0038

RECEIVED

AUG 3 1 2000

DIVISION OF
OIL, GAS AND MINING

ENERGY WEST Mining Co.
PO Box 310
Huntington, Utah 84528

August 25, 2000

Utah Coal Program
Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
P.O. Box 145801
Salt Lake City, Utah 84114-5801

Incoming
Amood

Re: Revised Volume 9 Hydrologic Section, PacifiCorp, Des-Bee-Dove mines, ACT/015/017, Deer Creek Mine, ACT/015/018, Cottonwood Mine, ACT/015/019

PacifiCorp, by and through its wholly-owned subsidiary, Energy West Mining Company ("Energy West") as mine operator, hereby submits a revised Volume 9 Hydrologic Section: Appendix A, Appendix C and hydrologic maps HM-2, HM-3 and HM-12 for the following mines: Cottonwood Mine Act/015/019, Deer Creek Mine Act/015/018 and Des-Bee-Dove mines Act/015/017. Revisions to Volume 9 are in response to concerns raised during review completed on March 13, 2000 (Deer Creek Mine Reclamation Plan).

The concerns raised during the review include:

Concern: **R645-301-731,** Provide a monitoring plan specific to reclamation that: 1) includes water quality and quantity monitoring, where flow accumulation is measurable, as determined by with the spring survey to be conducted in the 5th and 9th year following reclamation, 2) demonstrates mine water discharge will meet the criteria for water quality appropriate for the post-mining land use and in accordance with the state and federal standards (For Huntington Creek and tributaries the state standards are: Class 2B, Class 3C and Class 4 criteria), 3) commits to submit the water quality and quantity data quarterly.

Response: Volume 9 Appendix A has been revised to include a reclamation monitoring plan for surface and ground water resources.

Concern: **R645-301-731.221,** Provide a monitoring plan specific to reclamation that: 1) assures impacts to hydrologic balance are prevented, 2) clarifies how underground water recovery will be determined from the monitoring of HM-2 and HM-3, 3) describes how the State Water Quality Standards, Utah Administrative Code R317-8, for the Deer Creek, Huntington Creek, and any other stream receiving minewater discharge will be shown to meet federal and state water quality standards. (The Division recommends a minimum high and low flow season monitoring for selected parameters over the full period of

Huntington Office:
(435) 687-9821
Fax (435) 687-2695
Purchasing Fax (435) 687-9092

Deer Creek Mine:
(435) 687-2317
Fax (435) 687-2285

Trail Mountain Mine:
(435) 748-2140
Fax (435) 748-5125

reclamation. Parameters should be reflective of all potential in-mine contaminants), 4) includes a map that differentiates between alluvial and groundwater gradients and identifies; flow direction and groundwater divides in the permit and adjacent area for each mined seam, existing mine floor elevations, in-mine discharge locations, pertinent geologic controls, mine controls such as sealed mine sections, and changes to previously existing hydrologic barriers, 5) provides a water monitoring plan that; a) determines whether changes in groundwater hydrology will occur along the Straight Canyon Syncline during the time mining has idled, b) determines if the groundwater hydrology changes affects baseflows to the Cottonwood Canyon Stream, c) identifies the difference between changes due to climate, or from ground water discharge by including age dating to be conducted every 2nd year during the low flow period for; radio carbon dating, tritium dating, and stable hydrogen and oxygen isotopes (for meteoric waterline determinations) in the Cottonwood Canyon wells and Cottonwood Creek streamflow below well CCCW-1S and d) identifies all reclamation monitoring sites on a map.

