on Maps 760a and 760b, and on Figures 760c and 760d. As shown on the maps, surface drainage facilities have been designed where possible to convey all surface drainage waters from undisturbed areas above reclaimed mine areas, to downstream undisturbed areas. It is understood that any and all interim sediment control measures implemented as outlined below (such as silt fencing) will be removed subsequent to the required reclamation bonding period. It is also understood that all reclamation channels and/or structures will be renovated to the original design specification, including revegetation if required, at the termination of the reclamation bonding period. The general overall plan for reclamation associated with surface runoff facilities follows.

MAP 760a
MAP 760b
FIGURE 760c
FIGURE 760d

As shown on the maps, cut slopes in both the Valcam and Belina Permit Areas will be backfilled, regraded and reshaped. All reclaimed areas will also be revegetated according to methodologies and parameters specified in other areas of this mine permit application. The majority of reshaping of the Belina Permit Area will be completed through the removal of Sediment Pond 004A and coal loadout pad. Because much of the surface disturbances located within the Mine Permit Area were completed prior to these regulations being enforced, little topsoil exists on the site which can be used for regrading and reshaping during reclamation. A small topsoil storage area has been dedicated for use near the Belina Mines as shown on Map 731.720d. Presently, the stockpile contains approximately 975 cubic yards of substitute topsoil which came from the enlargement of Sediment Pond 002A. This material met the criteria of and was approved by the Utah Division of Oil, Gas and Mining for use as a substitute topsoil material.

The topsoil storage area is closely surrounded by dense forest exhibiting a medium amount of deadfall and heavy ground cover. This provides excellent protection against wind erosion as well as rapid snowmelt in the spring. The storage area has been bermed to prevent access by motor vehicles, as well as to prevent erosion of the material from the storage area. Straw bales are also used along the down gradient end (north end) of the storage area to assist in containment, should a slope failure of the stockpile occur. In the future, topsoil removed from the permit area for mining purposes, will be stored in this area for use during reclamation.

All reclaimed areas will be re-established predominately as grassy rangeland through the use of grass/forb/shrub seed mixtures. This seed mixture should provide a reclaimed surface similar to that of the adjacent land area, and compatible with the premining land use classification.

Water quality monitoring of both the Belina and Valcam areas will continue at all operational surface monitoring stations (within drainages wherein reclamation has occurred) throughout the mine reclamation time period and bond release. Sampling parameters and scheduling during this time period will follow those outlined for the operational phase of mining.

Valcam Permit Area

It is the present intent to utilize the General Office Area and accompanying property located west of the loadout facilities as the intermountain office of the Kanawha and Hocking Coal and Coke Company which will exclude it from reclamation activities. If it is decided at a later date by Valley Camp of Utah, Inc. not to utilize the property this manner or to sell or donate it to another entity which desires the facility, then the General Office Area will be reclaimed under the same guidelines agreed upon for the Valcam Loadout Facilities, whereinafter complete reclamation details will be provided to UDOGM.

All surface facilities within the Valcam Permit Area will be removed, and the area will be reclaimed except for those facilities associated with the operation of the railroad which traverse the site and the office and related facilities (including culverts C-19-48 and C-20-48) located west of the Valcam Loadout and Highway 96 as discussed above. Railroad facilities to remain consist of two railroad lines, an access road, and railroad drainage culverts. The drainage culverts which will remain meet the post mining land use requirements of the railroad. It is the intent that the existing paved road connecting the highway with the railroad tracks by the stockout tube will not be stripped of its oil surface, and that the railroad will continue to utilize the road in its present oiled condition. Continued use of this road will allow access by railroad personnel to the tracks and adjacent area in the vicinity of the stockout tube. Should the operators of the railroad desire a dirt, rather than oiled road surface at the time of reclamation, then the oiled surface will be removed. The road loop presently used for the truck dump will be removed upon reclamation. A north and south access roadway east of the railroad tracks will replace the existing Valley Camp railroad spur (most easterly track). Continued maintenance of the roadways will be the responsibility of the railroad company.

