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

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May 12, 1994

Mr. Larry Johnson
Genwal Coal Company
P. O. Box 1201
Huntington, Utah 84528

Re: Completeness Review, LBA #9 application, Genwal Coal Company, Crandall Canyon Mine, ACT/015/032-93-1, Folder #2, Emery County, Utah

Dear Mr. Johnson:

Enclosed is a review of Genwal's LBA #9 application. This review is being provided to you to assist you in correcting deficiencies identified in your plan. Please remember that this review was completed prior to our meeting of May 3, 1994, so there are items listed in this review that you may have already addressed in your latest submittal.

You may recall that the items that needed to be addressed for the administrative completeness determination include the following:

1. Right of Entry information.
2. Potential habitat for Raptors
3. Subsidence extending beyond permit boundary
4. Lack of data and analysis in PHC
5. Roof and Floor Analysis to determine acid toxic forming character.
6. Maps showing corrected lease boundary.

Please review the enclosed document and provide a response as quickly as possible. We expect a response by no later than the end of June. Please call if you have any questions.

Sincerely,

Daron R. Haddock
Permit Supervisor

enclosure
cc: WWestern
SFalvey
JSmith
PBaker

COMPLETENESS REVIEW

Genwal Coal Company
LBA #9 Application
May 11, 1994

R645-301-112 **Identification of Interests**

The applicant and operator IS Genwal Coal Company, and the resident agent is Larry Johnson. The Intermountain Power Agency (IPA) and Nevada Electric Investment Corporation (NEICO), as joint owners, will pay the abandoned mine reclamation fee. The revision shows the names of officers and directors of Genwal, IPA, and NEICO and the dates these officers and directors assumed their positions. Nevada Power Company owns all of NEICO's stock. The plan needs to include the names of persons that own or control Nevada Power, including the dates that they assumed their positions.

Because the Division will need to perform an Applicator-Violator System check for this revision, Genwal should update the list of officers and directors of controlling companies. The list of officers and directors of NEICO is not current.

The application says that IPA is currently engaged in the reclamation of the Horse Canyon Mine. NEICO holds the permit ACT/007/012 for an area south of Wellington.

R645-301-112.340 and R645-301-112.410 require that the plan contain the MSHA numbers with dates of issuance for affiliated mines. The Horse Canyon Mine MSHA number is not shown, and the dates of issuance are not shown for the Wellington Preparation Plant, the Horse Canyon Mine, and the Crandall Canyon Mine.

The plan needs to contain the employer identification numbers of any coal mining and reclamation operation owned or controlled by the applicant or by any person that owns or controls the applicant. The application contains Genwal's employer identification number, but it does not include the employer identification numbers for the Wellington Preparation Plant or the Horse Canyon Mine.

On page 1-6, the application says that CVR is a subsidiary of NEICO and IPA. This statement should be corrected. CVR is a subsidiary of NEICO but not of IPA.

On page 1-8, the application says that the applicant currently operates coal mining operations under approved mining permit number ACT/007/012 for the Wellington Prep. Plant. Genwal, the applicant, does not operate the Wellington Preparation Plant. The statement on page 1-8 needs to be corrected. The Wellington Plant still needs to be identified as an affiliated operation, however.

The plan shows holders of leasehold interests, including Genwal and the heirs of John Sanders. The coal is owned by the U. S. government and the State of Utah. The surface is owned by the United States, the State of Utah, and Mountain Coal Company.

Deficiencies

1. The plan needs to include the names of persons that own or control Nevada Power, including the dates that they assumed their positions.
2. The list of officers and directors of NEICO is not current.
3. The Horse Canyon Mine MSHA number is not shown, and the dates of issuance are not shown for the Wellington Preparation Plant, the Horse Canyon Mine, and the Crandall Canyon Mine.
4. The Statement that the applicant currently operates coal mining operations under approved mining permit number ACT/007/012 for the Wellington Prep Plant must be corrected.

R645-301-114 Right of Entry and Operation

Applicant's Proposal:

Documents are listed upon which the applicant bases its legal right to enter and begin underground mining operations. Copies of leases and/or assignments of leases are in Appendix 1-1. Plate 1-1 shows the leases and adjoining surface and coal ownership.

Analysis:

The LBA #9 Lease, UTU-68082, is not listed in Section 1.14 but is listed on Attachment A of Appendix 1-1. The listing in Appendix 1-1 includes portions of Sections 27 and 34, T. 15 S., R. 6 E. and Section 3, T. 16 S., R. 6 E., acreage that was not included in the LBA lease #9 when it was finally issued to Genwal. Plate 1-1 and other maps in the proposed plan that show the LBA lease indicate the extraneous acreage.

Deficiencies:

1. The LBA lease is not included in right-of-entry information in Chapter 1 and is not accurately described in Appendix 1-1.

2. The LBA lease is not shown accurately on Plate 1-1 and on other maps throughout the proposed plan.

R645-301-321 **Vegetation Information**

Forest Service stipulation seven requires that the lessee establish a monitoring system to locate, measure, and quantify the progressive and final effects of underground mining activities on the topographic surface, underground and surface hydrology and vegetation. The monitoring system shall utilize techniques which will provide a continuing record of change over time and an analytical method for location and measurement of a number of points over the lease area.

The plan says on page 3-13 that any area that appears to have been impacted through subsidence will be inventoried to determine if any damage to vegetation or wildlife is apparent. In the event damage has occurred, the management agency responsible will be notified and a joint plan of mitigation will be formulated and forwarded to DOGM for their approval prior to implementation.

This plan does not include a program to regularly monitor the vegetation. The mitigation plan should be acceptable, but the plan does not include a method of monitoring the surface of mined areas to decide if they have been affected. Long-term changes in vegetation composition would not be apparent with cursory or one-time observations.

The Forest Service has suggested that aerial color infrared photography taken every five years would be an acceptable method of monitoring vegetation changes. A program of on-the-ground monitoring or of color or black and white aerial photography may also be acceptable. Genwal might be able to coordinate aerial photography with other aerial surveillance, such as subsidence monitoring.

Deficiency

1. The plan does not include a program to regularly monitor the vegetation. The plan does not include a method of monitoring the surface of mined areas to decide if they have been affected.

R645-301-322 **Wildlife and Threatened or Endangered Species Information**

R645-301-333 **Wildlife Protection**

No new wildlife information is presented for the new lease area. The Forest Service EA contains some information about threatened, endangered, and sensitive species.

There is a potential for tree-nesting raptors to occur in the area. The plan commits to a plan presented by DWR in a letter dated April 28, 1993. This letter says that if annual subsidence monitoring detects an area that is actively subsiding, the area should be surveyed

for tree-nesting raptors. Measures should be implemented to protect any nest sites from destruction during the nesting season.

The plan says that surveys for cliff-nesting raptors conducted by DWR have located one site where golden eagles have either historically built aeries or where there is a potential for aeries. It also says that aerial surveys of the eagle nest will be conducted every three years or on request of the Fish and Wildlife Service or DWR. However, the plan does not contain new information about the potential for cliff-nesting raptors in the new lease area.