Response: **1) Volume 9 Appendix A has been revised to include a comprehensive reclamation monitoring plan for surface and ground water resources until bond release. Reclamation monitoring sites will consistent with established locations. 2) HM-2 and HM-3 are hydrologic maps provided by PacifiCorp which identify locations of in-mine groundwater sampling points. The maps list type of groundwater source, present and past monitoring locations and the year when monitoring was terminated. As indicated in the Deer Creek Mine reclamation plan, the intake portals in Deer Creek Canyon are projected as long term discharge sources based upon elevation of existing surface breakouts. Hydrologic maps HM-2 and HM-3 have been revised to include structural contours based on the floor elevations in the mine to assist in long term groundwater discharge projections. 3) As stated earlier, Volume 9 Appendix A (Hydrologic Monitoring Program) has been revised to include a reclamation monitoring plan for both surface and ground water resources until bond release. Monitoring of surface and ground water resources will include both quality and quantity and will be reported in the Annual Hydrologic Monitoring Report. 4) As documented in Volume 9, PacifiCorp has conducted extensive surface and underground exploration programs to determine coal seam and hydrologic characteristics of the East Mountain Property. Based on this research and independent studies, (refer to Brigham Young University master thesis submitted to the Division and the hydrologic study conducted by Mayo & Associates - Volume 9 - Hydrologic Support Information), stratigraphy of the East Mountain area contains perched/isolated aquifers and development of pieozometric gradients is impractical. 5) PacifiCorp has provided data which confirms**

that the hydrologic system of Cottonwood Canyon is not connected to the Deer Creek Mine. PacifiCorp has updated Volume 9 Appendix C, (Cottonwood Canyon Hydrologic Investigation, included in this submittal), Based on the comprehensive hydrogeologic study conducted in the Cottonwood Canyon area and reviewing available hydrologic data the following conclusions can be made.

- **Cottonwood Canyon Creek is a major drainage system which borders the western limit of the East Mountain Permit area. Based on data collected by PacifiCorp, Cottonwood Canyon Creek is an ephemeral stream from its headwaters to Section 24, Township 17 South, Range 6 East and intermittent from that point to its confluence with Cottonwood Creek at Straight Canyon. During periods of drought, flow in Cottonwood Canyon Creek is limited to flow emanating from the alluvial deposits at the intersection of Roans Canyon. From the intersection of Roans Canyon to Section 36 the stream loses water to the alluvial deposits. The drainage is dry from Section 36 to Section 6 except during spring runoff which occurs normally from late April through June or during precipitation events. Flow in the channel reemerges in Section 6 and continues to the confluence with Cottonwood Canyon at Straight Canyon.**
- **Two main structural features occur within the Cottonwood Canyon Creek area, the Straight Canyon Syncline and northeast-southwest trending fault-fracture systems. The Straight Canyon Syncline is a north-northeast trending double plunging syncline. In the area south of the syncline the strata dips gently in a northwest direction toward the syncline at approximately one to three degrees. Northwest of the syncline axis the strata dips to the southwest at approximately three to five degrees.**
- **The second structural feature consists of northeast-southwest trending fault systems known as the Roans Canyon and Mill Fork Canyon grabens. The Roans Canyon Graben bisects the northern reserves of the East Mountain permit area and occurs parallel to the axis of the Straight Canyon Syncline. The system contains up to six normal faults with displacements ranging from a few feet to over 150 feet. PacifiCorp has conducted extensive studies to document the hydrologic significance of the graben structure. (See Volume 9, R645-301-711, A. Existing Groundwater Resources: Structural Hydrologic Features). Based on research conducted by PacifiCorp, faulting along the Roans Canyon system occurred during two phases -- during the first (east-west compression phase) strike slip movement occurred prior to the deposition of the Flagstaff Limestone; during the second (east-west tension phase) normal**

faulting occurred along strike slip faulting plane resulting in the formation of a graben structure. Displacement along the Roans Canyon Fault system increases to the north until it is terminated by the Pleasant Valley Fault system. In the area of Cottonwood Canyon Creek, the Roans Canyon Fault system consists of two or more fractures with little or no displacement.

