PERMIT TRACKING FORM

X Permit Amendment ☐ Exploration Permit ☐ NOV Abatement ☐ Division Order ☐ Permit Transfer ☐ Incidental Boundary Change
☐Permit Midterm (MT) ☐ Permit Renewal (PR) ☐ New Permit ☐ Significant Revision ☐Bond Release

Date Received: 4/10/98	By: Tat	PERMIT NUMBER	ACT/007/020
Title of Proposal: Temporary Discharge of Mine Water		PERMIT CHANGE #	98D
Description:		PERMITTEE	Horizon Coal Company
# Copies Required: 5	# Copies Received: 5	MINE NAME	Horizon Mine

☐ **PERMIT CHANGE APPLICATION SENT TO SLC** Date:		Letter to Permittee:	
☐ **15 DAY INITIAL RESPONSE TO PERMIT CHANGE APPLICATION OR INITIAL COMPLETENESS REVIEW**	Date Due:	Date Done:	Letter to Permittee:
☐ Notice of Affidavit of Publication. (If change is a Significant Revision, New Permit, or Permit Transfer.)	Date Due:	Date Done:	Public Comment Received:

PFO Review Tracking	Round 1		Round		SLC Review Tracking	Round 1		Round	
	Due	Done	Due	Done		Due	Done	Due	Done
☐ Lead ☐Generalist					☐ Lead ☐Generalist				
☐Administrative					☐Administrative				
☐Land Use/ AQ					☐Land Use/ AQ				
☐Biology					☐Biology				
☐Engineering					☐Engineering				
☐Geology					☐Geology				
☐Soils					☐Soils				
☐Hydrology					☐Hydrology CXF		4/10		

TA Review Due:	Date:	Permittee Response Due: ☐Stipulation ☐Condition ☐No Requirements	Date:	Division Decision Letter: ☐ Approve ☐ Deny
TA Review Done	Date:	Response Received:	Date:	Date:

Coordinated Reviews:	Phone Cont.	Round 1		Round		Received:	Additional Tracking:	Date:
		Sent	Due	Sent	Due			
☐ OSM- C		4/13					Public Hearing	
☐ BLM- C		4/13					Letter from Comp. Super.	
☐ Water Rights-L		4/13					AVS Completed	
☐ DEQ- L		4/13					Approval Effective Date	4/10
☐ DWR- L		4/13					Approved Copy to File	
							Approve copy to Permittee	
							Approve copy to PFO/SLC	
							Approved copy to agencies	
							CHIA Modified	
							Update master TA Y/N	

Comments:

3.4.1.2 Control Measures to Mitigate Impacts

Second mining will not occur beneath the stream channels and raptor nests indicated on Plates 3-3 and 10-1 respectively. Based on the boundaries of the present surface disturbance, no public parks or historic sites will be impacted by mining operations. A further discussion of Cultural Resources may be found in Chapter 5.

3.4.2 Protection of Human Values

3.4.2.1 Projected Impacts of Mining on Human Values

As discussed in Chapter 5, no historical sites listed on the National Register of Historical Places are known to exist within the proposed disturbed areas. In addition, no known archaeological sites exist within the proposed disturbed area.

3.4.3 Protection of Hydrologic Balance

Horizon will employ various control measures to protect the hydrologic balance of the permit area and sedimentation controls will be provided for all disturbed areas.

Water rights on file with the Utah Division of Water Rights and located in the vicinity of the permit area are noted in Appendix 3-5. Should Horizon's mining activities cause an adverse impact on the area's water supply, the applicant intends to mitigate the effects (see Sections 3.4.8.2 and 7.1.6).

Diversions will be established to direct flow from disturbed areas to the sedimentation pond. If water is encountered during mining operations, this water will be used for underground operations. An UPDES permit has been obtained for the mine (see Appendix 3-6). Approval for the discharge of in-mine water directly into an undisturbed drainage culvert has been applied for and will be included in Appendix 3-6 upon approval. If the quantity of underground water encountered by mining exceeds the amount required for mining operations, discharges of water from underground workings will be monitored to ensure that effluent limitations are met (see Section 7.2.3.2, Sediment Pond Design).

3.4.3.1 Projected Impacts of Mining on Hydrologic Balance

The probable impacts of mining on surface or groundwater resources in the area are discussed in Chapter 7. Runoff-and sediment-control facilities within the disturbed area, together with coal buffer zones beneath Beaver Creek and North Fork of Gordon Creek, will preclude significant impacts to surface water in the area. Groundwater investigation and monitoring activities associated with the Hiawatha seam and its adjacent strata will continue, thus allowing a determination of the potential groundwater impacts of mining in the Hiawatha seam. A subsidence monitoring program (see Section 3.4.8) will provide a basis for determining possible impacts due to subsidence.

coal seam. However, a comparison of Figure 7-3 and Plate 3-3 indicates that the Hiawatha coal seam can be expected to be saturated very soon into mining operations. Anticipated maximum fluctuations in water levels will not significantly influence this conclusion.

A review of records on file with UDOGM, as well as discussions with former Beaver Creek Coal Company mining personnel, indicate that the Gordon Creek No. 2 Mine (operated by Beaver Creek Coal Company in the Castlegate A seam) immediately southwest of the proposed permit area, was a dry mine with only sporadic occurrences of groundwater inflow that dried up within a short time. The Gordon Creek No. 3 Mine (operated by Beaver Creek Coal Company in the Hiawatha seam immediately east and downgradient of the proposed permit area) was dry until a 12-foot graben was encountered in the northeast portion of the mine. This occurrence is consistent with the above conclusion since the Hiawatha coal seam is anticipated to become increasingly saturated with distance to the north. Groundwater from the graben was produced from the floor of the mine at a peak rate of approximately 400 gallons per minute. During retreat mining, the same faulted zone was dry, either as a result of previous dewatering, or as a result of elevation differences. It is possible that groundwater was stored in the fault zone, and when the fault zone was dewatered, there was insufficient recharge from overlying strata to maintain the groundwater discharge.