In general, reclamation at the Valcam Loadout includes the removal of all surface facilities, the restoration of the culverted stream emanating from the hills to the east of the facility, the regrading and shaping of the Valcam Permit Area, and the grading and recontouring of

sedimentation ponds. Sediment removed from local ponds within both the Valcam and Belina areas will be used in the reclamation process as long as the sediment is found to be non-toxic.

As shown on Map 760a, culverts C-1-32, C-4-42, C-14-42 and C-15-24 will remain in place as required for continued drainage of the railroad right-of-way. At the time of reclamation, a riprap pad will be installed at the outlet of all three culverts. The riprap pad design will be similar in nature to other adjacent railroad culverts not installed or owned by Valley Camp. The only exception to this will be that Culvert C-4-42 will be extended to Mud Creek in order to help prevent excessive erosion down the reclaimed contour.

The long range plan for channel reclamation at the Valcam Loadout Facility includes the construction of a riprap channel (RC-1) throughout much of the length of present culvert C-14-42 as shown on Map 760a. Reclaimed channel RC-1 begins at a location approximately 300 feet east of the railroad tracks. The existing culvert passing beneath the railroad tracks will be modified in that the upstream and downstream sections will be removed, and replaced with the riprapped channel as shown in the design details. The riprapped channel design is based upon a 100 year - 6 hour precipitation event of 2.3 inches and a design flow rate of 23.0 cfs. Channel RC-1 has a five foot bottom width and uses a riprap D_{50} of 1.0 feet except at the reclaimed outlet of culvert C-14-42 where it is 1.25 feet. All channels have a design freeboard of 0.5 feet which is essentially equal to the flow depth. Additional design details are shown on Maps 760a and 760b, and on Figures 760c and 760d and in Appendix 760.

Reclamation of the Valcam Loadout Facility will proceed initially with the construction of reclamation Channel RC-1. This channel is planned to be constructed first in order to divert the majority of undisturbed area waters through the reclaimed facility with minimal impact. Subsequent to the construction of this channel, the remaining area will be graded, reshaped, recontoured, and revegetated according to reclamation plans, details and specifications. Silt fencing will also be an integral part of sediment control until revegetation of the area has been completed. Note that 1) the silt fences shown on Map 760a are placed in a staggered pattern as discussed with UDOGM, and 2) that the fences traverse the entire reclaimed area of the Valcam Loadout Facility where contours will be regraded. Final reclamation efforts will include the removal of existing undisturbed area diversion ditch UDD-1 and the removal of Sediment Ponds 001A through 003A. Additional undisturbed area diversion ditches are not planned to be constructed prior to or during reclamation. Sediment Ponds 001A through 003A shown on the map will be removed during the final phase of reclamation by regrading pond embankment material to the general configuration shown on the reclamation plan map, followed by revegetation.

Drainage areas for the reclaimed Valcam area are not shown on mapping submitted because 1) the general drainage area is relatively narrow with small flow path lengths, and 2) the railroad tracks provide an effective hydrologic barrier. In essence the tracks are an easterly hydrologic barrier wherein runoff water is prevented from moving from upgradient hillslopes to the east to regraded slopes west of the tracks.

~~It is the present intent to donate the General Office and accompanying property located west of the loadout facilities to the Alpine School District or another beneficiary which will exclude it from reclamation activities. If it is decided at a later date by Valley Camp of Utah, Inc. not to donate the property to another entity, then the General Office area will be reclaimed under the~~

~~same guidelines agreed upon for the Valcam Loadout Facilities, whereinafter complete reclamation details will be provided to UDOGM.~~

Belina Permit Area

All surface facilities within the Belina Permit Area will be removed, and the area will be reclaimed. It is proposed to change the land use at the Belina Mines site from a shrub and brush rangeland use to a wildlife habitat with moderate recreational and grazing use. The slight change in land use appears to be compatible since the individual from whom the mine site is leased has shown some interest in using the area as a cattle holding facility. Postmining recreational use also appears to be compatible with both premined and postmined conditions. Since all roadways are to be reclaimed, recreational use within the presently disturbed mine area will be confined to foot traffic.