- **During the resistivity study a second linear feature, which could possibly be a southern extension of the Mill Fork Canyon fault system, was detected on transect line CCCR-5. The southernmost fault of the Mill Fork Canyon Graben was intersected in Arco's Beaver Creek #4 Mine in Mill Fork Canyon and has a displacement of about twenty (20) feet down on the northwest side. Where the fault crosses the northern end of East Mountain, the fault has a displacement of about thirty (30) feet down on the northwest side.**
- **Cottonwood Canyon Creek is a major drainage system where evidence of glaciation exists. From the headwaters to Section 24, Township 17 South, Range 6 East the canyon is characterized by U-shaped valleys with associated lateral and terminal moraine deposits. Lateral moraine deposits most commonly occur at the intersection with side canyons. Terminal moraine deposits occur at the northwest corner of Section 24, and from this point to near the confluence with Straight Canyon the canyon can be characterized as a V-shaped valley with little evidence of glaciation.**
- **Based upon the results of the resistivity and induced polarization study it is apparent that the depth of the alluvium is relatively consistent throughout the length of the canyon surveyed, but the lateral extent of the deposits increases from north to south to a point just north of CCCR-2. The pseudosections indicate that the fractures/faults cutting the lower end of the Cottonwood Canyon impound water in the alluvium approximately 300-500 feet up-canyon from the fracture/fault. The pseudosections also indicate that the level of groundwater increases in the area of Cottonwood Spring due to the change in the volume of the alluvium caused by change in geomorphology (glaciated-nonglaciated). It is also apparent that the lithologic contrast/fracture displaying high resistivity values on the east side of Cottonwood Canyon may be contributing water to the alluvial area.**
- **Cottonwood Spring, located at Station # 880 on Line CCCR-2, is probably fed by flow from the water coursing through the alluvium with additional flow contributed from the lithologic contrast/fracture on the east side of Cottonwood Canyon. Discharge rates from the spring area would reflect the level of groundwater within the alluvial**

deposits and the recharge both to the alluvial deposits and the strata above the Blackhawk Formation on the south side of Cottonwood Canyon. Maximum alluvial depths within the survey area appear to range from 40 to 70 feet. General resistivity highs within the alluvium indicate an abundance of fresh water. The depth estimates on the road profile CCCR-7 do not reflect maximum alluvial thickness since the cross profiles indicate maximum depths further eastward in the center of the drainage.

- **To delineate any potential impact to the first aquifer-saturated zone below the lowest minable seam (Starpoint Sandstone-Spring Canyon Member) PacifiCorp developed a series of wells downgradient of the existing and proposed mine development. The proposed locations were originally submitted to DOGM on March 23, 1992. An on site location review was held with the Forest Service and DOGM on June 4, 1992 to finalize the site locations. It was agreed that a total of three sites would be completed, one south and two north of the Roans Canyon fault system. Drilling of the wells was initiated on November 17, 1992 and was completed on January 19, 1993. Six (6) wells were drilled, and five (5) were completed for hydrologic monitoring. At each of the three sites two single completion wells were installed (except for CCCW-2), one in the colluvial/alluvial deposits and one in the first saturated zone below the lowest minable seam (Spring Canyon Member of the Star Point Sandstone). An additional well was developed in the Blackhawk Formation at site CCCW-3.**
- **It is apparent from the drilling results that groundwater production greater than five (>5) GPM was fracture controlled and inflow from non-fractured strata was less than five (<5) GPM. Based on the drilling and well completion data the lower Blackhawk/Upper Starpoint is not hydrologically connected to the upper Blackhawk Formation or the alluvial deposits, even in the area of the Roans Canyon Fault trace. In reviewing the data from drill site CCCW-3S, the effects of the drought in the upper Blackhawk Formation are evident. At the same stratigraphic unit, fluvial sandstone, groundwater production from UGMS-3 was artesian flow measured at one hundred fifty (150) GPM, and CCCW-3S was measured 77.6 feet below the ground surface. This would indicate a minimum reduction of head of approximately thirty-four (34) psi or 77.6 feet. At well CCCW-1A the static level was measured on January 14, 1993 at 112.2 feet, or an elevation of 7731.0 feet. This elevation approximately equals the elevation where the groundwater reemerges from the alluvium at Roans Spring.**
- **Monitoring of the wells completed has shown that water elevations in the Cottonwood Canyon Creek alluvial system vary as a function of**

