

# Mid-Term Permit Review

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TEXT  
SECTIONS R645-301-100 thru 800



VALLEY CAMP OF UTAH, INC.

February, 1993

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February 11, 1993

RE: Mid-Term Permit Review completed by:

	Daron Haddock
Section 100	Sharon Falvey/Rick Summers
Section 200	Priscilla Burton
Section 300	Paul Baker
Section 400	Paul Baker
Section 500	Wayne Western
Section 600	James D. Smith
Section 700	Sharon Falvey/Rick Summers
Section 800	Randy Harden

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DIVISION OF  
OIL GAS & MINING

Dear Daron:

Included within this letter report are our responses to questions raised by the Division of Oil, Gas and Mining with respect to the previously submitted Mine Permit Renewal Application (PAP). Specifically, responses have been provided for letters prepared by the project review team as outlined within Table 1. When the question posed by the UDOGM team can be answered directly, a direct response is given herein without additional modification to the permit. When the response warrants permit modification, the discussion given herein summarizes the contents of the modification after which it provides a reference to the modified permit section.

When reviewing the information provided herein please note the following revisions, facts and assumptions upon which this submittal is based:

- Walt Wright has left Valley Camp and therefore his name has been removed from all appropriate places within the permit. At the time of publication a new officer will be listed in the appropriate places within the MRP.
- Attempts have been made to redline and strikeout all text changes as prompted by the deficiency comments. In addition to these changes, further clarifications have been made to the permit which were not requested by the Division. These have also been redlined or struckout.

- Formatting modifications which have occurred throughout the text have not been redlined or struckout.
- Upon approval of this submittal, Valley Camp with the assistance of the Division will extract from the PAP all pertinent information affected by operational and reclamation commitments.

**TABLE 1. Comment Letters Received for Which Responses are Provided.**

LETTER DATE	SUBMITTED BY	TITLE
June 8, 1992	Wayne H. Western	Reclamation Engineer
July 8, 1992	James D. Smith	Hydrogeologist
July 21, 1992	Priscilla Burton	Soils Reclamation Specialist
August 3, 1992	Paul Baker	Reclamation Biologist
August 4, 1992	Sharon Falvey	Reclamation Specialist

It is important for the reviewer to note that page numbers between the currently submitted permit and the modified draft midterm permit submittal do not match. Because of the voluminous and or sporadic nature of some of the modifications it was not practical to keep page numbers consistent between the two submittals. As a result the entire permit has been recopied and submitted as part of this response letter. Text which has been added to the permit can be readily identified through "redlining" or shading. Text which has been deleted has been "struckout". The reviewer should have no problem in identifying these modified sections of the permit.

The text that follows has been divided into sections which relate directly to the letter submitted by the individual review team member. Comments made by that review team member are answered before continuing with a response to concerns raised by other team members. It should also be noted that some additional unsolicited changes have been made to the text which were not requested in the August 5, 1992 Completion of Mid-Term Review letter submitted by Mr. Daron Haddock. All changes made to the text are identified with redline and strikeout for easy identification.

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**RESPONSE TO RECLAMATION ENGINEERING CONCERNS**  
**WAYNE H. WESTERN letter of June 8, 1992**

**R645-301-512.100. Maps and Cross Sections.**

Please find the following certified maps in their appropriate pocket: R614-301-521.140 Belina #2 Mine Progress Map, R614-301-555 R-5 to R614-301-555 R-7.

Map R614-301-521.111 Pleasant Valley Mining District, is not intended to be certified, as only the larger mines are depicted to show general reference to the District.

**R645-301-512.200. Plans and Engineering Design.**

The statement "See Hydrology R614-301-700...." has been changed to "See Hydrology R614-301-742.."

**R645-301-513. Compliance MSHA Regulation and Approvals.**

Response not required.

**R645-301-514.100 to R645-301-514.140. Inspection of Excess Spoil Structures.**

Response not required.

**R645-301-514.200 to R645-301-514.250. Refuse Pile Inspection.**

Response not required.

**R645-301-514.300. Impoundments.**

Response not required.

**R645-301-515.100. Reporting a Slide.**

Response not required.

**R645-301-515.200. Reporting and Impoundment Hazard.**

Response not required.

**R645-301-515.300 to R645-301-515.521. Reporting Temporary Cessation.**

The statement "Should a temporary cessation of coal mining and reclamation operations of 90 days or more occur,..." has been changed to "Should a temporary cessation of coal mining and reclamation operations of 30 days or more occur,..."

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**R645-301-521.100. Cross Sections and Maps.**

The names of the major mines depicted on R614-301-521.111. Pleasant Valley Mining District Map has been added. Maps titled R614-301-521.141 A & B was an error and are R614-301-728.100a & R614-301-728.100b.

**R645-301-521.200. Signs and Markers Specifications.**

Response not required.

**R645-301-522. Coal Recovery.**

The statement "The Valley Camp operation originated under the Coal Exploration and Mining Operations Rules, 30 CFR 211, which governed operations for the exploration, development, and production of coal from Federal lands in accordance with the requirements of the Mineral Leasing Act of 1920 and its amendments. In 1983 Valley Camp provided Minerals Management Service with a cross-reference index from the State regulations to the 30 CFR 211 regulations to aid in their review of the MRP. The BLM office for the Price River Resource Area approves all Valley Camp mining plans and modifications, as well as inspects the mine(s) to assure there are no detrimental effects on recoverable reserves and that Valley Camp satisfies the requirements of maximum economic recovery of the federal coal resource.", has been added to second paragraph after "Also see R614-301-523."

The Division should refer to the 1984 OSM Technical Analysis, Chronology of Events, Date; February 10, 1977, Event; USGS issues 211 permit for Belina #1 mine covering the existing Belina #1 (Upper O'Connor Seam).

**R645-301-523. Mining Method(s).**

The Division should refer to (a. Main Entry System-South) of the existing permit for clarification of Deficiency 1.

A copy of the most recent "Approved" Roof Control Plan is submitted in the Annual Summary Report and is not required or necessary to clutter the MRP.

**R645-301-524. Blasting and Explosives.**

Response not required.

**R645-301-525. Subsidence.**

Please refer to Page 19?? through page 23?? of the 500 Section, which have been revised using redline/strikeout.

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**R645-301-526. Mine Facilities.**

Those Pre-1977 existing structures which are currently being utilized by Valley Camp have been modified to meet the regulations. Valley Camp is of the opinion UP&L power lines, Questar Pipeline Company gas pipe lines, and the D&RGW railroad tracks present condition meet the Public Service Commission standards. Valley Camp does not believe this permit needs to be cluttered with the finite details of existing structures, some of which were designed and built over 100 years ago and are not relevant.

**R645-301-527. Transportation Facilities.**

Response not required.

**R645-301-528.100. Handling and Disposal of Coal, Overburden, Excess Spoil and Coal Mine Waste.**

Considering the amount of backfill material required for reclamation, the area utilized for coal storage, and the responsibility towards the Natural Recourse, the Operator feels his previous commitment is more than adequate.

**R645-301-528.200. Overburden.**

Response not required.

**R645-301-528.300. Spoil, Coal Processing Waste, Mine Development Waste, and Noncoal Waste Removal, Handling, Storage, Transportation, and Disposal Areas and Structures.**

The statement "Excess Spoil. There are no Excess Spoil disposal areas within the Mine Permit Area. However, should it become necessary to create a waste disposal area, it will be accomplished in accordance with the requirements of the regulations, and other federal, state and local regulations." has been changed to "Excess Spoil. There is no Excess Spoil at the mined sites as per UDOGM definition."