After removal of the Castlegate "A" coal seam in mines adjacent to the permit area, water occasionally seeped into these stratigraphically-higher mines from the roof or, more rarely, from the floor. Generally, minor amounts of water were encountered when mining took place beneath a fluvial sandstone channel. The channels behave as perched aquifers that are confined by associated flanking shales. Such a condition, enhanced by local fracturing, appears to occur at the shallow monitoring well completed by Horizon Coal Company in the Blackhawk Formation (HZ-95-1S).

Based on the water level measurements collected from the permit and adjacent areas and information gathered from mines in the region, it is concluded that the Hiawatha coal seam, as well as the immediately underlying and overlying strata, will be saturated in the Horizon No. 1 Mine essentially from the beginning of mining operations. The rate of inflow of groundwater while mining in the Hiawatha coal seam will depend primarily on whether a faulted zone is encountered that contains groundwater in storage or that is hydraulically connected with an overlying perched zone. Based on the dry nature of previous mine workings in the area, as well as observations and measurements obtained from the LMC and HZ drill holes, the probability of significant sustained inflows to the Horizon No. 1 Mine is considered minimal. This conclusion is in agreement with Cumulative Hydrologic Impact Assessments prepared for the area by Engineering Science (1984) and UDOGM (1989). Additional information regarding potential inflows to the Horizon No. 1 Mine is presented in Section 7.3 of this document.

unnamed spring). A change-in-point-of-diversion application has been filed with the Division of Water Rights for use of this water within the permit area (see Appendix 3-5). A right for the evaporative loss of water from Sweet's Pond (91-4956) has also been assigned to Horizon Coal by agreement (see Appendix 3-5). The applications for change-in-point-of-diversion were approved on November 20, 1996 by Robert L. Morgan, P.E., Utah State Engineer for water rights 91-330, 91-94 and 91-353. Horizon will inform UDOGM if the change in point of diversion is altered in the future.

It should be noted that the change-in-point-of-diversion which has been filed on water right 91-330 would permit use of the water where it is encountered within the proposed Horizon No. 1 Mine workings. This water will not be diverted from the former Sweet Coal Mine workings into the Horizon No. 1 Mine.

Locations of water rights within the permit and surrounding areas are shown on Plate 7-3. Data contained in Appendix 3-5 indicate that water rights have been filed on a limited number of springs in the permit and adjacent areas. Legal rates of usage of spring water are all less than 0.25 cfs.

No water rights exist within the permit and adjacent areas for water wells. However, rights exist for the use of water from several springs in the permit and adjacent areas. Typically, these rights are for the use of less than 5 gallons per minute of water from springs issuing from the Blackhawk Formation. As noted above, this formation is not considered to be an extensive aquifer within the permit and adjacent areas. Water in this formation issues from perched aquifers of limited areal extent. This accounts for the low flow and usage rates of the springs.

One right exists within the adjacent area for the use of water encountered in underground coal mining operations (File No. 91-330 in the name of Florence A. Sweet). Horizon has leased this water right from Florence A. Sweet and requested change of diversion to water anticipated within the Horizon No. 1 Mine.

7.1.5 Groundwater Monitoring Plan

Monitoring points SP-1, 2, and 4, as shown on Plate 7-1, have been monitored for baseline information since 1989. SP-9 (Jewkes Spring) was monitored by the U.S. Geological Survey during the period of 1979 through 1983 and by Beaver Creek Coal Company from 1985 through 1995.

Groundwater monitoring during operation of the mine will be conducted in accordance with UDOGM regulation R645-301-723 and will consist of the following: collection of flow and water-quality data from springs SP-1, 2, 4, 9, 2-6-W (Homestead Spring) and GV-70; collection of flow and water-quality data from sustained inflows to the mine and mine water discharge quantities (temporary and permanent); and collection of water-level data from the HZ monitoring wells. Temporary mine discharge quantities will be reported montlhly and submitted to UDOGM with quarterly monitoring data. Reports will contain the period of pumping (i.e. 6:15 a.m. to 7:30 p.m.) and the daily flow rate, until a continuous flow

meter/guage is installed. Refer to Section 7.2.3.2 for a discussion of temporary mine water discharge monitoring.

Each of the springs to be monitored issue from portions of the Blackhawk Formation which are stratigraphically higher than the Hiawatha coal seam. Therefore, data collected from the springs will allow quantification of potential impacts to perched aquifers within the permit and adjacent areas of both the initial permit term and future permit terms. Spring SP-2 is within approximately 400 feet of the initial planned workings and in an area which overlies future workings (see Plate 3-3). Springs SP-1, SP-4, and GV-70 are in an area which lies within 200 to 700 feet of proposed future workings. These distances are all within the zone of potential subsidence as defined in Section 3.4.8.5. Hence, data collected from these springs will assist in determining the impacts of subsidence on the groundwater resources of the Blackhawk Formation.

Springs SP-9 and 2-6-W lie approximately 1800 feet and 4900 feet southwest of the proposed future mine workings. As a result, they are in areas which will not likely be impacted by subsidence effects (see Section 3.4.8.5). Hence, these springs will be monitored to provide background data on groundwater conditions within the Blackhawk Formation in areas that will not likely be impacted by mining.

During the operational and reclamation phases of the mine, the above-noted springs will be monitored once each calendar quarter when the springs are accessible. The data to be collected from these springs are listed in Table 7-2. Monitoring data will be reported to the Division on a quarterly basis.