precipitation and wells which isolate the Star Point Sandstone trend independently from precipitation (CCCW-1S is less apparent due to well completion). As the graphs illustrate, (review Drilling Results – Drill Site No. 1, Groundwater Elevation Data with Trend Lines and Palmer Drought Index vs. CCCW-1A Well Elevation), central Utah experienced dramatic shift climate patterns from extremely above normal precipitation from 1982 through 1986 to an extreme drought from late 1986 through 1993. As the climatic patterns returned to a normal pattern in 1993, groundwater in the alluvial system began to recharge. Recharge to the alluvial system peaked in early 1999 and began a downward trend. PacifiCorp stated in the MRP and meetings concerning Cottonwood Spring, as the alluvial system recharged, flow from the Cottonwood Spring area would re-develop. Based on the groundwater trends in well CCCW-1A, PacifiCorp initiated gain/loss surveys of Cottonwood Canyon in 1998 to confirm experienced in the monitoring wells and to document areas of groundwater discharge. Gain/loss surveys were conducted throughout reach of Cottonwood Canyon from Mill Canyon in Section 2, Township 17 South, Range 6 East to below Roans Canyon in Section 24, Township 17 South, Range 6 East. Station selection was based upon areas of detected change and to duplicate previous research (USGS). As discussed earlier, data collected compared directly to the climatic trends and to the data collected by the USGS (refer to Attachment 5 for Gain/Loss Survey Data). Over a two year period (1998-2000), flow the Cottonwood Spring area ranged from approximately 100 gpm to 40 gpm. The discharge data collected by PacifiCorp from 1998-2000 from the Cottonwood Spring area compared directly to the data collected by the USGS during the late 70's and early 80's.

- **Data from a study conducted by Mayo & Associates indicate that water from the alluvial system in Cottonwood Canyon is of modern age and is not related to the deep groundwater systems encountered in the mine.**
- **On October 27, 1998 the Division concluded the issue of Cottonwood Spring. As stated in the letter, "no definitive connection between Cottonwood Spring has been cited or proven in relation to mining at the Deer Creek Mine".**

The following list the revisions to Volume 9 - Hydrologic Section:

Volume 9 HYDROLOGY

- *Replace Appendix A: revised to include reclamation monitoring. Redline copy enclosed for your review.*
- *Replace Appendix C: revised to include updated information. Redline copy enclosed for your review.*
- *Replace Map HM-2: revised to include structural data.*
- *Replace Map HM-3: revised to include structural data.*
- *Insert Map HM-12 (map developed in conjunction with the Cottonwood Canyon Hydrologic Investigation).*

Attached are four copies of the amendment with the required C1/C2 forms. One copy has been sent to the Price Field Office.

If you have any questions or concerns regarding this submittal, please feel free to contact myself at 687-4720 or Dennis Oakley at 687-4825.

Sincerely,

Charles A. Semborski
Geology/Permitting Supervisor

CAS/cas

cc: Scott Child (InterWest Mining Company) w/o
Carl Pollastro (Energy West Mining Company) w/o
File

J:\Environmental\PERMITS\EMHydro\VOL9REVAugust2000.wpd

Form DOGM - C1 (Last Revised February 10, 2000)

APPLICATION FOR PERMIT PROCESSING

Permit Change ☐	New Permit ☐	Renewal ☐	Transfer ☐	Exploration ☐	Bond Release ☐	Permit Number: ACT/015/017,018,019
Title of Proposal: Amendment, Revise Volume 9 Hydrologic Section, PacifiCorp, Des-Bee-Dove mines, ACT/015/017, Deer Creek Mine, ACT/015/018, Cottonwood Mine, ACT/015/019						Mine: Des-Bee-Dove/Deer Creek/Cottonwood
						Permittee: **PacifiCorp**

Description, include reason for application and timing required to implement: Revisions to Volume 9: Hydrologic Section Appendix A and C, maps HM-2, HM-3 and insert new map HM-12.