Activities to be completed during reclamation are the removal of fill associated with the coal loadout pad; the removal of Sediment Pond 004A; the regrading, reshaping, and revegetation of the general mine area; and the reconstruction of Whisky Creek and the side drainage presently passing through the shop area. The removal of Sediment Pond 004A is necessary at this mine site because of general local topography and the pond's location. The pond is located within a relatively narrow canyon at the downstream end of the coal loadout pad. In order to prepare a reclamation design plan which would consider adequately the long term protection of the environment, the pond was removed. Main concerns with leaving the pond in place were that 1) it is located upon fill material, and 2) the discharge channel is excessively steep and could not adequately be design to ensure protection of the downstream embankment.

Whisky Creek is currently diverted beneath the coal loadout pad and sedimentation pond via a 42 inch corrugated metal culvert. Upon reclamation, the coal loadout pad will be removed and a new stream channel will be constructed. No culverts will remain subsequent to reclamation within the Belina Permit Area. Reclaimed channel RC-2 (as shown on Map 760b) extends from the undisturbed channel presently located at the inlet to Culvert C-40-42 to the downstream undisturbed sections of Whisky Creek. Reclaimed channel RC-3 joins channel RC-2 from the south after collecting water surface runoff water from the area behind the shop facilities. The general hydrologic drainages for the Belina mine area are relatively simple in nature and are therefore not shown on the detailed reclamation mapping. Showing the drainage boundaries on reclamation mapping is also difficult since they extend beyond the limits of the maps presented. Drainage areas utilized during reclamation design as well as design calculations are however presented as part of Appendix 760.

The reclamation channels as presented on the design detail sheets have been designed to provide for the required conveyance of the 100 Year - 6 Hour precipitation event with a freeboard of 0.5 feet. The flow rate calculated for the entire Belina Permit Area is 32.2 cfs. This flow rate was used for the lower section of channel RC-2 below the confluence with channel RC-3. The upper section of RC-2 was calculated to have a design flow rate of 13.4 cfs. A design flow rate of 3.1 cfs was calculated and used in the design for channel RC-3. Reclaimed channel design calculations are included within Appendix 760 as required by the agency. With channel flow depths in the range of 0.5 feet, an additional freeboard depth of 0.5 feet provides adequate channel capacity for runoff design, and to protect against overtopping.

The maximum size riprap which was believed feasible for use in the design of reclamation channels at Valley Camp has a D_{50} of 1.75 feet (Average diameter of 1.75 feet). With this maximum riprap size determined, the proposed reclamation channels for the Belina Permit Area were designed by optimizing the channel slope based upon the maximum riprap size assumed. Using a specified maximum D_{50} of 1.75 feet, the maximum slope which could be designed for channel RC-2 is 16%, and for channel RC-3 is 32%. Complete plan and cross section details are shown on Map 760b and on Figures 760c and 760d.

Fill material required for backfilling and regrading of disturbed area hillsides will come from the coal loadout pad fill. During reclamation, the western portions of the fill will be removed first so that Sedimentation Pond 004A can remain in place as long as possible. Backfilling efforts will initially be concentrated within the south western portions of the disturbed mine area including the topsoil stockpile, electrical power substation, and the upper mine portal pad areas. As removal of the coal loadout pad proceeds, backfilling and regrading of the upper pad in the area of the mine shop and southeast storage yard will be completed. These areas will be revegetated and protected against erosion through the use of silt fencing in a timely manner subsequent to final grading. It is planned that all existing undisturbed area bypass ditches will remain in place throughout the reclamation period. These ditches will help reduce the amount of surface runoff water which will traverse the area thereby reducing the potential for damage to newly reclaimed hillsides.

Sediment Pond 004A will remain intact as long as practical during the reclamation phase of the mine area. As reclamation proceeds, excavation of the coal loadout pad material will reach a point where the existing bypass culvert C-40-42, and Pond 004A will have to be removed. At this point in time, the culvert will be removed, and reclaimed channels RC-2 and RC-3 will be constructed in order to safely bypass undisturbed area waters through the area. Upon completing construction of the reclaimed channels, the adjacent hillsides will be 1) graded to the approximate final contour patterns shown on Map 760b, 2) revegetated and 3) protected against excessive erosion through the installation of silt fencing. The approximate locations of silt fencing proposed for the Belina area are shown on the map. Note that the silt fencing has been placed in a herringbone fashion using relatively short fence sections. The short sections are proposed in an effort to minimize the potential for a general fence failure due to wind or to another natural event. Because it is not possible to retain Sediment Pond 004A throughout the normal revegetation period, silt fencing has been placed on regraded slopes throughout the reclaimed area. At the termination of the reclamation period, undisturbed area bypass ditches UDD-2 through UDD-5 and all silt fencing will be removed.