The geology map shows outcrops of cliff-forming formations in the new lease area. It does not appear that past raptor surveys checked for cliff-nesting raptors in this area. Appendix 13-3 from the old plan contains a letter from DWR that needs to be included in this plan. It says that certain areas, particularly the State leases, were surveyed for cliff-nesting raptors and that the habitat is of poor quality for these species. The new lease areas were not surveyed.

The August 26, 1993, correspondence from the Fish and Wildlife Service to the Forest Service says that the lease needs to incorporate stipulations which preclude the subsidence of cliffs which provide nesting habitat for the golden eagle, prairie falcon, and other migratory birds of high federal interest within the vicinity of the proposed lease tract. Forest Service stipulation number nine says, "Except at specifically approved locations, underground mining operations shall be conducted in such a manner so as to prevent surface subsidence that would: (1) cause the creation of hazardous conditions such as potential escarpment failure and landslides . . . ".

A letter dated August 6, 1993, from the Forest Service to the Fish and Wildlife Service says that the Forest Service applied certain unsuitability criteria to the site. Specifically, the letter says:

> Criterion No. 11 There are no bald or golden eagle nest sites with the lease tract but golden eagle nests have been identified within a 1/2 mile buffer zone of the tract boundaries. However, exception (2)(i) applies. The underground mining of coal would not adversely affect the golden eagles or their nests.

This section of the letter appears to contradict information contained in September 2, 1993, DWR correspondence concerning the lease. The correspondence says that there is a golden eagle nest in T15S R7E, Section 31 which is contained within the lease. I have discussed this apparent contradiction with Steve Romero of the Forest Service. He acknowledged the discrepancy and said that he was familiar with the DWR comments about the nest. He said that no new survey work for cliff-nesting raptors was done for the EA but that he plans to do some work this spring. Depending on the results of the Forest Service's

work, Genwal may not need to conduct further surveys. However, Genwal will need to include the Forest Service results in the plan.

The mining and reclamation plan also discusses the golden eagle nest referred to above. It says that the second nest (187.723) shown on Plate 3-1 is outside the proposed mine area. This nest is outside the proposed lease area according to this map, but the DWR correspondence referred to above includes a map showing a golden eagle nest within the lease boundary. The nest shown on Plate 3-1 and the nest discussed in the DWR letter are probably the same. Genwal needs to update Plate 3-1 to show the golden eagle nest in Section 31, T15S R7E.

Genwal's plan needs to address the stipulation that mining be conducted in a manner that prevents surface subsidence that would cause potential escarpment failure. If cliffs are present in the new lease area, they need to be checked for cliff-nesting raptor nests. If nests are present, a protection plan needs to be developed. The protection plan would need to include provisions to monitor the nests for activity during periods before the areas subside. If any nests are active, a mitigation plan must be implemented to protect the nests. Even if the nests are not active, Genwal would need to obtain a permit from the Fish and Wildlife Service before damaging or destroying a nest.

Other effects on wildlife are expected to be minimal. DWR's primary concern is the potential loss of water sources, and Genwal's plan addresses this concern. If it is proven that the flow of any seep or spring has been reduced by 50% or more, Genwal will notify the Forest Service and the Divisions of Wildlife Resources (DWR) and Oil, Gas and Mining and begin working on an acceptable mitigation plan involving the use of guzzlers.

The EA contains a biological assessment/evaluation that discusses several endangered and sensitive species that could occur in the area. It found that there will be no effect on most of the species from leasing and mining the coal, but goshawks could be affected through loss of water sources. The assessment/evaluation indicates that field survey work was actually performed for the species in the list. The negative findings constitute information important to the Division. Genwal needs to include or reference these findings within the plan.

Deficiencies

1. Negative findings on threatened, endangered, and sensitive species from the Forest Service Environmental Assessment need to be included in the plan..
2. Genwal's plan needs to address the stipulation that mining be conducted in a manner that prevents surface subsidence that would cause potential escarpment failure.
3. The plan needs to discuss how cliff-nesting raptor nests will be identified and

protected.

4. Genwal needs to update Plate 3-1 to show the golden eagle nest in Section 31, T15S R7E.

R645-301-522 **Coal Recovery**

Coal Recovery Proposal

The Bureau of Land Management and the Utah State Division of Natural Resources governs the conservation and royalty payments of the coal located within the Applicant's proposed permit boundary. To ensure proper resource conservation, the mine plans must be approved by appropriate state and federal agencies.

In the proposed lease area, only the Hiawatha seam is considered mineable. According to the available information, all the coal in the lease area appears to be mineable. The Operator plans to extract as much coal as practical. During the course of mining, more information about the coal will be discovered. The new information may require the Operator to adjust the mine plan.

Some coal must be left in place to provide stream protection, buffer zones and barrier pillars. Perennial streams in the lease area must be protected from subsidence. The protection plan calls for no secondary mining in the stream buffer zones. The barrier pillars are needed to prevent material related damage from occurring outside the permit area.

Analysis

Usually the Division does not investigate the coal recovery program. The Division instead relies on the studies of other state and federal agencies. The main document used by the Division to determine resources conservation is the Resource Recovery and Protection Plan (R2P2). The Operator did not reference the R2P2 in the MRP. The Division does not have enough information to determine the adequacy of the coal recovery program.

Deficiency

1. Prior to approval, the Operator must reference the Resource Recovery Protection Plan in the Mine and Reclamation Plan.

R645-301-525 **Subsidence**

Proposal on Subsidence Monitoring and Control

There are no structures or utility corridors in the lease areas. If subsidence damage does

occur, it will be limited to natural renewable resources such as streams, grazing and wildlife habitat. The creeks within the lease area include Crandall Creek, Blind Canyon Creek and the left fork of Horse Canyon.

The streams will be protected by stream buffer zones. In the stream buffer zones, secondary mining will not be allowed. The pillars in the buffer zones are of sufficient size to prevent subsidence damage. The buffer zones are shown on Plate 5-2.

If it can be proven that mining related activities decrease flow in seeps and springs by fifty percent, the Operator will mitigate the damage. The mitigation will consist of installing guzzlers and other devices to store water.

Loss of grazing areas and wildlife habitat will be mitigated. The mitigation will usually consist of financial compensation.

The Operator will repair any structures such as roads and bridges that are adversely impacted as a result of mining-related subsidence.

The key to preventing subsidence damage from occurring outside the permit and stream buffer zones is to determine the angle of draw. The Operator has estimated the angle of draw to be 20 degrees based on studies by the U.S. Bureau of Mines and field observation of other mines in the area.

Subsidence will be monitored with aerial surveys designed by the U.S. Forest Service. The area within the 20 degree angle of draw will be flown before mining. Once mining begins, the affected area will be flown annually. When no subsidence has been detected at a point for two years, the point will be monitored biannually. If no movement has occurred on a point monitored biannually for three consecutive surveys, the monitoring will be done every five years.

As required within the approved 1988 MRP, a visual quarterly subsidence/escarpment failure survey has been completed for two years where mining has taken place beneath escarpment areas visible from Huntington and Crandall Canyon for two years after development mining within those areas. There are no further plans to monitor escarpments not visible from Huntington or Crandall Canyons.