Sampling of springs CC-5 and MC-4 will begin in 1997 and continue through 1999. If requested by UDOGM the sampling may continue beyond 1999. CC-5 and MC-4 will be sampled quarterly and analyzed for calcium, magnesium, sodium, potassium, carbonate, TDS, sulfate, and chloride. Flow, pH and conductivity data will also be collect for springs CC-5 and MC-4. The data from the analyses will be included in Appendix 7-2.

Data collected from mine inflows will allow impacts to be quantified to all hydrologic resources that are affected my mine dewatering. Changes in the quantity and quality of mine inflows will be evaluated with the additional groundwater data to assess the overall hydrologic impacts of the mining operation.

Data collected from the HZ wells will allow quantification of potential impacts to the regional groundwater system. Specifically, data collected from wells HZ-95-1 and HZ-95-1S will assist in evaluating the impacts of mine dewatering on the quantity of groundwater in the Blackhawk Formation and the underlying Spring Canyon tongue. This will be particularly helpful in estimating potential future impacts as the mining operation expands to the northwest beneath Beaver Creek.

Data collected from HZ-95-2 will allow quantification of impacts to groundwater in the Spring Canyon tongue outside of the assumed adjacent area. Furthermore, if impacts are noted to water levels at the location of HZ-95-2, these data may provide information regarding the

extent of the hydraulic connection across the northeast boundary fault. Finally, since HZ-95-3 is located near the initial mine workings, data collected from this location will allow early assessments of mining impacts to be made.

Representative points of inflow will then be selected based on the source or the areal zone, and samples will be collected from those representative points for analyses in accordance with Table 7-2. The sampling will continue once each quarter as long as the inflow point remains accessible during mining operations or until the flow diminishes. Data will be collected as close to the point of issuance as possible to prevent contamination by mining operations.

Should discharge of water from the mine become necessary, the water will be treated in underground sumps, if needed, to meet effluent limitations. Discharged water will be monitored in accordance with the discharge permit.

While sampling the HZ wells immediately after drilling, each well was pumped for a period of 2 to 4 weeks, during which time the wells were repeatedly pumped dry and allowed to recover. The samples were collected at the end of the above periods. Given the fact that the wells still appeared to be influenced by foam drilling fluids when sampled (based on pH, discoloration, etc) and the fact that sampling required an extended period of time due to the low yield of the wells, future sampling of the wells for water-quality analyses is not proposed. Rather, data collected from the wells in the future will consist solely of water-level information. Springs and mine-water inflows will be used to monitor changes in water quality within the permit and adjacent areas.

Water-level data will be collected during the operational and reclamation phases from the HZ wells once each quarter when accessible. All water-level measurements will be corrected to depth from top of 2" casing to permit correlation with previous measurements. Horizon commits to discuss with UDOGM a more stringent monitoring program for well HZ-95-1 prior to entering the northernmost mining block in Section 8.

Data collected from the springs to be monitored (SP-1, SP-2, SP-4, SP-9, 2-6-W, and GV-70) will provide information on the potential impacts of mining activities on localized aquifers. Similar information will be obtained by monitoring sustained inflows to the mine workings. Data obtained from the HZ monitoring wells will assist in evaluating potential losses of groundwater from the Blackhawk/Star Point aquifer system.

facilities, including buildings, trash containers, coal storage, and the topsoil stockpile, will be sloped so that the drainage from these facilities will be directed to the sedimentation pond.

A direct discharge of in-mine water has been applied for, however while approval is pending mine water discharge will be routed to the sediment pond and decanted through the currently approved UPDES discharge point. Waters decanting through the point will be monitored in accordance with the parameters of the UPDES permit.

During the period of discharge three monitoring points will be sampled: upstream of Culvert UC-3, at the discharge of the decent pipe from the sediment pond, and in the mixing zone below the UC-1 Culvert. The three samples points will be monitored for TDS, sulfate, and selenium by the laboratory. Field parameters will include pH, conductivity and flow. Sampling will begin when the first discharge occurs from the decant and a sample will be collected within each two week period thereafter. Sampling will be discontinued once the additional UPDES discharge point (outfall 002) has been approved or when UDOGM otherwise approves discontinuance of these monitoring points.

The sedimentation pond will be constructed at the location presented on Plate 7-4 as soon as possible following construction of the downstream sections of the undisturbed-area bypass culvert. All runoff from disturbed areas will be directed to the sedimentation pond.

The required storage volume for runoff from a 10-year, 24-hour precipitation event for all areas draining to the sedimentation pond is 0.56 acre-foot (see Appendix 7-4). Based on a disturbed area of 9.2 acres draining to the pond and a sediment storage volume of 0.1 acre-foot per acre of disturbed area, a total sediment storage volume of 0.92 acre-foot has been designed into the pond, resulting in a minimum pond storage requirement of 1.48 acre-feet.

To account for possible future changes in pad design and to provide a safety factor in the sedimentation capacity of the pond, the sedimentation pond has been designed with a total capacity of 2.6 acre-feet (see Appendix 7-4). At this total capacity, the quantity of runoff storage is 0.7 acre-foot and the quantity of sediment storage is 1.9 acre-feet. Based on the stage-capacity curve presented in Appendix 7-4, the pond will have a spillway crest elevation of 7585.0 feet, with a maximum sediment storage elevation of 7582.0 feet, and a sediment cleanout elevation (at 60% of maximum sediment storage) of 7580.6 feet). Plate 7-6 presents the plan view and cross-sections of the pond.