Belina ~~Coal~~ Haul Road

The Belina ~~Coal~~ Haul Road connecting Eccles Canyon and the Belina Mines will be backfilled and reclaimed according to the plan presented in the mining reclamation section of this mine permit application, and as shown on the reclamation detail drawings. In general, all drainages will be restored to the degree possible to premined conditions by removing all fill material, regrading, and reshaping of the adjacent terrain. Generally speaking, all fill material placed as a result of road construction in the vicinity of local drainages will be removed, and the reclaimed drainages will be excavated (or filled) to the degree possible to local natural grades as determined in the field. Existing culvert C-21-48 is not currently planned to be a part of the reclamation of the coal haul road because of the current right of way owned by the State

Department of Transportation which includes the area wherein the culvert is placed. It is the understanding of the applicant that they do not have the right to modify in any way the culvert without state interaction. Because the State currently utilizes the turnoff to the Belina mine as a turnaround for highway vehicles, the culvert will be donated to the State upon reclamation. In the event the State requests that the culvert be removed as a part of road reclamation, the applicant agrees to prepare design details sufficient to meet the requirements of the regulations. As a precautionary step, a preliminary feasibility design has been completed showing that design and construction are feasible. Preliminary design details are presented in Appendix 760.

In determining appropriate reclamation activities at each of the culverts along the coal haul road it should be remembered that the culverts may have differing functions. Some of the existing culverts found along the road are located to divert road runoff water while others have been placed at channel crossings in order to convey channelized runoff water across the coal haul road. During road reclamation those culverts currently conveying channelized runoff water from the upgradient watershed will be replaced with some type of erosion resistant channel. Culverts currently diverting road runoff water will not be replaced with designed channels because the post mining contours will generally be parallel to the road cut. Parallel contours at these locations will generally create sheet flow, not channelized flow where channel design would be required. Based upon the above mentioned observations, options for reclamation at existing culvert locations are 1) restore hillslope contour to create sheet flow by filling excavated road areas to natural grades or by excavating filled areas with native soil, or 2) where natural channelization occurs design an erosion resistant channel.

It has been determined through observations made during site visits and through available data and mapping that culverts C-22-24, C-23-24, and C-27-24 do not require reclamation channel design because they are located in areas where reclaimed contours will develop local sheet flow. Culverts C-25-36 and C-28-24 will require riprapped channel design, and culverts C-24-24, C-26-24, and C-26A-24 will require a "non riprap" erosion resistant channel design.

Channel design using Riprap. Two reclamation channels, RC-4 and RC-5 are proposed to be constructed using riprap as the erosion protection medium. Channels RC-4 and RC-5 are located along the drainage channels currently occupied by culverts ~~C-28-24 and C-25-36~~C-25-36 and C-28-24 respectively. For clarification, culvert C-25-36 is often referred to as the "bowl" culvert. At some point in the future if other more efficient methods of erosion protection become practical, the designs for both reclaimed channels should be re-evaluated.

The drainage occupied by culvert C-28-24 (reclaimed channel RC-4) has a total tributary area of 35 acres, an overall channel gradient of 34%, and a 100 year - 6 hour storm runoff design event of 7.84 cfs. A reclaimed riprap channel has been designed for the channel using the OSM "Steep Channel Riprap Design" criteria. Utilizing this design method for a 6 foot channel width; an average riprap size (D_{50}) of 0.75 feet and a total channel depth of 1.25 feet was calculated as being required. Design details are shown in Appendix 760 with plan and cross section details being shown on Map 760b and on Figures 760c and 760d.

The drainage occupied by culvert C-25-36 (reclaimed channel RC-5) has a channel gradient of 31.6%, a watershed of approximately 140 acres, and a 100 Year - 6 Hour precipitation event of approximately 34 cfs. Using the OSM "Steep Channel Riprap Design" method, a D_{50} of 1.5 feet and a channel bottom width of 6.0 feet was found to be adequate. Complete plan and cross

section details are shown on Map 760b and on Figures 760c and 760d with design calculations being presented in Appendix 760.