The subsidence/escarpment survey results were recorded and submitted to the appropriate regulatory authority. No escarpment failure occurred.

The 20 degree angle of draw used to project the outer limits of subsidence and to protect perennial streams within the mining area was determined by two documents which show this angle of draw to be adequate. A Bureau of Land Management letter to the Utah State Division of Oil, Gas and Mining dated December 11, 1981 states that the possible draw angle should be in the 15 to 20 degree range. This conclusion was based on previous history of subsidence occurring in the Wasatch Plateau/Book Cliff area. This letter is identified as Appendix 5-5.

Appendix 5-6 is a report, "Preliminary Study of Potential Subsidence Over the Genwal Coal Mine." This report includes subsidence calculations, subsidence history, analysis, and charts with final conclusions showing that there may be a maximum subsidence result of 3 to 4 inches within the boundaries of the leased area. The draw angle over the intact coal is expected to be in the order of 20 degrees.

Analysis of Subsidence Monitoring and Control

The two main issues involving subsidence control are confining subsidence to the permit area and preventing damage to the streams in the permit area. The Operator's maps show that subsidence is projected to occur outside the permit boundaries. The Operator must either modify the mine plans so that subsidence only occurs in the permit area or extend the permit area so it includes all subsidence areas.

Stream damage will be reduced by stream buffer zones. No secondary mining will be allowed in the buffer zones. The buffer zones are shown on Plate 5-2. The Blind Canyon buffer zone is not labeled nor are line types used to identify the buffer zone identities in the legend. To avoid confusion, all stream buffer zones must be clearly labeled.

The Operator states in Chapter 5 that the angle of draw will be 20. The two references cited for the 20 degree angle of draw are a letter from the BLM and a subsidence study conducted at the Genwal Mine. The BLM states that a 30 degree angle of draw is very high for this region. Angles of this magnitude come in part from observations of mining in the eastern United States and in part from the Nation Coal Board in the United Kingdom. Documented subsidence data from mining areas in the Wasatch Plateau show draw angles ranging from 15 to 20 degrees. This data came from mining companies and two independent studies from the Bureau of Mines.

The Terra Tek study commissioned by Genwal quotes the 1988 Bureau of Mines Information Circular 9194 by Allgaier which was conducted at the nearby Deer Creek mine. The Terra Tek report states, "It is reasonable to assume that the inferences drawn from the USBM study could be applicable to the Genwal Mine as well". The USBM study shows that the angle of draw over the Deer Creek Mine is 30 degrees.

Field studies by PacifiCorp show that deformation over their longwall panels is mostly plastic not elastic. Terra Tek's study includes a subsidence model that assumes elastic deformation. An elastic subsidence model may not be valid for this region.

The Operator states in its subsidence monitoring program that: "When no subsidence has been detected at a point for two years, the point will be monitored biannually."

Biannually means twice a year, but it seems from the context of the monitoring program that the Operator means that points which show no chance after one year will be monitored once every two years. If the Operator intended to conduct monitoring every other year then the wording should be changed to reflect his intent.

Deficiencies

1. Prior to approval, the Operator must include all subsidence areas in the permit area.

2. Prior to approval, the Operator must either use the 30 degree angle of draw or supply additional information that supports a lesser angle. Studies conducted by the USBM show that the angle of draw in the area is 30 degrees.

3. The proposal to "biannually" monitor subsidence points that do not show movement on an annual basis should be modified to reflect the Operator's intent. Such points only require monitoring every other year.

R645-301-612 **Certification**

Proposal:

All required maps, plans and cross sections presented in Chapter Six have been certified by a registered professional engineer.

Analysis:

Plates 6-2, 6-3, 6-4, 6-5, and 6-7 have not been certified by a registered professional engineer. Plates 5-2 and 7-7, which are referenced by Chapter Six, have

not been certified.

Deficiency:

1. Not all plans, maps and cross sections are certified by a qualified, registered, professional engineer or land surveyor.

R645-301-622 **Cross Sections, Maps, and Plans**
622.1 **Test Borings and Coal Sampling**

Proposal:

Stratigraphic sections and cross sections are in Appendices 6-1, 6-4, and 6-5. Coal seam isopachs are on Plates 6-3, 6-4, and 6-5 and overburden is shown on Plate 6-6. Hiawatha structure is on Plate 6-7. Plate 6-2 has been eliminated from the plan (page 6-4).

Lithofacies of the Blackhawk Formation are shown in the stratigraphic sections in Appendix 6-1. These two sections along with two additional holes drilled in State Section ML-21569 (Section 36) should be sufficient to determine the depth, nature, and thickness of the coal seams, rider seams, and over- and interburden for the permit area. Bore hole locations are on Plate 5-2. Location of proposed in-mine up-drilled bore holes are shown on Plate 5-2B (page 6-4).

Analysis:

Logs and a cross section of up-drilled holes DH-1 and DH-2 are in Appendix 6-5. Locations of these two drill holes and of measured sections "A" and "B" (Appendix 6-1) are on Plate 6-2 in the currently approved plan, but Plate 6-2 in this submittal has been revised and no longer shows these features. The locations of up-drilled hole DH-1 is on Plates 6-7 and 5-2, but up-drilled hole DH-2 is not on either Plate. The locations of Measured Sections "A" and "B" are not on any map in this submittal.

The location of drill hole NVP-7 is on several maps, but the location of the second drill hole in lease ML-21569 is not shown. Logs and other information from the two holes drilled in lease ML-21569 are not in the MRP, yet they are referred to as a main source of information on the nature, depth, and thicknesses of the coal seams, rider seams, overburden, and interburden for the permit area (page 6-4). Drill holes DH-2 through DH-7 have been used to construct Plates 6-3 through 6-7 but there is no information on these drill holes other than locations, which are shown on several maps. There is no Plate 5-2B so locations for proposed in-mine up-drilled boring are not shown in the plan.

Deficiency:

1. Plate 6-2 has been revised and is included in this version of the MRP, contrary to the statement on page 6-4.

2. Locations of in-mine drill hole DH-2 (Appendix 6-5) and measured sections "A" and "B" (Appendix 6-1) are not shown on a map in this submittal.

3. The location of the second drill hole in lease ML-21569 is not shown on any map and, except for the location of NVP-7, there is no information on either drill hole in lease ML-21569 in the proposed plan.

4. There is no information on drill holes DH-2 through DH-7 other than their location.

5. Plate 5-2B is not in this version of the MRP, so proposed locations for in-mine up-drilled borings in State lease ML-21568 (page 6-4) are missing from this proposed plan.

R645-301-622.2 Coal Seams, Overburden, Stratum Below Coal Seams.

Proposal:

Additional technical information has been submitted to determine the nature, depth, and thickness of the coal seams, rider seams, overburden, and interburden in

the permit area based on drilling completed to date (Appendices 6-1 and 6-5 and Plates 5-2 and 5-2C). The Hiawatha seam is the only coal seam in the permit area that is of minable thickness.

Information from drill holes 1, 2, 3, and 4 indicates the Blind Canyon seam is approximately 59, 40, 45, and 40 inches thick, respectively, in those areas. Refer to Plate 5-2 for locations. The Blind Canyon seam is present on approximately 60 acres of the property and has an average thickness of 4 feet. This seam remains fairly continuous across the property. Additional drilling information has been provided in Appendix 6-1 for the State Leases.