The statement "Refuse Piles. There is no large quantities of refuse materials generated within the Mine Permit Area as the only sources of refuse or coal waste materials are associated with the loadout and transportation facilities. This "refuse or waste" for the most part is fines which are returned to the raw coal pile at the Belina Mine Site or the coal pile at the Valcam Loadout Facility." has been changed to "Refuse Piles. There are no Refuse Piles as per UDOGM definition."

**R645-301-529.100. Exposed Underground Openings.**

The statement "When approaching a suspected or known old workings (abandoned mine), MSHA has specific mandatory regulations which this operator is obligated to follow." has

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been changed to "When approaching a suspected or known old workings (abandoned mine), MSHA Statutory Provisions of the 30 CFR Chapter 1, Subpart R-Miscellaneous, 75.1701 Abandoned areas, adjacent mines; drilling of boreholes, will be followed."

**R645-301-532. Sediment Control.**

The statements "See Hydrology R614-301-700.." which were made in section 500 of the permit have been changed to refer to specific sections within the hydrology section as requested. Sections in which these changes have been made include R614-301-512.200, R614-301-531, R614-301-532.

**R645-301-533 to R645-301-533.700. Impoundments, Stability, Foundations, Slope and Embankment Protection, Highway Location, MSHA and Non-MSHA Impoundments.**

The statement "See Hydrology R614-301-700. for details." as was stated in Section R614-301-533 has been changed to "For details see the following references in the permit: Impoundments - R614-301-733; Stability, Foundations, Slope and Embankment Protection, and Highway Location - R614-301-742.221; and MSHA and Non-MSHA Impoundments - R614-301-742.222."

**R645-301-534.100. Road Location, Design, Construction, Maintenance and Reclamation.**

1. Slope stability studies for the roads in the Valcam Loadout area are not applicable.
2. The Belina Haul Road has only an administration "Variance", Final Approval Letter, March 14, 1989, originator Ms. Susan C. Linner, UDOGM, Reclamation Biologist/Permit Supervisor.
3. N/A

The statement "The culverts were designed using ASTM standards, installed in accordance with UDOT Standard Specifications by General Coal Contractor, Helper, Utah, and the placement was monitored by Centennial Engineering Inc., SLC, Utah. Since no failures have occurred, the operator believes the culverts were designed and installed correctly.", has been inserted as the first paragraph.

**R645-301-535. Spoil.**

The Operator believes the present commitment stated in the permit meets the requests of the deficiencies.

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**R645-301-536. Coal Mine Waste.**

The statement "There is no coal mine waste disposal site(s) within the Mine Permit Area to...", has been changed to "No coal mine waste (as defined in R645-100-200) have been generated to necessitate a disposal site for coal mine waste. Should it become necessary to construct such a disposal site during the operation phase, it will be accomplished through the approval process."

The Operator is unable to predict whether or not there will be any underground development waste.

For deficiency No. 2, please refer to the Operators Response to R645-301-536. Coal Mine Waste.

**R645-301-537. Regraded Slopes.**

As indicated previously in response to Section 728.300, there is no spoil located within the Valley Camp permit area. Furthermore, it is believed that the materials located within the permit area are not acid-toxic forming, nor will underground development waste be brought to the surface and used in the reclamation process. Under these conditions it is believed that the intent of Sections 537.210 and 537.250 have been met.

**R645-301-541. Reclamation.**

Response not required.

**R645-301-542.100. Reclamation Schedule.**

As soon as possible after the operation plan and the land configuration for post mining land-use have been approved, the Operator will submit a "Detailed Reclamation Schedule".

**R645-301-542.200. Backfilling and Grading.**

Response not required.

**R645-301-542.300 to R645-301-542.500. Final Surface Configuration.**

N/A

**R645-301-542.600. Road Reclamation.**

The statement "See R614-301-700., for the specifications..." has been changed to "See R614-301-760., for the specifications..."

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**R645-301-542.700. Final Abandonment of Mine Openings and Disposal Areas.**

Response not required.

**R645-301-542.800. Reclamation Cost Estimate.**

As soon as possible after the operation plan and the land configuration for post mining land-use have been approved, the Operator will submit a "Detailed Reclamation Cost Estimate" and the supporting data to allow the Division to make a "Determination of Bond Amount".

**R645-301-551. Casing and Sealing of Underground Openings.**

Response not required.

**R645-301-552. Permanent Features.**

Response not required.

**R645-301-553. Backfilling and Grading.**

Response not required.

**R645-301-553.200. Spoil and Waste.**

The Operator believes the present commitment stated in the permit meets the requirements, as the Operator reads the Regulation R645-301-553.200 since there are no spoil or waste materials to be used during mining operation nor during reclamation.

**R645-301-553.250. Refuse Piles.**

As the Operator has stated previously in the MRP, Valley Camp does not have coal processing waste, underground development waste, nor is it envisioned, therefore it is this requirement is N/A.

**R645-301-553.300. Exposed Coal Seams, Acid-and Toxic-Forming Materials.**

N/A

**R645-301-553.400. Cut-and-Fill Terraces.**

Response not required.

**R645-301-553.500. Previously Mined Areas.**

Response not required.

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**R645-301-553.600. Approximate Original Contour.**

The statement "Areas which Valley Camp is requesting UDOGM "Variance...maps:" (including associated maps) has been changed to "Prior to approval of the Final Reclamation Plan, Valley Camp will seek approval of an alternative postmining land use as afforded by R645-303-220 and will meet the requirements R645-301-412 through 414.300."

**R645-301-553.900. Settled and Revegetated Fills.**

Please refer to: R645-301-537.200. Regrading of Settled and Revegetated fills to Achieve Approximate Original Contour.

**R645-301-560. Performance Standards.**

Response not required.

**RESPONSE TO HYDROLOGY CONCERNS  
JAMES D. SMITH letter of July 8, 1992**

**R645-301-622.100. Geology.**

The drill logs in question are geophysical logs. As the name implies it is the physical characteristics of the coal seams and other strata which allow geophysical logs to differentiate strata and to provide information which is useful in the exploration for coal and other resources, so information concerning the physical properties of the coal seams is inherent in the logs. According to R645-300-124 information on the physical properties of the coal is allowed to be held confidential, therefore, Valley Camp of Utah respectfully requests that the confidentiality statements regarding bore hole logs remain in the permit.

**R645-301-623 and R645-301-624. Geologic Information.**

**Deficiency 1**

The material excavated at the Belina Mines during the facing-up of the coal seams was used to construct a pad for mine facilities. The pad material, therefore, consists of earth excavated from above, below, and between the coal seams. In 1983 two sets of samples were taken; one set of samples of in-place material from above, below, and between the coal seams, and one set of samples from the pad area. It is expected that the results from these two sets of tests would be very similar.

The first set of samples was taken from bore holes BP-1 and BP-2 and were analyzed by MIDEKO in early 1983. The results of these analyses are contained in Appendix R614-301-623.100 and show high concentrations of boron and copper. The second set of samples was taken from test holes No. 1, No. 2, and No. B-5. These samples were analyzed by Ford Chemical

Laboratory in late 1983. The results of these analyses are also contained in Appendix R614-301-623.100 and show concentrations of less than 1 ppm for both boron and copper.

Since these samples were taken nine years ago and the people who took these samples are no longer at Valley Camp there is no information available regarding the methodologies used to collect and analyze the samples. While the actual reason for the high reported concentrations in the first set of samples is unknown and can probably not be determined, it is interesting to note that the values reported for the first set of samples are on the order of 100 times higher than the values reported for the second set of samples. It is possible that MIDECO simply reported the results with incorrect units (ie. milligrams/kilogram instead of micrograms/kilogram) and/or a misplaced decimal. Such an error could bring the MIDECO results more in line with those reported by Ford. To further explore this possibility an attempt was made to contact MIDECO, however, it was found that they are no longer in business.