As indicated in Appendix 7-4, the peak inflow to the sedimentation pond resulting from the 25-year, 6-hour storm is 1.40 cfs. The spillway on the pond has been designed as an armored, open channel over the southeast corner of the embankment, as presented in Plate 7-6. A cross section drawing of the spillway is provided in Plate 7-6. The spillway will have a depth of 1.5 feet and a crest width of 10 feet, with a slope of 5 percent for the crest section through the embankment. The flow depth above the crest of the spillway at the design flow will be 0.08 foot (assuming no routing of the hydrograph through the pond). This will provide 1.42 feet of freeboard between the water surface in the spillway at the design flow and the top of the pond embankment at 7586.5 feet. The flow down the steep section of the spillway will have a maximum velocity of 3.5 fps (see Appendix 7-4).

The spillway crest and outlet will be riprapped (see Plate 7-6). The riprap will have a median diameter of 6 inches with a gradation as presented in Table 7-6. The riprap will be placed in a layer with a minimum thickness of 12 inches and will be underlain by a geotextile filter

fabric. The riprap will consist of angular riprap placed to the point where it intersects the UC-1 outlet channel. The angle of entrance of the spillway channel into the UC-1 outlet channel will be no greater than 45° from the alignment of the outlet channel.

Riprap will also be placed on the slope of the inlet channel (DD-1) to the pond (see Appendix 7-4 and Plate 7-6). This will consist of 15-inch riprap with a minimum thickness of 30 inches. This will minimize erosion and potential structure stability problems to the impoundment.

The runoff storage volume will be maintained by the use of a 2-inch diameter dewatering/decant line. As indicated on Plate 7-6, the inlet of the decant will be located at the top of the sediment storage pool. The discharge from this decant will be controlled by a locking valve located on the outslope of the sediment pond embankment at the pipe outlet. This valve will used to drain the excess water from the sedimentation pond after allowing for settling of the sediment in the pond. Samples of the pond water will be collected as appropriate prior to decanting the pond to ensure that the requirements of R645-301-751 will be met. The decant invert will be 2.5 feet above the 60% sediment clean out level (see decant/dewatering design on Plate 7-6).

The decant/dewatering system acts as a baffle to oils and scum that may collect on the surface of the sediment pond. During operation the intake end of the baffle remains below the water's surface, therefore it is also below the oil/scum layer. The inlet will only draw water from below the water's surface, therefore having limited contact with the layer of oil/scum.

A sediment marker will be placed at the edge of the pond to indicate the depth and volume of sediment in the pond. The marker will have designations which will indicate when cleaning of the pond is necessary.

A percolation test was performed in the area of the proposed sedimentation pond. Results of this test are provided in Figure 7-11. The site is situated in seismic zone 2B which, under the Utah Building Code, indicates that the area is safe for the construction of the sedimentation pond. The Static Safety Factor calculations are located in Appendix 3-1. A report of construction and inspection on the sediment pond, by a registered professional engineer, will be provided to the Division at the end of construction.

Runoff Control Maintenance and Monitoring. The sedimentation pond will be inspected after each major storm to determine if water needs to be discharged and to check the sediment level. The pond will be cleaned when sediment builds to 60 percent of the maximum sediment storage level. Sediment removed from the pond will be handled in a manner consistent with the waste rock.The sedimentation pond will also be inspected quarterly by a registered professional engineer. Any weakness or defect in the structure which is noted during this inspection will be corrected as quickly as possible. The pond discharge will be monitored in accordance with the requirements of the UPDES Permit until bond release or until the pond is removed. An application for an additional UPDES discharge point at the mine portal was denied (August 14, 1996) until the water within the mine could be sampled and submitted for analysis. Horizon commits to obtaining a UPDES discharge permit for the mine water prior to discharge of water from the mine portal.

Ditches, culverts, and other drainage controls will be inspected after each major storm, and repaired as necessary. The pond embankments will be revegetated with the temporary seed mix described in Section 3.5.5.2 following construction of the pond. Any areas where revegetation is not successful or where rills and gullies develop will be repaired and revegetated accordingly.

During early 1998 quantities of water greater than previously expected were encountered while mining. Due to a delay in issuance of a discharge permit for Outfall 002, in-mine water will be discharged to the sediment pond. Flow quantities and potential hydrologic impacts will be assessed as additional data is collected.

It should be noted that the above estimates assume that groundwater inflow to the mine workings will occur primarily as a result of porous-medium flow rather than fracture flow. Historically, large amounts of the Hiawatha Coal seam have been mined out to the southwest of the proposed permit area by Sweet Coal Company's Sweet Mine, Blue Blaze Company's No. 1 Mine, National Coal Company's No. 1 Mine, and Beaver Creek Coal Company's No. 3 Mine. Based on a review of mine records (Skaggs, 1992), many faults have been mined through in the Hiawatha seam with only insignificant/minor amounts of water being encountered.

Only one fault has produced significant quantities of water when mined through. This fault lies in the east portion of the permit area and was intersected in mining of the Beaver Creek Coal Company No. 3 Mine. Inflows of approximately 400 gpm occurred when this fault was encountered (Skaggs, 1992). This fault will be located and avoided when mining the proposed Horizon No. 1 Mine by evaluating mine maps from the Beaver Creek No. 3 Mine and, if necessary, by periodically drilling horizontally from the Horizon No. 1 workings into the fault zone.

Surface mapping and mining experience in the overlying Castlegate "A" seam within the permit area indicate that fracturing within the permit area is not significant. Therefore, the previous estimates of potential groundwater inflow rates to the mine workings are considered adequate.

Based on a consumptive use of 37 gpm and assuming an inflow to the mine of 36 gpm, significant water which will be pumped into the mine only during initial operations. Thereafter, during the initial permit term, it is anticipated that water will be pumped into the mine only to meet the demands of peak operating conditions.

As noted in Section 7.1.4 of this permit application, groundwater which is encountered underground and consumed in the mining operation will be used in accordance with water right number 91-330. Water needed to operate the mine equipment will be derived from a spring which is covered by water rights 91-94 and 91-353. These rights have been leased by Horizon Coal Company.