Analysis:

Plate 6-3 shows the Hiawatha seam isopach, Plate 5-2 shows the structure of the Hiawatha seam.. There is no Plate 5-2C in this version of the MRP, but it is referred to in several places. Plates 6-4 and 6-5 indicate the Bear and Blind Canyon seams are not economically recoverable, however more information was used to compile these maps than is found in Appendices 6-1 and 6-5. The data from Appendices 6-1, 6-4, and 6-5 does not appear to have been used in creating Plates 6-4 and 6-5. Data used to compile the geologic description, including logs of drill holes, chemical analyses for acid- and toxic-forming materials, and the engineering properties of strata immediately above and below the coal seam to be mined, are to be provided as part of the permit application.

Plate 6-5 does not show thickness for the Bear Canyon seam at drill holes NVP-4 (DH-4) and GS-CLB-1 and no explanation is provided as to why this information is lacking.

It is not clear if drill hole 2 referred to at the top of page 6-6 is the DH-2 in Federal lease SL-062648 that is depicted in Appendix 6-5 but not shown on any map; or if it is the DH-2 that is located between Horse and Blind Canyons and shown on Plates 5-2 and 7-7 (NVP-2 on Plates 6-3 through 6-5). Based on the Blind Canyon thickness, it appears to be the first.

The statement that the Blind Canyon seam is present on approximately 60 acres of the property appears to apply only to thickness of 5 feet or more.

There is no information from drilling done on the State Leases in Appendix 6-1. Additional drilling has been done in and adjacent to these leases but no logs from these drill holes, which are required by R645-624.300, are in the MRP.

Deficiencies:

1. There is no Plate 5-2C in this version of the MRP, yet it is referred to in several places.

2. Drill hole logs representative of the State and LBA leases have not been provided. This deficiency applies to Section 6.24.31 also.

3. Not all coal thickness data, such as that in Appendices 6-1, 6-4, and 6-5, were used in making Plates 6-4 and 6-5.

4. Coal thickness data from NVP-4 and GS-CLB-1 are missing on Plate 6-5.

5. In several places in the MRP, the distinction needs to be made between the DH-2 (Appendix 6-5) that is located in Federal lease SL-062648 and the DH-2 that is located between Horse and Blind Canyons and shown on Plates 5-2 and 7-7 (NVP-2 on Plates 6-3 through 6-5).

6. The statement that the Blind Canyon seam is present on only 60 acres (page 6-6) needs clarification.

7. Contrary to the statement on page 6-6, there is no additional drilling information regarding the State Leases in Appendix 6-1.

R645-301-624.3 **Chemical Analysis / Lithology**
624.32 **Chemical Analysis - Strata**

Proposal:

Pyrite, alkalinity, and clay content data are in Appendix 6-2. Pyrite and alkalinity of strata immediately above and below the Hiawatha seam are summarized

on page 6-9.

Analysis:

Sample analyses in Appendix 6-2 were provided by Mr. Wollen, a former operator of the Genwal property (page 6-5). Locations where the samples were collected are not given. The assumption is that they are from roof and floor rock traversed by measured sections "A" and "B", which were also provided by Mr. Wollen.

Deficiency:

1. Locations where samples of strata, for which analysis results are in Appendix 6-2, were taken are not identified or shown on a map.

R645-301-632 **Subsidence Monitoring**

Applicant's Proposal:

A complete subsidence control plan addressing the regulations can be found in Section 5.25 of the proposed plan.

Analysis:

Figure 5-9 and Plate 6-2 show the maximum limit of possible subsidence. Figure 5-9 shows the seeps and springs that lie within the maximum limit of possible surface subsidence. Maximum possible subsidence is shown extending beyond the permit boundary. Disturbance of the natural land surface beyond the permit boundary is not allowed under the Coal Mining Rules. Either the permit boundaries need to be extended, for example through a Special Use Permit from the USFS, or the coal extraction plan needs to be modified so that projections of possible subsidence fall within the proposed permit boundary.

Deficiency:

1. Plate 6-2 and Figure 5-9 show subsidence beyond the permit boundary, which cannot be permitted.

R645-301-712 **Certification**

Proposal:

All required maps, plans, and cross sections presented in Chapter Seven that deal with the design of facilities or the determination of watershed characteristics have been certified by a professional engineer.

Analysis:

Plates 7-7 through 7-17 have not been certified by a registered professional engineer. Plate 5-2, which is referenced, has not been certified. Other than Plate 5-2, plates outside of Chapters Six and Seven were not checked.

Deficiency:

1. Not all plans, maps, and cross sections are certified by a qualified, registered, professional engineer or land surveyor.

R645-301-722 **Cross Sections, Maps, and Plans**

Proposal:

Figures 7-1 through 7-12 and Plates 7-1 through 7-17 depict existing surface and groundwater occurrences within and adjacent to the permit area. These maps also show the topography, streams, wells, water monitoring locations, and other hydrologic design information pertinent to the Crandall Canyon Mine (page 7-2).

Analysis:

Plates 7-12, 7-14, 7-15, and 7-16 show leases SL-062648 and U-54762 incorrectly. Assuming Plate 1-1 is correct, these two leases should be shifted approximately one-quarter mile west on the four specified plates.

The potential impact of the mine operation on Little Bear Spring was incorporated into the PHC (Appendix 7-15) dated June 18, 1993. The PHC has not been updated to include the larger area covered by the LBA lease. The location of Little Bear Spring is described in the PHC but there is no reference to any maps or other illustrations in the plan. The PHC indicates that there is little potential for the Crandall Canyon Mine to cause a negative impact on this spring. However, as this spring is of particular concern to water rights holders and is discussed in the PHC, it should be on a map referred to by the PHC. Plates 7-12, 7-13, and 7-14 would all be appropriate maps on which to show the location of this spring.

Deficiencies:

1. Leases SL-062648 and U-54762 are incorrectly located on Plates 7-12, 7-14, 7-15, and 7-16. (Check Plate 6-1 also.)

2. The locations of Little Bear Spring and of the associated water rights are not on appropriate maps, such as Plates 7-12, 7-13, and 7-14.

R645-301-724 **Baseline Information**
724.1 **Groundwater Information**

Proposal:

A few of the seeps and springs have been developed for beneficial use. No water wells used for consumption by animals or humans other than MW-1 are known to exist within the study area of the spring inventory. Hence, only minor groundwater development has occurred in the past within the mine plan or adjacent areas. Appendix 7-1 lists groundwater rights in and adjacent to the permit area and locations are on Plate 7-14.

Specific conductance, pH, temperature, use, and flow data for seeps and springs are given in Appendices 7-16 through 7-19 and discussed on pages 7-12 through 7-13.

SP-30 and SP-36 will be monitored to determine potential impacts in the immediate vicinity of the mine (page 7-36).