A summary statement which echoes these conditions has been added to the MRP within Section 623.100.

#### Deficiency 2

The thickness of the coal seams and the equipment used by Valley Camp to mine these seams are such that unmined coal is left on the floor and roof of the mine openings. As a result the strata above and below the coal seams are not normally encountered during mining. One benefit of this is that since roof and floor rock is not exposed, little to none of the material gets mixed into the mined coal thereby resulting in unusually low ash and high quality. A second benefit of leaving coal on the roof and floor is that coal generally forms a more competent roof than the material above the coal seam.

Since the rocks above and below the coal seams are not exposed during mining, Valley Camp has not generally been in a position to sample these strata. Because material from these strata remain in place within the mine and are not brought to the surface, it is Valley Camp's position that the acid and toxic forming characteristics of this material are irrelevant to the protection of the environment of the mine area. Any influence these strata may have on ground water quality will be detected by the ground water and UPDES sampling programs. The acid-toxic forming potential of the coal extracted from the mine is discussed below in response to deficiency 4.

#### Deficiency 3

No additional data is available in response to this deficiency than is already provided in the MRP. Information related to coal strength and subsidence failure potential was previously provided the Division in the report entitled "Thick Seam Retreat Mining with Narrow Pillars" prepared by Kenneth C. Ko & Associates.

#### Deficiency 4

A composite sample of coal was taken during the month of October, 1992, and was analyzed. The results of the analyses are shown in Appendix 623.100b. The following table summarizes the results and compares them to the Division Guidelines (Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining, April, 1988). When mining continues at the Belina mine coal samples will be collected semi-annually as stated in the permit.

#### SUMMARY OF ANALYSES OF COAL

PARAMETER	ANALYZED IN VALLEY CAMP COAL	DOGM GUIDELINE CLASSIFICATION
pH	7.84	Good
Selenium	0.008	Good
Boron	0.93	Good
SAR	0.167	Good
ABP	19.11	Good

The coal mined at Valley Camp is classified as "good" according to Division Guidelines for topsoil and overburden.

#### Deficiency 5

Inconsistencies within Section R614-301-624.100 of the permit text and mapping have been resolved. Specific changes made include:

- The reference for Map R614-301-622.200f was incorrectly stated and has been changed. The correct reference should have been to Map R614-301-622.200g.
- The statement "Drill hole 75-24-4 is located in the SW quarter of the SW corner of Section 24,..." has been changed to "Drill hole 75-24-4 is located in the SE quarter of the SE quarter of Section 24,..."
- The statement "The lowest unit of the Blackhawk Formation in the vicinity of the Mine Permit Area is the Flat Canyon coal seam which rests upon the Star Point Formation." has been changed to "The lowest coal seam of the Blackhawk Formation in the vicinity of the Mine Permit Area is the Flat Canyon coal seam which lies approximately 50 feet above the Star Point Sandstone Formation".

**R645-301-632. Subsidence Monitoring.**

It is unlikely that features "O", "P", and "24" on Map R614-301-728.100a, Subsidence Base Map, are related to subsidence. As described in the notes on this map, feature "O" is an existing weathered depression. Feature "P" is described as a "small crack, may be natural" and feature "24" may be related to drilling as stated on the map. The mapped subsidence features which are located over 2nd East Mains and over 1st and 2nd Left, 3rd East Mains, are probably related to subsidence. The elevation of the coal seam at 1st Left, 3rd East, is 8980 feet and the surface elevation at this point is approximately 9600 feet so the overburden thickness is approximately 620 feet. Assuming approximately the same coal seam elevation in 2nd East Mains and allowing for about an 80 foot increase in surface elevation results in an overburden thickness of around 700 feet. The statements made within the Geology and Hydrology sections of the permit have been changed to state that no subsidence effects are noted where the overburden thickness is greater than 700 feet. Specifically the last sentence of the first paragraph in section R614-301-632 now reads "No surface effects of subsidence have been found above areas where pillars have not been pulled, nor have they been found above areas where the overburden above the mined coal seam is greater than approximately 700 feet."

**R645-301-722.100. Location and extent of Subsurface water.**

- 1) A 1986 report by the USGS (Water-Supply Paper 2246) identifies the Blackhawk Formation and Starpoint Sandstone as the exposed strata in the VALCAM Loadout Facility area, with the Starpoint Sandstone exposed west of the Pleasant Valley fault and the Blackhawk Formation exposed east of the Pleasant Valley fault. The general significance of these layers as water bearing strata is discussed in Section R614-301-624 of the MRP.

Additional information related to the local aquifer which has been located is presented in Section 722.100 of the permit. Based upon the additional information presented in this section, ground water contours for the VALCAM Loadout area have been added to Map R616-301-722.100c.

A survey of the seeps and springs in the VALCAM Loadout Facility area will be completed at the same time the seep and spring survey is updated for the Belina Mine Area. At this point in time, no new monitoring wells or piezometers are planned in the area of the VALCAM Loadout Facility.

- 2) The ground water contours Map (R616-301-722.100c) was updated for areas where information was available. Data were obtained for five monitoring wells in the Skyline Mine area adjacent to the permit area. The available information indicates a small general decline in groundwater levels in this area. Data were insufficient to determine any seasonal trends or variations.

Although there are no recent data available from monitoring wells in the Belina Mine permit area, mining impacts on groundwater can be inferred from annual spring flow

data. The spring flow data and a discussion of the flow variations is found in the annual Spring Depletion Report completed by HA&L dated December 1, 1992. This report states that most of the variations in spring flows appear to be due to natural flow factors and below average precipitation for the area. The only spring which shows evidence of significant mining impact is located along the northwestern mine permit boundary in the South Fork of Eccles Creek. It is possible that groundwater levels in this area are being impacted by mining on the west side of the fault.

**R645-301-722.400. Location and depth, if available, of water wells.**

- 1) The text in Sections 722.100 and 722.400 of the permit application has been updated based on additional well information from Valley Camp, the State Engineers Office, and UDOGM files. Information related to the hydrogeologic environment has been addressed within other sections of this permit response.

**R645-301-724. Baseline Information.**

**Deficiency 1**

The text, maps and tables within Section R614-301-724.100 have been reviewed and corrected to the best of our knowledge to eliminate any discrepancies which might have existed. Changes made to the text include a correction to the reference for the reported high TDS value found within the discussion on springs. Table R614-301-724.100b was changed to include the fourth quarter data for station S31-13, and Map R614-301-722.100a was changed to show the correct TDS values for VC-10 and VC-11.

**Deficiency 2**

The discharge from abandoned mine workings at the Belina mine are combined with waters discharging from Filtration Pond 005A before entering Whiskey Creek. Approval to discharge waters directly from these abandoned mine workings was granted in a letter dated October 14, 1986, a copy of which is inserted along with the UPDES discharge permit within Appendix 750. According to the letter, the Utah Water Pollution Control Committee "...determined that the proposed alteration basically conforms with the State Wastewater Disposal Regulations." Approval was thereby granted to complete the then proposed discharge modification. As defined in the letter, "Water from the first East sump is conveyed to the outlet of Filter Pond 005 where it is combined with treated water from Filter Pond 005 and discharged into Whiskey Creek."