Impacts to the Hydrologic System Resulting From Subsidence. As noted in Section 3.3.2.2, stream buffer zones will be maintained for a distance of 100 feet on either side of Beaver Creek, within which second mining will not occur. According to Gentry and Abel (1978), topographic lows (e.g., stream channels) tend to be protected by upwarping of adjacent slopes during subsidence. Therefore, mining-induced surface fracturing should be very limited (or nonexistent) within the Beaver Creek stream channel area. Any fracturing that does occur in the stream channel is likely to fill rapidly as a result of sedimentation.

It is also not anticipated that subsidence will significantly affect springs within the permit and adjacent areas. Von Schonfeldt et al. (1980) found that uniform subsidence "rarely causes problems to renewable resources such as aquifers, streams, and ranch lands." Since second

mining will occur uniformly across the permit area except in buffer zones, the resulting subsidence should also be uniform, minimizing the potential impacts to overlying springs.

As noted in the Cumulative Hydrologic Impact Assessment, mining in the area adjacent to the proposed Horizon permit area has not resulted in hydrologic impacts due to subsidence. Given the lack of extensive aquifer systems in lithologic units that overlie the coal within the permit and adjacent areas, it is not anticipated that groundwater will be significantly affected by subsidence. Thus, subsidence caused as a result of mining by Horizon Coal Corporation should not cause significant surface or groundwater impacts within the permit or adjacent areas.

Potential Hydrocarbon Contamination. Diesel fuel, oils, greases, and other hydrocarbons products will be stored at the mine site. Diesel fuel will be contained in above-ground tanks. Diesel fuel may spill during filling of the storage tank, leakage of the tank, and filling of vehicle tanks. Hydrocarbons may be spilled during use in surface and underground activities.

The extent of contamination by spillage of hydrocarbons will likely be small since storage tanks will be located above-ground and thus leakage can be readily detected and abated. Furthermore, and spillage of hydrocarbons during filling of the tank and mine vehicles will be minimized to avoid loss of an economically valuable product, and the fuel storage area will be surrounded by a concrete enclosure of sufficient size to contain a fuel spill if the tanks were to rupture. In the event of a fuel or hydrocarbon leak or spill, Horizon Coal Corporation will abate the problem in accordance with the Spill Prevention, Control, and Countermeasure Plan (see Appendix 7-10). Absorbent materials will be kept within easy access for the purpose of spill clean up and control.

Road Salting. The access road to the mine is a gravel road maintained by the county. Paving of the road is not expected. Since the road is to remain gravel, the likelihood of road salting is extremely small. As a result, the likelihood of road salting impacting water quality is very remote.

Impacts to Water Quality. Data presented in Appendix 7-3 indicate that the average TDS concentration of the surface water measured at station SS-3 (immediately downstream from the proposed surface facilities) is 427 mg/l, with a standard deviation of 122 mg/l. The calculated 95-percent confidence interval for the average concentration is 407 to 447 mg/l, based on the historical record.

As noted in Section 7.1.3, water standing in the old mine workings of the Blue Blaze No. 1 Mine has a TDS concentration which has been measured at 414 to 452 mg/l. These values are approximately within the 95-percent confidence interval range of the mean calculated for station SS-3. Hence, assuming that water must be discharged from the mine workings, the salinity of the surface water should not be adversely impacted by the salinity of the underground water.

It is currently anticipated that a calcium-carbonate rock dust will be used in mining operations rather than a calcium-sulfate rock dust. Since surface and groundwater within the permit and adjacent areas is characterized as a calcium bicarbonate type, changes in the general chemical characteristics of water in the area should not occur if water from the mine seeps into the

adjacent groundwater or under the condition that water is discharged from the mine to surface water resources.

North Fork Gordon Creek flows across the Mancos Shale immediately downstream from the mine area. Since the Mancos Shale is a gypsiferous formation, sulfate and TDS concentrations naturally increase as the surface water contacts this formation (Waddell et. al., 1981). Thus, increases in TDS concentrations downstream from the surface facilities, if they occur, will more likely result from natural conditions rather than mining impacts.

As noted above, it is anticipated that a small amount of water may be discharged from the mine workings to the surface during the initial permit term. As mining progresses during future permit terms, additional water will likely be pumped from the mine. As also noted above, the mine water is anticipated to have a TDS concentration which approximates that of the surface water immediately downstream from the proposed surface facilities.

If the excess groundwater encountered in the mining operation was allowed to flow naturally rather than being discharged from the mine, this water would flow naturally downgradient and eventually discharge into the North Fork of Gordon Creek (see the potentiometric surface map presented in Figure 7-2). As it flows downgradient, the water would come increasingly into contact with the underlying Mancos Shale, dissolving additional salts in the process. Hence, water which is discharged from the mine should have a lower TDS concentration than that which would seep naturally into the local surface-water system. As a result, the TDS concentration of surface water downstream from the proposed surface facilities will be improved (i.e., decreased) if water is discharged from the mining operation.

Information regarding the acid- and toxic-forming potential of the coal, as well as the roof and floor materials, is presented in Section 6.5.6 of this document. As indicated therein, the roof and floor materials (i.e., that which may become waste rock) is neither acid nor toxic forming, suggesting that the material which comprises coal parting would also not be acid- or toxic-forming. However, the coal has a potential to be acid forming. The acid-forming potential of the coal will be tempered by its slightly alkaline nature (with a pH that varies from 7.3 to 7.8, according to Appendix 6-2). Furthermore, impacts to the environment of the permit and adjacent areas resulting from this acid-forming potential will be minimized by three factors. First, coal will be stored on the surface for only short periods of time before being shipped off site, thus reducing the potential for weathering, oxidation, and generation of acid drainage. Second, runoff from the coal stockpile will be routed through the facility sedimentation pond, where it will mix with more-alkaline runoff from additional areas, thus neutralizing any acidic drainage which might form. Finally, acidic leachate which is generated from coal which is left underground and exposed to the mine air will be buffered by the naturally alkaline environment in which the coal occurs. Hence, impacts to the acidity of the local hydrologic system are not anticipated.