Analysis:

Little Bear Spring in Little Bear Canyon is located roughly two miles southeast of the mine portal. This spring is an important source of water for the Castle Valley Special Services District and that organization has expressed concerns in the past about potential impacts of mining on the spring. These concerns are discussed briefly in the PHC (Appendix 7-15) but this spring is not mentioned in Section 7.24.1. Little Bear Spring is downgradient of the underground workings, based on the potentiometric surface on Plate 7-13, but will probably be unaffected by mine operations. The spring is not within areas covered by Genwal's previous seep and spring surveys and is not on any of the maps in the proposed permit.

Along with TDS (or specific conductance corrected to 25° C) and pH, analysis of groundwater for total iron and total manganese is required by R645-301-724.100 and 731.211. Tables 7-4 and 7-5 include dissolved iron but not total iron and include manganese without indicating whether it is total or dissolved. Laboratory reports in Appendix 7-20 show analysis has been done for dissolved iron part of the time, for total iron part of the time, and for both total and dissolved iron part of the time: whether analysis was for total or dissolved iron is not indicated on many reports. The laboratory reports rarely identify analysis for manganese as being for total or dissolved forms.

Use, flow, temperature, pH, and specific conductance (at 25° C) are included in Appendices 7-16 through 7-20 and in the summaries on pages 7-12 and 7-13. Iron and manganese, either total or dissolved, are not summarized in the appendices or on pages 7-12 and 7-13.

According to Appendix 7-17 and Annual Reports for 1990, 1991, 1992, and 1993, spring SP-30 has not had measurable flow since 1985. SP-30 is being

monitored to determine impacts in the immediate vicinity of the mine, yet there is no analysis of the loss of flow at SP-30 as it might relate to mining in lease SL-062648, even if that mining occurred prior to Genwal's operation of the mine.

Deficiency:

1. Little Bear Spring, an important water supply source discussed in the PHC, is not mentioned in the groundwater development section of 7.24.1.

2. Little Bear Spring and associated water rights are not shown on appropriate maps.

3. Total iron and total manganese are not included in the groundwater analysis lists in Tables 7-4 and 7-5.

4. Information on total iron and total manganese, required by R645-301-724.100 and 731.211, is not included in the groundwater quality information in Appendices 7-16 through 7-20 and on pages 7-12 and 7-13.

5. The possible relationship between the cessation of flow from SP-30 and mining in lease SL-062648 has not been investigated.

R645-301-724.2 **Surface Water Information**

Proposal:

Flow measurements collected at the USGS gauging station at the mouth of Crandall Canyon, from a flume in Blind Creek, and estimated in Horse Creek are contained in Appendix 7-2. Instantaneous flow data for Blind, Horse, and the north end of Crandall Canyons were collected in 1991 at locations shown on Plate 7-7. During seep and spring surveys in 1989, the south fork of Horse Canyon was dry above station HS-0 (Plate 7-7) and Blind Canyon was dry above the midpoint between stations B-2 and B-3 (Plate 7-7).

USFS water quality data for Indian Creek are summarized in Appendix 7-45. Surface water quality data collected from Crandall Creek by Genwal are in Appendix 7-3. Appendix 7-42 contains laboratory analytical results of water samples taken at the flumes in Crandall and Blind Canyons. Field water quality measurements from 1989 to the present for Crandall and Blind Canyons are in Appendix 7-43.

Blind Canyon is the location of a study, to be done by the USFS and partially financed by Genwal, of effects of retreat-mining induced subsidence on watershed erosion and stream flow (page 7-24). A timetable for the research and mining is in Appendix 7-26 and related information is in Appendices 7-27 through 7-39. Because subsidence induced increases of sediment load could impact USFS lands and waters outside the permit boundary, Genwal has committed to provide off-site erosion control measures for USFS lands to offset potential damage. An agreement whereby Genwal donates $15,000 to the Manti-La Sal National Forest to fund graveling of a road in Nuck Woodward Canyon is in Appendix 7-44. In addition Genwal commits to remediating any adverse effects of retreat-mining.

Analysis:

Flow measurements from Crandall Canyon from October 1979 to September 1984 are in Appendix 7-2; however, flow measurements from the flume in Blind Canyon and estimated flows from Horse Canyon are not in Appendix 7-2 as stated on page 7-19. Instantaneous flow measurements for the three canyons for the year 1991 are in Appendix 7-23, along with flume measurements for Crandall and Blind Canyons and results of an instantaneous flow survey by IES of Horse, No Name, Blind, and Crandall Canyons for 1992. Instantaneous flow data for Horse Canyon for 1991 recorded no flow at least once during the year at four of the stations. Instantaneous flow data for Horse Canyon for 1992 in Appendix 7-23 indicate the south fork to be dry and the main channel to be dry approximately 340 feet upstream of the fork. This is sketchy information, but not even all of this has been included in the characterization of flow in Section 7.24.2. Locations of the stations used for these instantaneous flow measurements are not on Plate 7-7, contrary to the statement on page 7-23.

USFS water quality data for Indian Creek are summarized in Appendix 7-45. No reference is made in the text in Section 7.24.2. to the Indian Creek flow data in

Appendix 7-44. The supplemental information on drainages from the west face of East Mountain in Appendix 7-48 is not included in the surface water characterization in Section 7.24.2. Although the BLM has removed the acreage west of the Joes Valley fault from the LBA #9 lease, these drainages are adjacent to the permit area and need to be included in the description of the surface water quality and quantity. Because the information is not in this section it has not been used in the determination of the PHC and therefore the need for operational monitoring has not been determined.

Appendices 7-3 and 7-42 appear to contain the same water quality data from Crandall and Blind Creeks. If they are different, this needs to be clarified. Otherwise one of these appendices should be removed from the proposed plan. Field water quality measurements for Crandall and Blind Canyons in Appendix 7-43 are for 1989 to 1991, not up to the present as stated on page 7-23.

There are no water quality data for Horse Canyon in the proposed plan. Additional data are needed to adequately characterize baseline water quality and quantity. Because the needed information is not in this section, determination of the PHC is incomplete and the need for operational monitoring in Horse Canyon has not been evaluated. Mining has already been done under the south fork of Horse Canyon, retreat-mining under the uppermost reaches. Further retreat-mining under this drainage is not proposed until 1996, according to Plate 5-2. This will provide time to obtain data to characterize more adequately baseline conditions in this drainage.

The Blind Canyon study has the objectives of quantifying changes in stream channel profiles and changes in channel features, such as erosion caused by subsidence from retreat-mining. Methods outlined in the proposal in Appendix 7-25 involve establishing cross sections and stream profiles, surveying morphometric features, and assessing streambank stability and landslides. Appendix 7-44 contains USFS flow data for Indian Creek and not the erosion control enhancement agreement with the Manti-La Sal National Forest. A copy of that agreement is not found in the proposed plan.

Deficiency:

1. Flow measurements from the flume in Blind Canyon and estimated flows from Horse Canyon are not in Appendix 7-2, contrary to the statement on page 7-19.

2. Data on flow in Horse Creek are very meager, but meager as they are, not all available flow data, i.e., instantaneous flows observed in 1992, have been utilized in Section 7.24.2 to characterize baseline water quantity for Horse Canyon.