According to phone conversations held February 7, 1993 with Mr. Mike Herkimer of the State Department of Environmental Quality (DEQ), Valley Camp was able to confirm the fact that the discharge from in-mine waters originating from the 1<sup>st</sup> East Sump mine area are of such quality that they do not require a UPDES point source discharge permit. Although no discharge has occurred over the past few years, Valley Camp agreed with DEQ during the aforementioned phone conversation to monitor any flow from this area at the time of future discharge startup

to confirm that the water quality still meets discharge regulations for compatible Filter Pond 005A. Appropriate modifications have been made to the text within Section 724.100 to clarify this issue.

As stated within Section 731.221 of the MRP, no biomonitoring requirements are set forth within the current UPDES permit dated August 19, 1992. Statements within the UPDES permit related to this issue state that "Since Valley Camp of Utah has been conducting Whole Effluent Toxicity (WET) testing since 1988 with no indication of toxicity ... Valley Camp of Utah will not be required to conduct Whole Effluent Toxicity (WET) at this time."

### Deficiency 3

An appropriate number of copies of the current UPDES permit have been forwarded to the regulatory agencies as required.

### R645-301-724.400. Climatological Information.

Section R614-301-724.411 has been revised to include monthly, annual and period of record average precipitation values for the state, the USGS station at Nephi, the Forest Service station at Utah Fuel Company, and the private station at Cyprus Plateau Mining Company, from 1981 through 1991.

The "Seeps and Springs" discussion found within Section R614-301-72.100 states that there has been a spring flow decrease of approximately 33 percent from 1979 to 1990. Data shown in Table R614-301-724.411 shows precipitation decreases of 38, 46, 36, and 33 percent for the state as a whole, the station at Nephi, the station at Utah Fuel, and the Cyprus Plateau station respectively for the period of record. All of these stations show a decrease in precipitation of roughly the same magnitude as the decrease in spring flows which have been measured within the Valley Camp permit area. The appropriate text has been modified within Sections R614-301-722.100, R614-301-724.411, and R614-301-728.100 to reflect this information.

### R645-301-728. Probable Hydrologic Consequences (PHC).

- 1) Information and references have been added to Section 728 of the permit text to address deficiencies defined in other sections which relate to the PHC. A summary of changes made to the text are discussed below according to the deficiency subject.

#### Toxic and Acid Forming and Coal Analysis

The following statement was added to the end of the 5th paragraph in the Operational Effects Section of the PHC.

Analysis results for a composite sample of coal taken during the month of October, 1992, support the conclusion that no acid or toxic forming material are

present in coal being mined at the Belina mines. The results of the analyses are shown in Appendix 623.100b.

### Subsidence

The statements in the 1st paragraph of section 632 entitled "Subsidence Monitoring" and in Section 728 within the discussions related to "Subsidence Effects" and "Impact on Water Rights" have been changed to state that no subsidence effects are noted where the overburden thickness is greater than about 700 feet.

### Precipitation

The following statement has been added to the 6th paragraph of the "Hydrologic Impact of Mining Activities" portion of permit Section 728.

Precipitation records which help document local and regional drought conditions were presented earlier in Table R614-301-724.400a.

- 2) The following text has been added to the 2nd paragraph in the "Subsidence Effects" section of the PHC:

During the 1992 seep and spring survey, a field technician noted that flow from spring S25-11 was beginning to pond in the bottom of the sinkhole below the spring. It was the opinion of the field technician that the sinkhole was beginning to seal. It is expected that the sinkhole will continue to seal as the bentonitic clays in the underlying shale layers swell and seal the flow path through the sinkhole.

- 3) A seep and spring survey of the VALCAM Loadout Facility area will be completed at the same time the annual seep and spring survey is updated for the Belina Mine Area.
- 4) The only reason TDS data for VC-5 was evaluated without samples taken on June 27, 1986 and April 22, 1988 was to show general seasonal TDS variations. Eliminating these two high TDS values in order to point out the general seasonal trend is justified because the high TDS values on these dates are believed to be the result of a sporadic event rather than a general trend. If TDS results for these dates were included in the determination of seasonal TDS variations, the data base would have been skewed, leading to erroneous conclusions. Considering the data base without the samples taken on June 27, 1986, and on April 22, 1988, was not intended to minimize the significance of these two TDS measurements.

The high TDS values are likely due to road salting operations, although more frequent data would be required to determine the cause for certain. Salt is applied to roads as needed during the winter season to reduce and eliminate snow and ice accumulations.

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When and how much salt to apply is a function of weather conditions, so application of salt tends to be sporadic throughout the winter season. It is expected that local streams will also sporadically experience higher TDS levels in the winter and spring due to road salting operations.

**RESPONSE TO SOILS RECLAMATION CONCERNS  
PRISCILLA BURTON letter of July 21, 1992**

**R645-301-223. Soils Resource Information.**

The following statement has been inserted to assist the person(s) reviewing the MRP, to clarify inconsistencies within the Section, and to respond to Deficiencies 1 through 4. "In 1980 Endangered Plant Studies, Inc., did the Vegetation and Soils study for Vaughn Hansen Associates, Inc., Waterbury Plaza-Suite A, 5620 South 1475 East, SLC, Utah dba Hansen, Allen & Luce, Inc., SLC, Utah, authored by Mr. Stanley Welsh, Leah Juarros, Joseph R. Murdock, and Elizabeth Neese. The purpose of the studies were to gather data for the "Report of Vegetation, Threatened and Endangered Plant Species, Soils, and Reclamation Plans for Valley Camp of Utah Inc., and Lease Area, Carbon--Emery counties, Utah."

These investigations were designed to provide Surface Mining regulations (783.19, 783.21, 784.13, 784.21), U.S. Forest Service requirements, and requirements of the Utah Division of Oil, Gas, and Mining. Included in R614-301-300 Biology section is a description of the plant communities, a list of plant species by vegetative type, estimates based on random sampling of cover and productivity for areas that could be disturbed and for comparable areas which will not be disturbed, and maps showing vegetative and soil types and sample locations. Soils are described and reclamation potential is also discussed."

The statement "Valley Camp of Utah, Inc. lease area.....were collected as follows:", has been changed to "Valley Camp of Utah, Inc. lease area soils are developed in vegetation types and topographic features similar in all major respects to the adjacent Skyline lease area soils. Corresponding soils data presented here for the Valley Camp lease area are based in part on previous extensive studies of the adjacent Skyline lease area. Data for thos studies were collected as follows:"

**NOTE:**

It is apparent some confusion was caused when the Proposed Conveyor Corridor has withdrawn from the permit, the terminology "Proposed Conveyor Corridor" was removed from the text along with the nomenclature and proposed conveyor route from the Soils and Vegetation maps. The site locations in Whisky Canyon were however, retained on the said maps, and results of that study are found in this section and the Biology section.

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**R645-301-233. Topsoil Substitutes and Supplements.**

Sections 231, 232, 233, 234, 242, and 243 of the PAP have been modified to respond to the concerns of this section. Some of these sections have been revised to clarify Valley Camp commitments regarding the harvesting, testing, and handling of the soil used for reclamation revegetation.

**R645-301-240. Reclamation Plan.**

**Deficiency 1**

Map 820.110 was not completed and is not available for submission. The performance bond covers the entire permit area as defined by numerous maps within the PAP. No bond releases have been achieved to date since the mine is not in reclamation.

**Deficiency 2**

The MK report is in error related to the acres of roadway which will not be topsoiled. All reclamation will be accomplished with in-place material at the toe of slopes as stated in the PAP.

**Deficiency 3**

The VSM used as cover material over the regraded areas will be quantified along with appropriate cost estimates in the reclamation plan.

**Deficiency 4**

Section 242.100 has been modified to state that slope angles constructed during reclamation will not exceed those of the surrounding hillsides, that reclamation contours will match those found naturally at the point of contact, and where possible, reclaimed contours will be constructed at slope angles less than those found naturally.