Public Water Supplies. The water located in the Gordon Creek Drainage system is not a culinary water supply. The water in this drainage is used for agricultural, livestock, wildlife and industrial use (see Appendix 3-3).

Water derived from the spring associated with water rights 91-94 and 91-353 will be piped to Sweet's Pond and pumped from there to the mine for surface and underground use. As

noted previously, it is not anticipated that large quantities of groundwater will be discharged from the mine during the initial permit term. Water that may be encountered underground during mining operations will be used in conjunction with dust abatement.

Flooding Potential of Downstream Areas. Runoff from all disturbed areas will flow through a sedimentation pond or other sediment-control device (Section 7.2). Three factors indicate that these sediment-control devices will minimize or preclude potential flooding impacts to downstream areas as a result of mining operations:

1. The sediment-control facilities have been designed to be geotechnically stable. Thus, the potential is minimized for breaches of the sediment-control devices to occur that could cause downstream flooding.

2. By retaining sediment on-site in the sediment-control devices, the bottom elevations of stream channels downstream from the disturbed areas are not artificially raised. Thus, the hydraulic capacity of the stream channels is not altered.

3. The flow routing that occurs through the sediment control devices reduces peak flows from the disturbed areas. This precludes flooding impacts to downstream areas.

Following reclamation, stream channels will be returned to a stable state, thus minimizing detrimental effects that may result from flooding.

7.4 Alluvial Valley Floor Determination

A reconnaissance investigation of the permit and adjacent areas was conducted to delineate alluvial deposits which might be considered to be alluvial valley floors. Identification of locations where unconsolidated stream-laid deposits occur was performed using surficial geology and soils maps of the area. Further, field reconnaissance and an analysis of aerial photographs of the mine permit and adjacent areas were conducted. Locations of stream-laid deposits thus identified are the same as those identified on Plate 6-1 as Qal (Recent Alluvium and Qoa (Older Alluvium).

From a geomorphic standpoint, the rugged mountainous terrain of the permit and adjacent areas has resulted in drainages still in a youthful stage of development. The streams are confined in narrow, steep-sided, V-shaped valleys with steep channel gradients. Meanders normally associated with AVF development are absent except in a few isolated locations.

Information presented on Plate 6-1 indicates that alluvial deposits exist in the permit and adjacent areas along Beaver Creek, North Fork Gordon Creek, and Jewkes Creek, as well as short distances into tributaries of the above drainages. Alluvial deposits along Beaver Creek exhibit minor stream meandering and contain numerous beaver ponds. Some of the stream-laid deposits along Beaver Creek, particularly at the mouths of small tributary canyons, appear to be debris flows. Soils in the valley exhibit localize signs of being flooded or water logged during a field visit to the site.

Alluvial deposits were also identified at the mouth of Jewkes Creek and along North Fork Gordon Creek. The alluvial deposits at these locations are below the coal outcrop and thus, could not be directly impacted by mine subsidence. The soils investigation showed the upper reaches of the alluvial deposit along Jewkes Creek and North Fork Gordon Creek to be disturbed and consisting of about 90 percent fill material (i.e., from road cuts and coal waste). Included in the area are small areas of Patmos and Podo soils as well as areas of rock outcrops. Even before disturbance, this area had limited range and wildlife capability. The valley floor is quite narrow along these reaches.

Agricultural developments are not found along North Fork Gordon Creek, Beaver Creek, or their tributaries in the permit and adjacent areas. The agricultural potential of the valley floors in the area is limited by the soil capability and the short growing season. The narrow valleys are occupied by the stream and the road and both break up the narrow valley so that development of hay meadows or improved pasture is impractical.

The valley floor along Beaver Creek, North Fork Gordon Creek, and their tributaries would be incapable of supporting agricultural activities without proper drainage. Even with adequate drainage, agricultural development would be restricted to grasses and pasture because of the high elevations and short growing seasons. Hence, given the extensive prior disturbance in the proposed disturbed area, the narrowness of the valleys, and climactic conditions in the area, the stream-laid deposits in the permit and adjacent areas are not considered to be alluvial valley floors. This conclusion is supported by the opinion of Mr. T.B. Hutchings, State Soil Scientist with the U.S. Soil Conservation Service (see Appendix 7-6).

Horizon Coal Corporation
P.O. Box 599
Helper, UT 84526

ACT/007/020 #2

April 9, 1998

Utah Coal Regulatory Program
Utah Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
Salt Lake City, UT 84114-5801

Subject: Temporary Discharge of Mine Water

Enclosed are six copies of the amendment for the temporary discharge of mine water to the sediment pond in Jewkes Canyon at the Horizon Mine. The content of the amendment were verified by Sharon Falvey and Daron Haddock of UDOGM and Mike Herkimer of the Division of Water Quality.

If you have any questions please contact me at (801) 561-1555.

Sincerely yours,

Vicky

Vicky S. Bailey

cc: Price Field Office

Application for Permit Change
Detailed Schedule of Changes to the Permit

Title of Change: Amendment for Temporary Mine Water Discharge into the Sediment Pond	Permit Number: ACT/007/020
	Mine: Horizon Mine
	Permittee: Horizon Mining, LLC.