Instructions: *If you answer yes to any of the first 8 questions (gray), this may be a Significant Revision and require Public Notice. Any questions, please call a Permit Supervisor.*

☐ Yes	√ No	1. Change in the size of the Permit Area? ____ acres Disturbed Area? ____ acres ☐ increase ☐ decrease.
☐ Yes	√ No	2. Is the application submitted as a result of a Division Order? DO #
☐ Yes	√ No	3. Does application include operations outside a previously identified Cumulative Hydrologic Impact Area?
☐ Yes	√ No	4. Does application include operations in hydrologic basins other than as currently approved?
☐ Yes	√ No	5. Does application result from cancellation, reduction or increase of insurance or reclamation bond?
☐ Yes	√ No	6. Does the application require or include public notice/publication?
☐ Yes	√ No	7. Does the application require or include ownership, control, right-of-entry, or compliance information?
☐ Yes	√ No	8. Is proposed activity within 100 feet of a public road or cemetery or 300 feet of an occupied dwelling?
☐ Yes	√ No	9. Is the application submitted as a result of a Violation? NOV #
☐ Yes	√ No	10. Is the application submitted as a result of other laws or regulations or policies? Explain:
☐ Yes	√ No	11. Does the application affect the surface landowner or change the post mining land use?
☐ Yes	√ No	12. Does the application require or include underground design or mine sequence and timing? (Modification of R2P2?)
☐ Yes	√ No	13. Does the application require or include collection and reporting of any baseline information?
☐ Yes	√ No	14. Could the application have any effect on wildlife or vegetation outside the current disturbed area?
☐ Yes	√ No	15. Does application require or include soil removal, storage or placement?
☐ Yes	√ No	16. Does the application require or include vegetation monitoring, removal or revegetation activities?
☐ Yes	√ No	17. Does the application require or include construction, modification, or removal of surface facilities?
√ Yes	☐ No	18. Does the application require or include water monitoring, sediment or drainage control measures?
√ Yes	☐ No	19. Does the application require or include certified designs, maps, or calculations?
☐ Yes	√ No	20. Does the application require or include subsidence control or monitoring?
☐ Yes	√ No	21. Have reclamation costs for bonding been provided for?
☐ Yes	√ No	22. Does application involve a perennial stream, a stream buffer zone or discharges to a stream?
☐ Yes	√ No	23. Does the application affect permits issued by other agencies or permits issued to other entities?

√ Attach 4 complete copies of the application.

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.

Charles A. Semborski — Geology/Permitting Supervisor — 8/28/2000
Signed - Name - Position - Date

Subscribed and sworn to before me this 28th day of August, 20 00.

Lori Ann Anderson
Notary Public

My Commission Expires: December 22, 2004
Attest: STATE OF Utah
COUNTY OF Emery

NOTARY PUBLIC LORI ANN ANDERSON
Huntington, Utah 84528
My Commission Expires December 22, 2004
STATE OF UTAH

Received by Oil, Gas & Mining

ASSIGNED TRACKING NUMBER

Form DOGM - C2 (Last Revised February 1, 2000)

Application for Permit Processing
Detailed Schedule of Changes to the MRP

Title of Application: Amendment,Revise Volume 9 Hydrologic Section, PacifiCorp, Des-Bee-Dove mines, ACT/015/017, Deer Creek Mine, ACT/015/018, Cottonwood Mine, ACT/015/019

Permit Number: **ACT/015/017/018/019**

Mine: Des-Bee-Dove/Deer Creek/Cottonwood

Permittee: **PACIFICORP**

Provide a detailed listing of all changes to the mining and reclamation plan which will be required as a result of this proposed permit application. 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 existing 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	√ REPLACE	☐ REMOVE	Volume 9: Hydrologic Section, Replace Appendix A
☐ ADD	√ REPLACE	☐ REMOVE	Volume 9: Hydrologic Section, Replace Appendix C
☐ ADD	√ REPLACE	☐ REMOVE	Volume 9: Hydrologic Section, Replace Map HM-2
☐ ADD	√ REPLACE	☐ REMOVE	Volume 9: Hydrologic Section, Replace Map HM-3
√ ADD	☐ REPLACE	☐ REMOVE	Volume 9: Hydrologic Section, Replace Map HM-12
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	

Any other specific or special instructions required for insertion of this proposal into the Mining and Reclamation Plan?