**Deficiency 5**

Due to the steep slope angles involved with the Belina mine site, subsoil ripping prior to application of VSM may result in slope failure and therefore cannot be specified prior to reclamation, but will be determined at that time. A similar statement has been added to Section 242.100.

**Deficiency 6**

See the added text to Section 231.100.

**R645-301-242. Soil Redistribution.**

**Deficiency 1**

What is described in the "Test Plot Program - 1987" was agreed upon by OSM, UDOGM and Valley Camp. See permit Section 341.300.

**Deficiency 2**

See Map 231.300 entitled "Topsoil Substitutes & Supplements - (Vegetation Supporting Materials)".

**Deficiency 3**

This information will be provided in the new MRP under reclamation.

**Deficiency 4**

Section 231.200 has been modified to contain the specific statement requested.

**Deficiency 5**

As discussed with Prescilla Burton, VSM will be derived from existing fills. No differentiation is possible as described in Section 231.100.

**Deficiency 6**

The planned excavation depth is 3" below the root zone as discussed within Section 231.200.

**Deficiency 7**

A volume or depth of topsoil is not applicable with these pre-law conditions. Valley Camp has committed to test these materials prior to revegetation.

**Deficiency 8**

Text has been modified as appropriate in Section 231.100.

**R645-301-244. Soil Stabilization.**

**Deficiency 1**

Rills and gully's will be repaired as required and as stated within modified Section 244.300.

## Deficiency 2

This is covered within Section 300.

### R645-301-321. Alluvial Valley Floor Determination.

Corrections have been made to the permit within Section 724.700 which help document the fact that neither the Belina Mine area nor the VALCAM Loadout facility are located within Alluvial Valley Floor zones. Specific comments made by OSM in their 1984 "Recommendation for Approval" include "The alluvial valley floor that was identified in the vicinity of the Belina mines (i.e., in Pleasant Valley below the Utah No. 2 loadout) is not within the proposed permit area and no farming will be interrupted, discontinued, or precluded. In addition no material damage to the water supplied to the alluvial valley floor will occur as a result of mining."

Further comments made as part of the Original "Technical Analysis" conclude that "...the narrow valleys of Whisky Canyon, Eccles Canyon, and Pleasant Valley above the Utah No. 2 mine facilities are not AVF's."

In order to help facilitate a more complete understanding of the ground water conditions in the VALCAM area additional research was conducted based on existing reports from governmental agencies as well as from the "Skyline" permit on file with the Division. Responses to each request made by the Division are provided below.

- 1) The additional groundwater information requested is provided and discussed in the response for sections R645-301-722.100 and R645-301-722.400.
- 2) An irrigation water diversion was constructed near the north end of the VALCAM Loadout Facility within the last few years. The structure diverts water from Mud Creek into a corrugated metal pipe for use as irrigation on pasture land just north of the VALCAM Loadout Facility. This diversion is described in Section R614-301-731.710 of the permit. There is another irrigation water diversion point on Mud Creek about 3,000 feet north of the VALCAM Loadout Facility. Aerial photographs taken in 1973 and 1977 show water from Mud Creek being diverted at the lower diversion point. Although there is no evidence that the entire area has been irrigated, it is possible that some sections of Pleasant Valley below the outlet of the upper diversion has been historically flood irrigated. Most of lower Pleasant Valley (below the VALCAM Loadout Facility) appears to have been historically used as pasture or improved pasture based on the 1973 and 1977 aerial photographs and the irrigation diversion locations (See Map 411.100). Upper Pleasant Valley and the surrounding mountains are undeveloped rangeland.
- 3) The OSM technical analysis for Valley Camp states:

"Eccles Creek within Eccles Canyon has been determined to not be an alluvial valley floor (AVF). This issue was addressed in the OSM technical analysis for the Skyline Mine. In addition, the Whisky Canyon and Pleasant Valley above the Utah No. 2 facilities were

observed by OSM (August 1983) to be too narrow for flood irrigation or subirrigation agricultural activities.

Valley Camp's response (Volume V Apparent Completeness Review) mentions that the upper part of Pleasant Valley has historically not been flood irrigated. The PAP indicates that the lower part of Pleasant Valley (i.e., below the proposed Belina permit area) has historically been flood irrigated and may also be subirrigated near the stream channel. OSM staff evaluated the AVF characteristics of Pleasant Valley during a field trip in early August 1983. The field investigation confirmed the statements in the PAP, that the upper part of Pleasant Valley (near the Utah No. 2 Mine) is narrow and is generally not suitable for flood irrigation development. The lower part of the valley was observed to be flood irrigated. In addition, it appeared that grasses on the valley bottom may be subirrigated.

On the basis of the information presented in Volume V of the PAP and information gained during the field investigation, it is concluded that the surface topography, soils, water quality, and water quantity of lower Pleasant Valley (i.e., below the Utah No. 2 mine) are all suitable for flood irrigation agricultural activities. It is also likely that portions of Pleasant Valley are subirrigated for agriculturally useful species of plants. It is concluded that the lower Pleasant Valley is an AVF with the essential hydrologic functions of flood irrigation and possibly subirrigation. Conversely, it is concluded that the narrow valleys of Whisky Canyon, Eccles Canyon, and Pleasant Valley above the Utah No. 2 mine facilities are not AVFs."

It is also determined through a review of existing reports including a Soil Conservation Service report for the region that no soil moisture data or vegetation mottling characteristics are available.

- 4) Areas shown as being disturbed on Map R614-301-521.150 were compared with aerial photographs dated October 20, 1973, aerial photographs with an oblique view taken between 1973 and 1977, and aerial photographs dated October 25, 1977 in order to determine Pre-SMCRA disturbance areas for the permit area. Although no dates appeared on the oblique photographs, it is known that they were taken between 1973 and 1977 through the identification of structures which show on the oblique photographs and on the 1977 photographs, but do not show on those taken in 1973. Based on the comparison of photographs and mapping, no Pre-SMCRA disturbance areas were identified outside the current disturbance areas with the exception of drill hole access roads located west of the Loadout area.

No ground water surface contours prior to mining activities are available for the VALCAM Loadout area.

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**RESPONSE TO RECLAMATION & BIOLOGY CONCERNS**  
**PAUL BAKER letter of August 3, 1992**

**R645-301-321. Vegetation Information.**

Response not required.

**R645-301-322. Wildlife Information.**

See the wildlife protection plan located within Section 330.

**R645-301-330. Operation Plan.**

**Deficiency 1**

This comment was previously responded to in Valley Camps response to Sharon Falvey's Section 120 deficiency. Appropriate text has also been added to permit Section 332.

**Deficiency 2**

Text has been corrected as appropriate within Section 332.

**Deficiency 3**

The subsidence control and mitigation plans are found within Appendix 724.600 and MRP Section 525 respectively.

**Deficiency 4**

Whisky Creek is an ephemeral stream and has been dry for a number of months therefore ongoing biological monitoring is not applicable.

**Deficiency 5**

For a response to this comment the Division is referred to the Wildlife Protection Plan within Section 330.

**R645-301-341.100. Revegetation Timing.**

The statement found within Section 242.100 has been clarified to indicate that planting will occur in the fall.

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**R645-301-341.210. Species and Quantities of Seeds and Seedlings.**

**Deficiency 1**

Valley Camp's committal for the planting of shrubs is found within Section 341.250.

**Deficiency 2**

Riparian area planting is discussed within Section 341.250.

**Deficiency 3**

Adapted exotypes and varieties is discussed within Section 341.250.