3. References to Plate 7-7 for locations of instantaneous stream flow measurement points are not correct.

4. The Indian Creek flow data in Appendix 7-44 and water quality data in 7-45 are not included in the surface water information in Section 7.24.2.

5. Information in Appendix 7-48 for Joes Valley and East Mountain has not been incorporated in the surface water information in Section 7.24.2.

6. Appendices 7-3 and 7-42 appear to be redundant, containing the same water quality data from Crandall and Blind Creeks.

7. Field water quality measurements from Blind and Crandall Canyons in Appendix 7-43 are for 1989 to 1991 only, not up to the present as stated on page 7-23.

8. Additional data are needed to adequately characterize baseline water quality and quantity for Horse Canyon before retreat-mining beneath it resumes.

9. Appendix 7-44 does not contain the erosion control enhancement agreement with the Manti-La Sal National Forest, contrary to the statement on page 7-25.

R645-301-728 **Probable Hydrologic Consequences Determination**

Proposal:

The PHC is in Appendix 7-15. An updated version was submitted June 18, 1993 in response to the part of Division Order #93A concerning Little Bear Spring.

No water inflow is occurring in the Crandall Canyon mine. Consequently, water is being pumped into the mine (page 1 Appendix 7-15). Surface water availability could be impacted by excessive pumping of water from Crandall Creek. Genwal has committed not to pump at a rate that will cause the flow of the creek to fall below the minimum required rate.

There is some potential for impact to seeps and springs through subsidence. Seeps and springs and water rights have been identified. Genwal is monitoring flow rates and quality for the water rights within and adjacent to the current mine permit area.

An alternate water source plan has been developed in the event any water rights or springs/seeps are adversely affected by the mining operation or reclamation activities.

Analysis:

Water inflow totals no more than 100 gpm, mostly from the old workings, as described on page 7-14 of the proposed plan. This water flow was also described and discussed at the June 10, 1993 meeting of Genwal, DOGM, Castle Valley Special Services District, and Huntington Cleveland Irrigation Company. The mine inflow is pumped to State Lease ML-21569 for use in the mining operations. All inflow is used in underground mining operations (page 7-14). Use is approximately 7.6 gpm and projected use is 7.9 gpm (page 7-13).

Well MW-1 currently serves as a water supply well for the mine, minimizing the need for surface pumping (page 7-29). In Appendix 7-15 it is stated that all water for in-mine consumption is being pumped into the mine with no contribution from mine inflow. On page 7-27 it is stated that no water has been pumped from Crandall Creek for the previous two year period. (On the other hand water has been discharged from the mine only three times in the past five years (page 7-16). Because the Mining and Reclamation Plan has undergone numerous updates, it is not clear when the two and five year periods referred to begin or end. Statements such as "the

last five years" or "the previous two years" become confusing or meaningless as the plan is amended and updated.)

Little Bear Spring is not currently being monitored by Genwal, but the Castle Valley Special Services District is almost certainly monitoring water quality and quantity. As mentioned above, because this spring is discussed in the PHC (Appendix 7-15) and because of the concerns of the water right holders, the location of this spring and the associated water rights should be on the appropriate plans and maps in the proposed plan.

Information on surface and groundwater in Joes Valley and the west flank of East Mountain is found in various sections of the proposed plan, including Appendices 7-44, 7-45, and 7-48. The data have not been described, summarized, or analyzed in Sections 7.24.1 and 7.24.2 and have not been used in the determination of the PHC. Water monitoring is supposed to be planned based on the findings of the PHC. The proposed plan does not include monitoring of surface or groundwater in Joes Valley, but there is no determination in the PHC to justify the decision not to monitor.

Flow data indicate that Horse Canyon does not have perennial flow within the permit area, but these data have not been used in the proposed plan to arrive at such a determination. There is intermittent flow in the south fork within the permit area, and intermittent or perennial flow in the main fork in the area adjacent to the permit area. These drainages are not evaluated in the PHC. Three springs in the upper reaches of Horse Canyon tributaries are included in the operational monitoring plan but there is no surface water monitoring. The basis for not having surface water monitoring in Horse Canyon is not found in the PHC.

The analysis provided in Appendix 7-15 Probable Hydrologic Consequences Determination states that the water emitting from springs and seeps in State Lease ML-21568 and ML-21569 as well as surrounding areas have no direct communication with the regional Blackhawk - Starpoint aquifer. The Operator has not included the proposed lease UTU-6082 as part of the PHC discussion. Additionally, the seep/spring survey in Appendix 7-16 shows numerous seeps to issue from the Blackhawk and Starpoint formations.

The Operator states that the wells indicate the potentiometric surface lies 50 to 60 feet below the top of the Starpoint Sandstone, and the Hiawatha seam lies at the base of the Blackhawk overlying the Starpoint. However, the Operator does not include a discussion of the new drill holes associated with the LBA lease, whether they intercepted water, or whether the LBA lease is the same distance from the potentiometric surface.

The Operator indicates that it is unlikely that the groundwater quantity or quality will be affected by the underground mining operations. The Operator should discuss the reasoning or reference the analysis in the plan which supports the basis for this determination.

To date, the plan indicates the Operator has intercepted significant flows three times. However, the Operator does receive inflows currently which are used in mine operations. The Operator should discuss potential impacts related to closing of the portal for reclamation and the potential to accumulate water in the current workings. The since the Operator is now mining upgradient, the relation of mine workings elevation to the elevation of the portal should be discussed in terms of potential to discharge from the portal.

A discussion of flow from Little Bear Spring was included. It was stated that the present mine workings would not interfere with the Starpoint aquifer and the concerns for diminution and mitigation for the Little Bear Spring flow were discussed. However, the Operator did not state what the future potential impacts to Little Bear Spring are or what discussions and mitigation measures were proposed.

The Operator has not included a discussion of the LBA lease area and sampling for acid and toxic forming constituents within the PHC. Although the Operator indicates no materials will come out of the mine, acid and toxic materials may affect the operational or post reclamation water quality. Should any spring or water source be recharged or intercepted by mining operations acid and toxic forming materials found in the workings could potentially affect water quality of the springs shown to discharge from the Blackhawk.

The Operator has committed to provide additional roof and floor samples from three equally spaced locations within the current mine workings (State lease and Right-of-Way areas), according to the approved plan. These areas have been mined. Yet, no analysis were received. The Operator should provide sampling from the three sites which were committed to (from the State lease and Right-of-Way include sample location). Additionally,

the proposed sampling points should be placed on a map for the new LBA leases and may be based on information gathered from the State Lease and Right-of-Way samples.

The analysis in soils section Chapter 2, page 2-9, indicates the applicant has determined the coal to have an acid forming potential. The result of chemical analysis for overburden is stated to be provided on pages 8 and 10 within Appendix 2-3. However, this information could not be located on the referenced pages.

The Operator has indicated there is some potential for surface water impacts and that those impacts are expected to be minimal. The Operator states the historical data summarized in the annual report shows no indication of mine related impacts on hydrology of the area. No comparisons or summary of data could be found in the annual reports to support this statement. R645-301-728.200 states the PHC determination will be based on hydrologic, geologic and other information collected for the permit application. The Operator has not met the commitment in this plan and should update the PHC using analysis of existing data to support the determinations made.