Channel Design using Vegetative Matting. Reclaimed channels C-24-24, C-26-24, and C-26A-24 are relatively small drainage channels located on steep sidehills. Flows predicted for each of the channels are 1.2, 2.5, and 1.24 cfs with estimated slopes of 54, 57, and 48 percent respectively. The design of these flows on steep embankments is limited by 1) the ability of the channel to control the flow without flow concentration and erosion, 2) the physical ability to construct the channel on the steep slope sections, and 3) by the long term stability of both the embankment and riprap. Even if riprap were adequately designed and could be placed effectively, concerns related to a potential slope failure subsequent to construction are important to be considered.

In an effort to eliminate some of these concerns, an alternate method of erosion protection has been devised to protect the hillside and reduce the failure potential. It is proposed that vegetative matting be installed within the disturbed bottom portions of the newly formed reclaimed channels at the above mentioned locations. This vegetative matting is shown in Appendix 760 in schematic form. Note from the design details provided that it is proposed that the uppermost section of matting be buried two feet, with all upstream layers overlying downstream layers where joints are required. The downstream section would be buried at depth of one foot and all sides would be staked to prevent movement. As an added measure, it is proposed that trees be planted within all matted sections to aid in the long term stabilization of the channel. It is proposed to plant at least two trees per 10 foot length of each matted section. Through time, channel stabilization will occur through vegetative growth from seeds within the matting itself as well as through root structure growth from natural or planted trees. Aspen or other rapid growth native vegetation are proposed for use under these conditions.

765. PERMANENT CASING AND SEALING OF WELLS.

Attempts will be made at mine closure to transfer ownership of wells located on or utilized in conjunction with the mining operation to other interested parties. If such transfers are not realized or possible, then each well site will be reclaimed as part of mine closure and be permanently sealed as required to prevent access to the mine workings by people, livestock, fish and wildlife, machinery and to keep acid or other toxic drainage from entering ground or surface waters. Well closure and abandonment includes the following:

- All pumps, equipment, etc. will be removed from the well.
- The well will be completely filled with sealing material such as to prevent the vertical movement of water within the well.
- Sealing materials may include the following:

  - Neat Cement conforming to ASTM standard C150 of sufficient weight (not less than 15 lbs/gallon) to prevent the flow of any water into the hole from any aquifer penetrated.

  - Cement grout consisting of equal parts of cement conforming to ASTM standard C150 and sand/aggregate with no more than 6 gallons of water per sack of cement.

- Bentonite-based products specifically designed for permanent well abandonment, which are mixed and placed according to manufacturer's recommended procedures (i.e. Plug-Gel, Shur-Gel, etc.).

- The liquid phase of the abandonment fluid shall be non-saline water containing no chemicals or toxic materials or other substances which may decompose or possibly contaminate the ground water supply.

o Neat cement or cement grout used as a sealing material in abandonment operations shall be introduced at the bottom of the well or interval to be sealed (or filled) and placed progressively upward to the top of the well. All such sealing materials shall be placed by the use of a grout pipe, a tremie line, or a dump bailer, in such a way as to avoid segregation or dilution of the sealing materials.

REFERENCES

Bentley, R.G., Jr., K.O. Eggleston, D. Price, E.R. Frandsen, and A.R. Dickerman. 1978. The Effects of Surface Disturbance on the Salinity of Public Lands in the Upper Colorado River Basin - 1977 Status Report. U.S. Bureau of Land Management. Denver, Colorado.

Brater, Ernest F., and Horace Williams King. 1976. Handbook of Hydraulics for the Solution of Hydraulic Engineering Problems. McGraw-Hill Book Company. New York, New York.

Cedar Creek Associates. 1984. Seep and Spring Inventory and Proposed Seep and Spring Monitoring Program. Fort Collins, Colorado.

Cordova, R.M. 1964. Hydrogeologic Reconnaissance of Part of the Headwaters Area of the Price River, Utah. Utah Geological and Mineralogical Survey Water Resources Bulletin No. 4. Salt Lake City, Utah.