**R645-301-341.220. Planting and Seeding Techniques.**

**Deficiency 1**

Appropriate corrections to the text has been made to Section 341.250.

**Deficiency 2**

Best technology currently available will be used for seed bed preparation at the time of reclamation. Modifications to the text have been made within the discussion related to planting procedures found in Section 340.

**R645-301-341.230. Mulching Techniques.**

**Deficiency 1**

The statement in Section 341.250 has been modified to state that the hydroseeding and mulching techniques will be used where appropriate.

**Deficiency 2**

The appropriate text has been modified as requested within Section 341.250.

**R645-301-341.240. Irrigation and Pest Control.**

Response not required.

**R645-301-341.250. Revegetation Success Determination.**

Response not required.

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**R645-301-341.300. Revegetation Feasibility Demonstration.**

Response not required.

**R645-301-342. Fish and Wildlife.**

A response to this deficiency has been made within Section 341.250.

**R645-301-411. Land Use Environmental Description.**

**Deficiency 1**

Premining wildlife habitat within both the Belina and VALCAM areas consisted of natural local species as well as species introduced by the Division of Wildlife Resources which were not native to the Permit area. Sheep and cattle grazing have been conducted for many years in the adjacent areas to both the mine and the loadout facilities as evidenced by the many local livestock watering rights.

Town sites are known to have existed in the area adjacent to the VALCAM loadout, however, no specific information is available as to locations nor extent of the historic facilities. The Utah No. 1 mine location is shown on the Pleasant Valley Mining District Map (Map 521.111).

**Deficiency 2**

To the knowledge of Valley Camp, no zoning changes have been made to date by the County Commission.

**R645-301-412. Reclamation Plan.**

**Deficiency 1**

The office facilities west of the VALCAM loadout will be retained by Kanawha & Hocking Coal and Coke Company and used as a field office, and not for recreational and/or educational purposes as originally stated in the MRP.

**Deficiency 2**

All requirements of R645-302-270 will be met should a variance be required for any proposed reclamation which deviates significantly from the original contour. Under such conditions, the permit will be specifically marked as containing a variance as required by R645-302-272.200.

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**Deficiency 3**

See MRP section 412 through 412.140.

**R645-301-420. Air Quality.**

No response required.

**RESPONSE TO RECLAMATION CONCERNS  
SHARON FALVEY letter of August 4, 1992**

**R645-301-112.500. Boundaries.**

The map R645-301-112.500 depicts the Forest Boundary correctly, however ownership of Section 26, T13S, R6E was incorrect due to an error in the card file at the county courthouse. Those properties within Sections 6 & 7, T14S, R7E are in fact inside the Forest Boundary and owned by Rescu-Med Inc. and L & L Agri-Business. Ownership of Section 26, T13S, R6E has been corrected on map R645-301-112.500.

**R645-301-120. Permit Application Format and Contents.**

**Deficiency 1**

The statement regarding food and fiber within Section 300 has been taken from the presubsidence survey report prepared by EPS, Inc. in 1980. This report was approved in the 1984 TA by OSM.

**Deficiency 2**

As requested by the Division, logical dividers have been placed in the hydrologic calculations appendix of the permit (Appendix R614-301-742,310). These divider pages separate calculations into "Disturbed Area Ditches", "Unidisturbed Area Ditches", "Culverts", and "ASCA's". Page numbers have not been added to the appendix due to the confusion that it would potentially create given the changing nature of runoff calculations during the permit term.

As further clarification, logical dividers are also provided for Appendix R614-301-760. Separated sections include "VALCAM Loadout Area Channels", "Belina Mine Area Channels", "Haul Road Area Channels", and "Eccles Canyon Channel".

**Deficiency 3**

The first sentence under the heading "Water Quality" found within Section R614-301-721 has been changed to read "In general, the chemical quality of water in the headwaters of the Price and San Rafael river basins is excellent", eliminating the reference to downstream users.

Uses of water in the vicinity of the permit area and downstream are discussed in Section R614-301-724.100 of the permit and in Appendix R614-301-722.100c. The statement found within Section R614-301-624.100 that the primary use of hydrologic resources around the permit area is for watering stock and wildlife is correct.

**R645-301-713. Inspections.**

The statement "All sediment ponds will be inspected annually by a certified professional engineer and a certified report of such inspection will be provided to the Division and a copy will be retained at the mine office." has been inserted into Section R614-301-713 of the permit.

**R645-301-742. General.**

- 1) As described in the PHC section of the permit, mine dewatering in the permit area has the potential for transferring ground water from the Huntington Creek drainage into the Mud Creek drainage. Any significant quantity of water transferred from the Huntington Creek drainage will be discharged through the Belina mine portal into Whisky Creek in the Mud Creek drainage. The water discharged through the Belina portal is developed within the mines from various locations and includes water which would have naturally flowed through time into both Huntington and Mud Creeks. Water diverted in this manner from Huntington Creek is not recovered downstream within the same drainage basin from which it was taken, but it is rather discharged into the Mud Creek drainage. The percentage of water discharged at the Belina portal that may have originated in the Huntington Creek drainage is difficult to quantify due to the high variability of mine inflows. However, the percentage of mine inflow originating from the Huntington Creek drainage could be roughly estimated based on the percentages of coal production on either side of the groundwater divide. A comparison of the mine inflow rates with coal production rates at the Skyline Mine, adjacent to the permit area, has shown that the mine inflow is roughly proportional to the coal production.

Thus, the predicted trans-basin impact is an increased flow in the Mud Creek Drainage as mine dewatering occurs and a decrease of flow in the Huntington Creek drainage. Because of the lag time effect of routing in the aquifer, the effects in the Huntington Creek drainage will be spread out over a long period of time lessening the impact of any flow reduction in Huntington Creek.

At present there is no groundwater discharge from the Belina Mine so there are no trans-basin impacts. The applicant will continue to monitor the Belina Mine discharges.

- 2) The text of the permit within Section 525 has been updated to state that the operator will restore to the extent physically and economically feasible the original stream channels of intermittent and perennial streams within the permit area that may be disturbed by underground coal mining activities, including surface subsidence effects.

- 3) The letter from the BLM Moab District dated October 26, 1991, indicates that a 250 ft buffer zone is required on both sides of Boardinghouse Creek. This buffer zone is provided for Boardinghouse Creek as shown on Map R614-301-728.100a. Overburden thickness in the Belina No. 2 Mine at Boardinghouse Creek is approximately 250 feet thick. With 250 feet of overburden and a 35 degree angle of draw, a buffer zone about 175 feet wide on both sides of Boardinghouse Creek is needed for protection of the stream bed. The 250 foot wide zone that is presently designated in the permit provides an 75 feet of additional buffer to the stream bed than is required base on a 35 degree angle of draw.

Map R614-301-728.100a has been updated to clarify the potential fault influenced angle of draw over Boardinghouse Creek in the Belina No. 2 Mine area. This clarification has been made by indicating that the area beneath Boardinghouse Creek will be "Room and Pillar" mined only without pillar recovery.

- 4) The text of permit Appendix 724.600 has been updated to state that only room and pillar mining with no pillar recovery will be used in the buffer zones beneath perennial streams as defined on Map R614-301-728.100a. The pillars that will be left in the buffer zones beneath perennial streams will measure approximately 60 feet by 60 feet with a span between pillars of about 20 feet.
- 5) Only one of the three springs (S31-13) was chosen for inclusion in the water monitoring plan because of the proximity of all three springs. Including all three springs in the monitoring program would have resulted in unnecessary effort because it appears that all three springs are associated with the same groundwater source and have the general same recharge area. It is believed that the potential for any individual spring to be affected differently by subsidence is insignificant. As a result, a representative spring has been chosen from the group for inclusion in the monitoring program. This method of sampling station selection is consistent with the approach used to select other springs for the monitoring program.