Determinations were made for Blind Canyon, Crandall Canyon and Horse Creek perennial flow. These determinations are based on data presented in Appendix 7-23. Final determinations are presented on Plate 14-5. Crandall Canyon Indian Creek and two drainages on the west facing slope of East Mountain were measured in October for two consecutive years to determine perennial flows. The Division's requirements applies to intermittent and perennial streams, as well as overall protection of the hydrologic balance. The Operator must summarize existing reference to subsidence within the buffer zone, or otherwise adequately discuss the potential for adverse hydrologic consequences from mining within the buffer zone so that, the Division may make a finding as required under R645-301-731.611.

Appendix 7-48 "Findings from Supplemental Information on Hydrologic Conditions" should be included in the PHC analysis. At a minimum these reports should be cross referenced or combined to provide a clear document. For instance, the potential impacts to surface waters does not consider the potential impacts (from subsidence) identified in Appendix 7-48.

The Operator should summarize the Probable Hydrological Consequences based on the analysis of potential impacts and the mitigation measures used to minimize those impacts.

The potential impact of the mining and reclamation operations upon water quality and quantity of surface and ground waters under seasonal flow conditions must be addressed. A useful method to address the regulations is to analyzes the potential impacts according to risk. Follow with a discussion of how mining operations minimize the potential impacts and what the resulting probable hydrologic impacts are. The monitoring plan should be developed according to the potential impacts, as required by R645-301-730.

Deficiency:

1. The analysis provided in Appendix 7-15 Probable Hydrologic Consequences Determination must be updated to include current information presented in the plan; according to R645-301-728.400.

2. The Operator must indicate whether the new drill holes associated with the LBA lease intercepted water, and the relation to the aquifer and coal in the LBA lease area. The Operator must include a discussion for the LBA area potential impacts on Little Bear Spring flows.

3. The Operator must include a discussion pertinent to the potential for acid and toxic forming constituents within the PHC, as required by R645-301-728.320. Analysis of the potential impacts of reclamation on the groundwater and surface water quality should be discussed. The Operator must provide additional roof and floor samples from three equally spaced locations within the current mine workings (State Lease and Right-of-Way areas), as committed to in the approved plan. The Operator should include mapping of the selected sites, and analysis according to the DOGM guidelines for Topsoil and Overburden. Finally, include the proposed sampling points on a map for the new LBA leases.

4. The Operator states the historical data summarized in the Annual report shows no indication of mine related impacts on hydrology of the area. However, no comparisons or summary of data are presented in the annual report to support this statement. The Operator must meet the requirements of R645-301-728.200 which states the PHC determination will be based on hydrologic, geologic and other information collected for the permit application. Appendix 7-48 "Findings from Supplemental Information on Hydrologic Conditions"

should be included or referenced in the PHC analysis.

5. The Operator should include in the PHC a section summarizing existing references for a determination of PHC of the water quality and quantity due to subsidence within 100 feet of perennial and intermittent streams; i.e. buffer zone, or otherwise adequately discuss the potential for adverse hydrologic consequences from subsidence according to R645-301-728.330.

6. There are confusing and what appear to be contradictory statements concerning groundwater inflow to the mine, surface water pumped into the mine, and the sources of water used in mine operations in the PHC (Appendix 7-15) and pages 7-14 through 7-29.

7. Joes Valley and the west flank of East Mountain have not been included in the determination of the PHC.

8. Horse Canyon has not been included in the determination of the PHC.

R645-301-730 Operations Plan
R645-301-731.21 Ground Water Monitoring Plan

Proposal:

Construction and completion of wells MW-1 and MW-2 are described on pages 7-37 and 7-41.

Groundwater monitoring will include collection of water quality and quantity data from eleven springs (page 7-36). SP2-24, SP2-9, SP-47a, SP2-14, SP2-23, and SP1-3 were chosen because of the water rights filed on them by the USFS. SP-30 and SP-36 will be monitored to determine potential impacts in the immediate vicinity of the mine. SP-58 will be monitored as an indicator of long term changes in groundwater issuing from the Blackhawk Formation in an area that will not be affected by mining operations. SP-19 and SP-22 will be monitored as indications of the water supply in the upper reaches of Blind Canyon.

Groundwater rights are listed in Appendix 7-1 and shown on Plate 7-14. Seep and spring locations are on Plate 7-12. Tables 7-4 and 7-5 list the parameters for which baseline and operational monitoring are done. Groundwater quality and quantity information is in Appendices 7-16 through 7-20.

Analysis:

Construction and completion of wells MW-3, MW-4, and MW-5 are not mentioned on pages 7-31 and 7-34. Drillers logs and well construction information for MW-4 and MW-5 are in Appendix 7-46. Either information on construction and completion of these three wells should be added to pages 7-37 and 7-41 or a reference be given to where information can be found. If no log is available on MW-3, whatever information is available should be mentioned.

According to Appendix 7-17 and Annual Reports for 1990, 1991, 1992, and 1993, spring SP-30 has had no measurable flow since October 1985. SP-30 is being monitored to determine impacts in the immediate vicinity of the mine, yet there is no analysis of the loss of flow at SP-30 as it might relate to mining, even if that mining occurred prior to Genwal's operation of the mine. Continued monitoring of an apparently dry spring is of little value; consideration should be given to other springs in lease SL-062648 to be monitored in addition to or as replacements of SP-30.

Water rights have been claimed by the USFS on lands within and adjacent to the permit area, with numerous claims on springs in Upper Joes Valley immediately west of the permit area. At least part of the water discharged by the Joes Valley springs has been characterized as coming from East Mountain (page 7-6). The USFS has in the past expressed concern that the monitoring plan is not adequate to characterize the groundwater system or to monitor effects of mining on water resources contributing to surface and groundwater flow on Forest Service lands. Ground water information for these areas has not been covered in Section 7.24.1 so these areas were not included in the determination of the PHC. Springs are to be monitored in Joes Valley, but because this area is not included in the PHC, the monitoring plan may not be sufficient.

There is no proposed operational monitoring of any springs within lease ML-21568. The only spring selected for operational monitoring in the state leases is SP

1-19, an intermittent spring at the edge of the area of potential subsidence for lease ML-21569 (Sec 36). Lease ML-21569 is identified as high priority area for deer in the summer (Plate 3-1A). SP 1-9 in lease ML-21568 and SP 1-24 in lease ML-21569 are perennial springs that would be good candidates for monitoring as they are in areas most likely to experience maximum subsidence. There are no water rights filed on any seeps and springs within the state leases, but impacts to these springs could indicate impacts to surface and groundwater in the Crandall and Blind Canyon drainages. In addition, use of these seeps and springs by wildlife could be greatly affected.

A commitment is made in Section 7.27 that when flows are interrupted or reduced (by 50% or more) as a result of mining activities, alternate water supplies will be developed. While monitoring of every spring and seep is not practical, there must be enough monitoring to detect impacts from mining, otherwise the commitment to mitigate is meaningless.

Deficiency:

1. Construction and completion of wells MW-1 and MW-2 are described on pages 7-37 and 7-41, but there is no information on wells MW-3, MW-4 and MW-5, even by reference to the information in Appendix 7-46.