Craig, G.D. and J.G. Rankl. 1977. Analysis of Runoff from Small Drainage Basins in Wyoming. USGS Open File Report 77-727. Cheyenne, Wyoming.

Danielson, T.W., M.D. Remellard, and R.H. Fuller. 1981. Hydrology of the Coal-Resource Areas in the Upper Drainages of Huntington and Cottonweek Creeks, Central Utah. U.S. Geological Survey Open-File Report 81-539. Salt Lake City, Utah.

Doelling, H.H. 1972. Wasatch Plateau Coal Fields. In Doelling, H.H. (ed.). Central Utah Coal Fields; Sevier-Sanpete, Wasatch Plateau, Book Cliffs and Emery. Utah Geological and Mineralogical Survey Monograph Surveys No. 3. Salt Lake City, Utah.

Golder Associates. 1980. Surface FAcilities Grading Plan - Belina Mine Area. Valley Camp of Utah. Denver, Colorado.

Haan, C.T., and B.J. Barfield. 1978. Hydrology and Sedimentology of Surface Mined Lands. College of Engineering, University of Kentucky. Lexington, Kentucky.

Hansen, V.E.. 1979. Mines Prevent Deterioration in Water Quality. Paper presented at the American Water Resources Association Symposium: Water Resource Management in a Changing Society. Las Vegas, Nevada.

Hansen, Allen & Luce, Inc. 1989. Analysis of Sediment Pond Design and Hydrologic Analysis of Undisturbed Area Bypass Channels and Small Exemption Areas. Valley Camp of Utah, Inc. Salt Lake City, Utah.

Hem, J.D. 1970. Study and Interpretation of teh Chemical Characteristicss of Natural Water. U.S. Geological Survey WAter-Supply Paper 1473. Second Edition. Washington D.C.

Israelsen, C. Earl, Joel E. Fletcher, Frank W. Haws, and Eugene K. Israelsen. 1984. Erosion and Sedimentation in Utah: A Guide for Control. Hydraulics and Hydrology Series - UWRL/H-84/03. Utah Water Research Laboratory, College of Engineering, Utah State University. Logan, Utah.

Jeppson, R.W., G.L. Ashcroft, A.L. Huber, G.V. Skogerboe, and J.M. Bagley. 1968. Hydrologic Atlas of Utah. Utah Water Research Laboratory and State of Utah Department of Natural Resources. PRWG35-1. Utah State University. Logan, Utah.

Morrison-Knudsen Co., Inc. 1983. Geotechnical Investigation of Cut Slopes at the Belina Mine Complex and Haul road, Carbon South, Utah. Report prepared for Valley Camp of Utah, Inc. Clear Creek, Utah.

Mundoff, J.C. 1972. Reconnaissance of Chemical Quality of Surface Water and Fluvial Sediment in the Price River Basin, Utah. Utah Department of Natural Resources, Division of Water Rights. Technical Publication No. 39. Salt Lake City, Utah.

Price, D., and T. Arnow. 1974. Summary Appraisals of the Nation's Ground Water Resources - Upper Colorado Region. U.S. Geological Survey Professional Paper 813-C. Washington D.C.

Price, D., and K.M. Waddel. 1973. Selected Hydrologic Data in the Upper Colorada River Basin. U.S. Geological Survey Hydrologic Investigations Atlas HA-477. Washington, D.C.

Rapin, D.L.. 1977. Soil Resource Inventory, Ferron-Price Planning Unit, Manti-LaSal National Forest. USDA Forest Service. Manti-LaSal National Forest. Price, Utah.

Richardson, E.A. 1971. Estimated Return Periods for Short - Duration Precipitation in Utah. Department of Soils and Biometeorology Bulletin No. 1. Utah State University. Logan, Utah.

Southestern Utah Association of Governments. 1977. Waste Water Quality Management Planning Program (208) for Emery, Carbon, and Grand Counties, Utah. Price, Utah.

Spieker, E.M. 1931. The Wasatch Plateau Coal Field, Utah, U.S. Geological Survey Bulletin No. 819. Washington D.C.

Storey, H.C., R.L. Hobba, and J.M. Rosa. 1964. Hydrology of Forest Lands and Rangelands. V.T. Chow. Handbook of Applied Hydrology. McGraw-Hill Book Company. New York, New York.