**R645-301-724.320. Climatology.**

Response to this comment was made previously in Section R645-301-724.400 above.

**R645-301-750. Performance Standards.**

Retaining the 9 inch criterion is important because it provides an objective measurement for determining excessive erosion. The lack of an objective criterion opens the way for disagreements, inconsistencies, and abuses by the regulator and/or the operator. If an objective criterion is established then there is no argument or disagreement between the inspector and the operator. Inspection becomes an objective matter of measurement not a matter of opinion which may be argued and taken to conference wasting valuable resources of both the Division and the operator.

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There may be concern by the Division that establishing an objective criterion for erosion would not allow administration of the regulations, however it is not believed that adopting an objective criterion will render any of the regulations unenforceable. The benefits of maintaining an objective criterion within the permit appear to far outweigh any reasons for removing it from the permit. Valley Camp would welcome any alternative reasonable criteria which the Division feels might be more appropriate.

**R645-301-722.300. Monitoring Stations.**

The explanation for no longer sampling station W19-1 has been added to Table R614-301-722.300b.

**R645-301-731.521. Gravity Discharges.**

There are no gravity discharges from the Belina Mines. Water flowing from the 6 inch bypass line has been pumped from abandoned sections of the mine. However, to address concern expressed regarding the bypass discharge see the response to R645-301-724, Deficiency 2, above.

**R645-301-742.240. Exemptions.**

**Deficiency 1**

The discussion related to ASCA's has been moved from Section R614-301-742.240 to Section R614-301-751 as requested.

**Deficiency 2**

The statement related to the collection of water quality samples for Alternate Sediment Control Areas has been modified slightly to reiterate the applicants position. If the Division feels differently, the applicant welcomes the Division to demonstrate how "accurate", "on site" seasonal sampling can be accomplished within the Mine Permit Area sufficient to meet the monitoring request. In response to deficiency 1, this modification is now found at the end of Section R614-301-751.

**Deficiency 3**

Table R614-301-742.240d (now Table R614-301-750d) has been corrected to clarify the locations of the sediment control devices identified. Major sediment control structures are shown on the map as appropriate, however, some of the other facilities such as straw bales and straw pits are not shown on the map. These devices are not shown on mapping because of the continued modifications to permit mapping that would be required whenever ditch maintenance improved performance by moving a device. Table R614-301-750d provides a verbal representation of the location of all facilities which will clarify many of the concerns raised in the midterm response. See Section R614-301-750 thru 301-755 for further discussion.

#### Deficiency 4

The design of Ditch 44B was completed during the period of time when SAE's were allowed under the regulations. Since the regulations have changed, SAE 7 has been incorporated into ASCA 6. Calculation details for Ditch 44B have been corrected to show that the tributary drainage includes a portion of ASCA 6 instead of SAE 7.

#### R645-301-724.240. Diversions.

Comment was made in the analysis portion of this deficiency regarding culvert C-20B-24 which could not be found within the permit or its appendices. Culvert C-20B-24 was installed by, and is maintained by the railroad and therefore is not the responsibility of Valley Camp of Utah. The location of Culvert C-20B-24 is shown on Map 731.720a.

#### Deficiency 1

Minimum ditch design criteria have been provided as requested in Appendix 742.310 for convenience ditches and those defined as using a general design. As was indicated by the general design, all convenience ditches and general design ditches require less than a 1.0 foot channel depth with freeboard. The text found within Section R614-301-742.310 has also been changed to indicate that depth and velocity calculations are provided as required.

#### Deficiency 2

*Full Reference*  
Many of the calculations which show or indicate that the channel or culvert outlet should be monitored and repaired as necessary do not require riprap according to one of two methods for which they were evaluated. The first method used involved the use of the "Urban Storm Drainage Criteria Manual" developed by the Denver Regional Council of Governments. Using their methodology, it was found that lining is not required for velocities in erosion resistant soils less than 7.7 feet per second. Many of the culverts for which previous calculations showed that a lining should technically be provided, but yet did not experience significant erosion without a lining, were found to have velocities less than the 7.7 fps limit. These calculations were changed to show that lining is not required based on the referenced manual.

The second method used was the EPA method for the design of discharge pads from culverts (shown as Figure I-15 in the calculations). In many instances the flow rates determined for a culvert were too small to show on the figure thereby indicating that lining protection is not applicable to the installation.

The application of these two design criteria has clarified and simplified the calculations shown in the appendices. For example, some culverts which showed a previous need for outlet protection when no erosion has historically been noted now show that lining is not required. These textbook evaluations now show more consistency between field conditions and previous design evaluations.

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When neither of the two limiting conditions apply, riprap was sized for the culvert installation. Information and calculations related to the 10 year, 6 hour runoff event for culverts C-19-48 and C-20-48 are found within Appendix R614-301-742.310. Information related to these culverts for the 100 year, 6 hour runoff event which applies to reclamation is included within Appendix R614-301-760.

**R645-301-760 to R645-301-764. Reclamation.**

**Deficiency 1**

As requested, Section 760 of the permit has been modified to reflect the fact that culverts will be removed unless approval for their retention is given by the regulatory agency. The culverts recommended for retention are commensurate with post mining land use as required under Section 410 in that 1) the VALCAM culverts are required for continued use of the railway by the railroad company, 2) the culverts used by the office facilities will continue to be needed to control surface runoff and 3) the Eccles canyon culvert is currently used by UDOT for a highway turnaround point.

Comment was made by UDOGM related to culvert C-25-36 located at the "bowl" in that it "must be removed or properly backstowed". Culvert C-25-36 is to be removed and replaced with Reclaimed Channel R-4 upon reclamation as shown on Map 760b and as discussed in the text.

**Deficiency 2**

ok

All culverts to remain through reclamation are shown on the appropriate maps by using a bolded, not a screened culvert number. For example, Culvert C-18-21 identified on Map R614-301-760a is screened thereby indicating removal upon reclamation. Culvert C-15-24 on the other hand is bolded indicating that the culvert will remain through reclamation. A slight change to the text has been made within the first paragraph of Section 760 in response to this comment.

**Deficiency 3**

It is currently proposed by Kanawha and Hawking Coal and Coke Company to continue to utilize the office and associated facilities west of the VALCAM Loadout as their intermountain office. Upon reclamation therefore the post mining land use will be formally declared as continued office facilities. Given this declaration, culverts C-19-48 and C-20-48 have been designed to pass the 10 year, 6 hour runoff event as required. This correction resolves any inconsistency in the calculations which might have been noted.

Thank you for the opportunity of working with you on this important project. Should you have any questions, please call.

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## NEW SECTIONS

### R614-301-112.100.

The list of officers and directors for the companies shown below have been revised using redline/strikeout.

Quaker State Corporation

Valley Camp Coal Company

Valley Camp of Utah, Inc.

Kanawha & Hocking Coal & Coke Company

### R614-301-113.300. through 301-113.350.

To update R614-301-113 Violation Information., page 18?? of this section, these additional violations were added.

35. NOV No. N89-28-9-1 1 of 2 and 2 of 2
36. NOV No. N89-28-6-1 1 of 1
37. NOV No. N89-12-1-1 1 of 1
38. NOV No. N90-13-2-1 1 of 1
39. NOV No. N90-28-4-1 1 of 1
40. NOV No. N91-15-1-1 1 of 1
41. NOV No. N91-38-1-1 1 of 2 and 2 of 2
42. NOV No. N91-39-6-1 1 of 1
43. NOV No. N92-39-4-1 1 of 1

This update necessitates adding an additional pages, please note that fact while reviewing this section.