2. Monitoring a flowing spring in addition to or in place of SP-30 should be considered.

3. The monitoring plan (or lack of monitoring) for Joes Valley and Horse Canyon is not based on the PHC.

4. Areas likely to be affected by subsidence, such as the State leases, need additional monitoring of springs to determine impacts from subsidence.

R645-301-731.22 Surface Water Monitoring Plan

Proposal:

Two flumes have been installed on Crandall Creek and one in Blind Canyon to monitor possible effects of mining in State Lease ML-21569. Water quality samples will be collected from the flume locations quarterly and analyzed according to Tables 7-8 and 7-9. In anticipation of acquiring adjacent leases, a flume has been installed in Indian Creek (page 7-43). The flume locations are shown on Plate 7-7.

Stream channel monitoring stations have been established along both the north and south forks of Crandall Creek, Blind Creek, and the south fork of Horse Creek to determine which stream reaches exhibit perennial flow. Stream flow and water temperature were measured regularly during several months in 1991 and once in September 1992. Stream monitoring results are in Table 7-6a, but a determination of what stream reaches exhibit perennial flow has yet to be made (page 7-43).

Stream flow observations made during drilling operations and seep and spring surveys suggest that large portions of the south fork of Horse Creek, Blind Creek, and both the north and south forks of Crandall Creek have only ephemeral or intermittent flows within the state leases. Plates 5-2A and 5-2B show the points of transition between perennial and intermittent flow.

No retreat-mining will be conducted beneath the buffer zones along these streams until it has been determined what reaches are perennial and that these reaches will not be adversely affected by mining (page 7-43).

Analysis:

Locations of the three flumes installed by Genwal are shown on Plate 7-7. Although most of the permit area drains to Huntington Creek through Crandall, Blind, and Horse Canyons, the westernmost portion of permit area drains from East Mountain into Joes Valley. USFS data on flow and water quality for Indian Creek are in Appendices 7-44 and 7-45. Genwal has installed a flume in Indian Creek but no data from that flume are presented in the proposed plan. There is no stated intent to monitor surface water quality or quantity anywhere in Joes Valley as part of the operational monitoring plan.

Drainages on the west side of East Mountain are not included in the description of surface water quality and quantity in Section 7.24.2. Joes Valley and

the East Mountain drainages have not been included in the determination of the PHC. The probable hydrologic consequences of mining are not determined for Joes Valley, so the operational monitoring plan in these areas may not be sufficient and operational surface water monitoring may be needed in these drainages.

Table 7-6a is identified on page 7-43 as the location of the information on perennial flow for Crandall, Blind, and Horse Canyons. This table is not in the proposed plan.

Stream flow observations made during drilling operations and seep and spring surveys suggest that large portions of the south fork of Horse Creek, Blind Creek, and both the north and south forks of Crandall Creek have only ephemeral or intermittent flows within state leases ML-21568 and ML-21569. According to the statement in the first paragraph on page 7-43, a determination of what reaches of those three drainages exhibit perennial flow has yet to be made. However Plates 5-2A and 5-2B, which are not in the proposed plan, are referenced as showing the points of transition between perennial and intermittent flow.

Reaches of streams that were flowing during surveys in 1991 and 1992 may be dry in the future, but the permit applicant should have an idea of where intermittent and perennial reaches of the drainages are based on the available data. The data should be evaluated in the PHC and the operational monitoring program planned accordingly.

Under the currently approved plan, mining has already been done under the south fork of Horse Canyon and Blind Canyon. Retreat-mining has been done beneath the uppermost reaches of Horse Canyon, which were identified as not having perennial flow, and under Blind Canyon. The USFS is currently investigating the effects of subsidence from retreat-mining on the Blind Creek drainage. An interim report is due from the USFS by September 1994 and a final report by September 1995. The remainder of the south fork of Horse Canyon and several smaller tributaries to the main fork are in the zone of possible subsidence in the proposed mining plan. Genwal has established monitoring stations along Blind and Horse Canyons, but the future use of these stations and the surface water monitoring plans for Horse Canyon are not described in the proposed plan.

The need of an operational monitoring for Horse Canyon cannot be evaluated because of the lack of water quality data and the fragmentary water quantity data in the proposed plan. Monitoring of Horse Creek was stipulated as part of the current coal mining permit, but the nature of the monitoring was not specified. Additional data are needed to adequately characterize baseline water quality and quantity. Under the proposed plan, further retreat-mining beneath this drainage is not anticipated until 1996 (Plate 5-2). This will provide time to obtain data to characterize more adequately baseline conditions in this drainage.

Deficiency:

1. Although a flume has been installed, there is no stated intent to monitor water quality or quantity on Indian Creek in the proposed plan.

2. There is no Table 7-6a, containing results of stream monitoring for perennial and intermittent flow, in the proposed plan (page 7-43).

3. The proposed operational monitoring plan is not based on a determination of what stream reaches exhibit perennial flow according to the statement in the first paragraph on page 7-43.

4. Plates 5-2A and 5-2B are not in the proposed plan (page 7-43), therefore the reaches of streams where flow is perennial and the points of transition between perennial and intermittent flow are not identified in the proposed plan.

5. Monitoring surface water quality and quantity in Horse Canyon needs to be planned and implemented as soon as possible in order to characterize baseline conditions and determine the PHC before retreat-mining resumes beneath that drainage.

6. Until it is demonstrated through determination of the PHC that surface water monitoring is not needed for Joes Valley, including the west flank of East Mountain, surface water monitoring needs to be planned and implemented in those areas.

R645-301-731.600. Stream Buffer Zones

Proposal:

In Section 7.31.6, page 7-45, the Operator states that portions of the road and sediment pond outslope are within 100 ft of Crandall Creek, a perennial stream. The buffer zone signs designate the area beyond which no disturbance shall take place.

Analysis:

The Operator's description does not accurately detail the buffer zones included in the plan. However, the 100 foot buffer zone along Crandall Creek can be determined from the disturbed area boundary shown on Plate 7-5A. According to this map a large area of the sediment pond, part of the road, and the west pad area are within 100 horizontal feet of the stream. Additional permit operations include the portable pump, NPDES discharge, and outlet culvert UD-1. The Operator should include reference to page 3-9 and 3-10 which identify how impacts are minimized during construction activities. The buffer zone information should also be discussed in terms of final and contemporaneous reclamation.

Other buffer zone areas are in the subsidence plan. The Operator should reference the applicable portions of the plan where buffer zones are identified for protection from subsidence. The areas which are intermittent and are not protected from subsidence should be identified as proposed variances from the buffer zone. The Operator should closely tie the probable impacts from subsidence to the proposed subsidence buffer zone within the intermittent and perennial stream zones, as requested under R645-301-728.

Deficiency:

1. The Operator should include reference to other portions of the plan where buffer zones related to subsidence are addressed. The areas which are intermittent and are not protected from subsidence should be identified as proposed areas of buffer zone variance. Other portions of the plan where applicable maps and text are addressed should be referenced, including pages 3-9 and 3-10 which identify how impacts are minimized during construction activities.