Provide a detailed listing of all changes to the mining and reclamation plan which will be required as a result of this proposed permit change. Individually list all maps and drawings which are to be added, replaced, or removed from the plan. Include changes of the table of contents, section of the plan, pages, or other information as needed to specifically locate, identify and revise the exiting mining and reclamation plan. **Include page, section and drawing numbers as part of the description.**

			DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED
☐ ADD	X REPLACE	☐ REMOVE	Chapter 3, page 3-20
☐ ADD	X REPLACE	☐ REMOVE	Chapter 7, pages 7-17, 7-30 thru 7-32, 7-59 thru 7-60, and 7-74 thru 7-78

April 9, 1998

APPLICATION FOR PERMIT CHANGE

Title of Change: Amendment for Temporary Mine Water Discharge into the Sediment Pond.	Permit Number: ACT 007/020
	Mine: Horizon Mine
	Permittee: Horizon Mining, LLC.

Description, include reason for change and timing required to implement:

☐ Yes	X No	1. Change in the size of the Permit Area? _____ acres ☐ increase ☐ decrease.
☐ Yes	X No	2. Change in the size of the Disturbed Area? _____ acres ☐ increase ☐ decrease.
☐ Yes	X No	3. Will permit change include operations outside the Cumulative Hydrologic Impact Area?
☐ Yes	X No	4. Will permit change include operations in hydrologic basins other than currently approved?
☐ Yes	X No	5. Does permit change result from cancellation, reduction or increase of insurance or reclamation bond?
☐ Yes	X No	6. Does permit change require or include public notice publication?
☐ Yes	X No	7. Permit change as a result of a Violation? Violation
☐ Yes	X No	8. Permit change as a result of a Division Order? D.O.
☐ Yes	X No	9. Permit change as a result of other laws or regulations?
☐ Yes	X No	10. Does permit change require or include ownership, control, right-of-entry, or compliance information?
☐ Yes	X No	11. Does the permit change affect the surface landowner or change the post mining land use?
X Yes	☐ No	12. Does permit change require or include collection and reporting of any baseline information?
☐ Yes	X No	13. Could the permit change have any effect on wildlife or vegetation outside the current disturbed area?
☐ Yes	X No	14. Does permit change require or include soil removal, storage or placement?
☐ Yes	X No	15. Does permit change require or include vegetation monitoring, removal or revegetation activities?
☐ Yes	X No	16. Does permit change require or include construction, modification, or removal of surface facilities?
X Yes	☐ No	17. Does permit change require or include water monitoring, sediment or drainage control measures?
☐ Yes	X No	18. Does permit change require or include certified designs, maps, or calculations?
☐ Yes	X No	19. Does permit change require or include underground design or mine sequence and timing?
☐ Yes	X No	20. Does permit change require or include subsidence control or monitoring?
☐ Yes	X No	21. Have reclamation costs for bonding been provided or revised for any change in the reclamation plan?
☐ Yes	X No	22. Is permit change within 100 feet of a public road or perennial stream or 500 feet of an occupied dwelling?
☐ Yes	X No	23. Is this permit change coal exploration activity ☐ inside ☐ outside of the permit area?

Attach 6 complete copies of proposed permit change as it would be incorporated into the Mining and Reclamation Plan.

I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations herein.

Larry A. Jones V.P. Mining 4/10/98
Signed - Name - Position - Date

Subscribed and sworn to before me this 10th day of April, 19 98.

Julie C McKenzie
Notary Public

My Commission Expires: _____, 19_____ }
Attest: STATE OF _____ } ss:
COUNTY OF _____ }

JULIE C MCKENZIE
NOTARY PUBLIC • STATE of UTAH
50 SOUTH MAIN #1600
SALT LAKE CITY, UT 84144
COMM. EXP. 5-23-2001

Received by Oil, Gas & Mining
RECEIVED
APR 10 1998
DIV. OF OIL, GAS & MINING
ASSIGNED PERMIT CHANGE NUMBER

Michael O. Leavitt
Governor
Ted Stewart
Executive Director
Lowell P. Braxton
Division Director

State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

1594 West North Temple, Suite 1210
PO Box 145801
Salt Lake City, Utah 84114-5801
801-538-5340
801-359-3940 (Fax)
801-538-7223 (TDD)

April 10, 1998

Denise Dragoo, Resident Agent
Van Cott, Bagley, Cornwall, & McCarthy
50 South Main Street, Suite 1600
Salt Lake City, Utah 84111-1495

Re: Interim Mine Water Discharge, Horizon Mining, LLC, Horizon Mine, ACT/007/020-98D, File #3, Carbon County, Utah

Dear Ms. Dragoo:

The referenced amendment is hereby approved effective April 10, 1998. A stamped approved incorporated copy is provided for insertion into your Mining and Reclamation Plan.

The Division of Water Quality has concurred with The Division of Oil, Gas, and Mining that the temporary discharge of mine water into the sediment pond is allowable under the current U.P.D.E.S. permit for the Horizon mine and the permittee will monitor any discharge from the pond in accordance with the parameters outlined in this permit. Within ten days of final approval for discharge of water at point 002 Horizon Mining must update the PHC section of their Mining and Reclamation Plan.The technical analysis of this amendment is provided .

Analysis:

Probable Hydrologic Consequences:

Numerous discussions within the PHC require further updating regarding water encountered within the mine (e.g. Page 7-17, submitted April 1998, still predicts sustained inflow to be minimal). Additional changes to the PHC including: water source identification, water dating, etc. will be necessary to update the PHC.

Ground Water Monitoring:

The permittee will proceed with in-mine monitoring from the region where water is being intercepted. In addition to ground water monitoring parameters identified in the plan selenium will be monitored because high levels were identified in the data from the old workings from a sample collected in December 1997.