U.S Bureau of Reclamation. 1977. Design of Small Dams. U.S. Government Printing Office. Washington, D.C.

U.S. Geological Survey. 1979. Development of Coal Resources in Central Utah, Final Environmental Statement. Salt Lake City, Utah.

U.S. Soil Conservation Service. 1972. SCS National Engineering Handbook - Section 4: Hydrology. Washington, D.C.

U.S. Soil Conservation Service. 1975. Erosion, Sediment, and Related Salt Problems and Treatment Opportunities. Special Projects Division. Golden, Colorado.

Utah Division of Water Resources. 1975. Hydrologic Inventory of the Price River Basin. Utah Department of Natural Resources. Salt Lake City, Utah.

Vaughn Hansen Associates, Inc. 1980. Hydrologic Inventory and Baseline Study of the Valley Camp Lease Area, Carbon and Emery Counties, Utah. Salt Lake City, Utah.

Vaughn Hansen Associates, Inc. 1983. Hydrology Update. Valley Camp Coal Company of Utah. Salt Lake City, Utah.

Waddell, K.M., J.E. Dodge, D.W. Darby, and S.M. Theobald. 1983. Hydrolgoy of the Price River Basin, Utah with Emphasis on Selected Coal-Field Areas. U.S. Geological Survey Open-File Report 83-208. Salt Lake City, Utah.

Wilson, LeMoyne, Marvin E. Olsen, Theron B. Hutchings, Alvin R. Southard, and Austin J. Erickson. 1975. Soils of Utah. Agricultural Experiment Station Bulletin 492. Utah State University. Logan, Utah.

Mid-Term Permit Review

Section R645-301-800
Bonding and Insurance

Valley Camp of Utah, Inc.

February 1993

TABLE OF CONTENTS
BONDING. R645-301-800

SECTION		PAGE NO.
800.	BONDING AND INSURANCE	Page 800-1 of 2
820.	REQUIREMENT TO FILE A BOND	Page 800-1 of 2
	APPENDICES	

R645-301-800. BONDING AND INSURANCE.

820. REQUIREMENT TO FILE A BOND.

820.100.

The Mine Permit Renewal Application under R645-301 has been approved, and prior to the permit being issued, Valley Camp of Utah, Inc. filed with the Division, on a form prescribed and furnished by the Division, a bond for performance made payable to the Division and conditioned upon the faithful performance of all the requirements of the State Program, the Mine Permit and the Reclamation Plan.

On November 17, 1989, the Utah Division of Oil, Gas and Mining and Valley Camp of Utah, Inc. entered into a Coal Reclamation and Bonding Agreement.

BOND TYPE (Form of Bond) Performance

BOND (Bond Amount-Dollars) 2.3 Million
(Year-Dollars) 1989

INSTITUTION (Bank or Agency) Federal Insurance Co.
(CHUBB GROUP of Insurance Co.)
15 Mountain View Road,
Warren, New Jersey 07060

POLICY OR ACCOUNT NUMBER 8099-56-50

LIABILITY INSURANCE (Exp) Ongoing
(Insurance Company) The Home Indemnity Company, P.O. 5160
Manchester, New Hampshire 03108

POLICY OR ACCOUNT NUMBER GL 99 48 43

For further details see Appendix 820.100. Reclamation Agreement.

820.110. AREAS TO BE COVERED BY THE PERFORMANCE BOND.

820.111. THRU 820.114.

The bond covers the entire Mine Permit Area which is utilized by Valley Camp's coal mining and reclamation operations.

See 550 Reclamation maps for the effected and disturbed area boundaries.

820.120.

Prior to any new surface disturbances, Valley Camp will adjust the performance bond to the amount approved by the Division.

820.130. THRU 820.224.

Valley Camp has filed and received the approval of the Division, a performance bond to cover the bond amount for the Mine Permit Area as determined in accordance with 830.

820.300. THRU 820.352. PERIOD OF LIABILITY.

The performance bond liability is for the duration of the coal mining and reclamation operations and for a period which is coincident with Valley Camp's period of extended responsibility for successful revegetation provided in 356. or until achievement of the reclamation requirements of the State Program and permit, whichever is the later.