The permittee will monitor the quantity of flow discharged from the mine by documenting the

Surface Water Monitoring:

Water discharged from the pond will be monitored for the required UPDES parameters. Additional monitoring is required while the mine water is discharged to the sedimentation pond. The decant will be monitored along with the following sites; upstream of the UC-2 culvert and, downstream of the UC-1 culvert (where adequate mixing has occurred). The following laboratory and field parameters; TDS, selenium, sulfate, pH, conductivity and flow, will be analyzed from these sites. A sample will be obtained with the initial discharge and then a sample will be obtained from each site within each two week period thereafter. This monitoring will continue until approval of the stream discharge location point 002 is obtained and after it is demonstrated that the sampling is no longer necessary.

Sedimentation Pond

Mine water that is temporarily discharged to the pond will be discharged through the sedimentation pond decant. The plan indicates that the runoff storage volume will be maintained. During a precipitation event the pond should be at the decant level or below and the decant level. The decant must be in the closed position to meet the pond design requirement in a precipitation event to assure the capacity for the 10 year 24 hour event is maintained.

Findings:

The temporary measure, allowing-in minewater discharge to occur through the sedimentation pond at UPDES discharge point 001, are approved and meet the intent of minimizing impact.

Recommendation:

This amendment should be approved and incorporated into the plan. Additional information and updates are necessary. Numerous discussions within the PHC require further updating from the encountered mine water. Additional changes to the PHC including: water source identification, water dating, etc. will be necessary to update the PHC. It is recommended that this amendment be followed up by a request or Division Order from the Division to Horizon mine to obtain the information necessary to fully address the PHC. This update may be coordinated with the approval for UPDES discharge monitoring point 002 and a demonstration that monitoring is no longer necessary.

cc: William Malencik, PFO
O:\007020.HZN\FINAL\HZN98D

If you have any questions, please call.

Sincerely,

Joseph C. Helfrich
Permit Supervisor

tat
Enclosure
cc: Ranvir Singh, OSM
Richard Manus, BLM, w/o
Alan Rabinoff, BLM, w/o
Mike Herkimer, Water Quality, w/o
Mark Page, Water Rights, w/o
Dave Ariotti, DEQ, w/o
Bill Bates, DWR, w/o
Vicky Bailey, EarthFax, w/o
Price Field Office, w/o
O:\007020.HZN\FINAL\APPROVAL.98D

State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
Governor
Ted Stewart
Executive Director
Lowell P. Braxton
Division Director

1594 West North Temple, Suite 1210
PO Box 145801
Salt Lake City, Utah 84114-5801
801-538-5340
801-359-3940 (Fax)
801-538-7223 (TDD)

April 10, 1998

TO: File

THRU: Daron Haddock, Permit Supervisor
Joe Helfrich, Permit Supervisor

FROM: Sharon Falvey, Senior Reclamation Specialist

RE: Horizon Mine Temporary Mine Water Discharge, Horizon Mining, LLC, Horizon Mine, ACT/007/020-98D, Folder #2, Carbon County, Utah.

Summary:

The Division held a meeting on April 9, 1998 to assist the operator in meeting Division Regulatory Requirements for a mine water discharge that was not identified within the existing permit. According to Vicky Bailey, Earth Fax Consultant, water is seeping from the face of the workings at a visually estimated rate of 75 gpm. This review discusses those changes made to the document to meet regulatory requirements and to protect the hydrologic balance.

Analysis:

Probable Hydrologic Consequences:

Numerous discussions within the PHC require further updating regarding water encountered within the mine (e.g. Page 7-17, submitted April 1998, still predicts sustained inflow to be minimal). Additional changes to the PHC including: water source identification, water dating, etc. will be necessary to update the PHC.

Ground Water Monitoring:

The permittee will proceed with in-mine monitoring from the region where water is being intercepted. In addition to ground water monitoring parameters identified in the plan selenium will be monitored because high levels were identified in the data from the old workings from a sample collected in December 1997.

The permittee will monitor the quantity of flow discharged from the mine by documenting the rate and time period that water is transferred from the mine to the sedimentation pond. Daily quantities will be summarized for each month and submitted to the Division in the quarterly report. This will continue until a totalizing flow meter and the discharge monitoring report for the direct discharge point are operational.

Surface Water Monitoring:

Water discharged from the pond will be monitored for the required UPDES parameters. Additional monitoring is required while the mine water is discharged to the sedimentation pond. The decant will be monitored along with the following sites; upstream of the UC-2 culvert and, downstream of the UC-1 culvert (where adequate mixing has occurred). The following laboratory and field parameters; TDS, selenium, sulfate, pH, conductivity and flow, will be analyzed from these sites. A sample will be obtained with the initial discharge and then a sample will be obtained from each site within each two week period thereafter. This monitoring will continue until approval of the stream discharge location point 002 is obtained and after it is demonstrated that the sampling is no longer necessary.

Sedimentation Pond

Mine water that is temporarily discharged to the pond will be discharged through the sedimentation pond decant. The plan indicates that the runoff storage volume will be maintained. During a precipitation event the pond should be at the decant level or below and the decant level. The decant must be in the closed position to meet the pond design requirement in a precipitation event to assure the capacity for the 10 year 24 hour event is maintained.

Findings:

The temporary measure, allowing-in minewater discharge to occur through the sedimentation pond at UPDES discharge point 001, are approved and meet the intent of minimizing impact.

Recommendation:

This amendment should be approved and incorporated into the plan. Additional information and updates are necessary. Numerous discussions within the PHC require further updating from the encountered mine water. Additional changes to the PHC including: water source identification, water dating, etc. will be necessary to update the PHC. It is recommended that this amendment be followed up by a request or Division Order from the Division to Horizon mine to obtain the information necessary to fully address the PHC. This update may be coordinated with the approval for UPDES discharge monitoring point 002 and a demonstration that monitoring is no longer necessary.

cc: William Malencik, PFO
O:\007020.HZN\FINAL\HZN98D