### R614-301-220. Environmental Description.

The statement "The Valley Camp of Utah, Inc., Mine Permit Area consists of about six and one-half square miles of land situated in the Wasatch Plateau of Utah astride the Carbon-Emery county line. The property straddles the divide between the headwaters of Huntington Creek on the west and Pleasant Valley on the east. Elevations vary from a low of about 8000 feet in the Pleasant Valley drainage to a high of near 9800 feet on the divide crests. Canyon slopes are steep with rounded summits, and are vegetated." has been added.

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R614-301-231.100.

This part of the section was inadvertently entered out of order in the last submittal and has been reinserted in its correct order, it should have occurred on the previous page of the Section. Please note during your review.

Portions of the statement concerning the proposed on site field trial have been stricken and inserts have been made relative to said subject. Also inserted is a statement of Post Mining Land use for the office area.

R614-301-231.200.

The statements in this part "There are no plans at.....have been identified as:" has been revised and now states "There are no plans to obtain topsoil or substitute topsoil from an off-site source. The existing disturbed slopes vacant of topsoil or substitute topsoil, which have been previously revegetated, do reflect the growing properties of the exposed subsoil strata and conversely indicates no incompatible soil characteristics. Additionally, natural revegetation is occurring on all disturb area slope planes. It is Valley Camp's position, since this phenomena has taken place and continues to transpire, the disturbed area fill materials clearly meet standards set forth for a Vegetation-Supporting Material. During reclamation the excavated materials will theoretically return the soils to the cut areas in the reverse sequence of the original excavation sequence. Harvesting the materials under this concept would place them last or at least intermingle those soils (pre-law top or upper soils) with the previously downcast materials, improving the soil characteristics of the vegetation-supporting material."

NOTE:

Since the inception OSM/UDOGM, reclamation criteria for soil and vegetation suitability requirements continually deviated and at this time OSM has yet to determine an admissible reclamation suitability criteria. The uncertainty of OSM/UDOGM has compelled Valley Camp to submit four separate reports (EPS, Inc., Cedar Creek Associates, Morrison Knudsen Co., Mt. Nebo Scientific), to meet the regulatory requirements and has in the past apparently collectively these efforts undertaken previously, now fail to meet certain Divisional criteria.

In that light, Valley Camp will retain the EPS, Inc. and the Cedar Creek information in the text, but has removed the Morrison-Knudsen Company and Mt. Nebo Scientific Studies from the text and will only preserve the study in the appendices to demonstrate an ongoing endeavor to comply. At the Divisions request, when weather permits, in early 1993, Valley Camp has solicited the Carbon County SCS office and they have so agreed, to evaluate site specific conditions and make a determination if a soil survey would be needed at this point in time to determine suitability of the disturbed area soils. If the SCS deems a survey is necessary, Valley Camp will furnish the SCS office with a mylar positive of map R614-301-233, Sheets 1 through 4, Titled: SCS Disturbed Area Soil Survey, (scale 1"=100') to depict and describe their survey and results thereof. Upon SCS completing the project, results will be submitted for inclusion in the Reclamation Plan and appendices, with an additional copy in the "Annual Summary."

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**R645-301-529.200. Temporary Sealing of Mine Openings.**

The statement "Any mine opening which is temporarily inactive will be properly guarded so as to prevent access into the opening and posted to identify the hazardous nature of the opening. The devices will be periodically inspected and maintained in good operating condition by Valley Camp." has been changed to "Any mine opening which is temporarily inactive will be properly guarded as per MSHA Statutory Provisions of the 30 CFR Chapter 1, Subpart R-Miscellaneous, 75.1701 Abandoned areas, adjacent mines; drilling of boreholes Sealing of mines."

**R614-301-531. General.**

The statement "see Hydrology R614-301-700." has been changed to "See Hydrology R614-301-733.130 and 742.221."

**R614-301-536.100. Disposal Facilities.**

The statement "Should a disposal facility be needed..., stability of existing foundations and or abutments, no weak zones, or groundwater effects upon the facility. "has been changed to "Should a disposal facility be needed..., stability of existing foundations and or abutments, weak zones, or groundwater."

**R645-301-537.200. Regrading of Settled and Revegetated fills to Achieve Approximate Original Contour.**

Inadvertently, Map R614-301-820.110 was never completed, but is included in this review as Map 521.150 Sheets 1 and 4. The sole purpose of these maps is to exhibit categorically, areas which are revegetating naturally.

Sincerely,

VALLEY CAMP OF UTAH, INC.

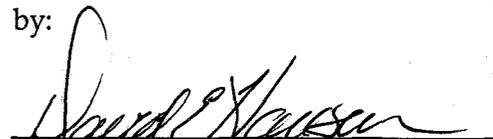
by:



Steven K. Tanner  
Environmental Coordinator

HANSEN, ALLEN & LUCE, INC.

by:



David E. Hansen, Ph.D., P.E.  
Principal

# **Mid-Term Permit Review**

**Section R645-301-100  
Coal Mine Permitting**

**Valley Camp of Utah, Inc.**

**February 1993**

VALLEY CAMP OF UTAH, INC.  
SCOFIELD ROUTE  
HELPER, UTAH 84526

**INTRODUCTION**

This Five-Year Mine Permit Renewal Application is submitted by Valley Camp of Utah, Inc., "Valley Camp" is a wholly owned and controlled by The Valley Camp Coal Company, a private corporation. The capital stock of The Valley Camp Coal Company is wholly owned and controlled by Quaker State Corporation.

This submittal is a complete reorganization of the existing Underground Mining and Reclamation Permit, Belina Complex. ACT/007/001, Carbon County and is prepared as a Site Specific Underground Mining and Reclamation Permit.

The FORMAT for this submittal follows the State of Utah R645 Rules Organization of the Coal Mining Reclamation Act of 1979.

The TEXT, APPENDICIES AND ASSOCIATED MAPPING are subdivided into eight (8) sections as follows:

HEADING	SECTION
COAL MINE PERMITTING	R645-301-100
SOILS	R645-301-200
BIOLOGY	R645-301-300
LAND USE AND AIR QUALITY	R645-301-400
ENGINEERING	R645-301-500
GEOLOGY	R645-301-600
HYDROLOGY	R645-301-700
BONDING	R645-301-800

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**COAL MINE PERMITTING. R645-301-100.**

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R645-301-100. COAL MINE PERMITTING: PERMIT APPLICATION REQUIREMENTS.

112. IDENTIFICATION OF INTERESTS.

Valley Camp of Utah, Inc., is the Mine Permit Renewal applicant and operator on the subject properties. The principal place of business for Valley Camp of Utah, Inc., is Scofield, Utah. The address is Scofield Route, Helper, Utah, 84526. The telephone number is (801) 448-9420.

112.100. STATUS OF APPLICANT

Valley Camp of Utah, Inc., is a Utah corporation. The capital stock of Valley Camp of Utah, Inc., is wholly owned and controlled by The Valley Camp Coal Company. The Valley Camp Coal Company's principal corporate offices are located at 206 Seneca Street, P. O. Box 900, Oil City, PA. 16301. The Valley Camp Coal Company is a corporation organized and existing under the laws of the State of Delaware. The capital stock of The Valley Camp Coal Company is wholly owned and controlled by Quaker State Corporation, P. O. Box 989, Oil City, PA. 16301. Lists of Valley Camp of Utah, Inc., and its parent company's officers and directors are shown below:

TABLE 112.100a  
OFFICERS AND DIRECTORS, QUAKER STATE CORP

QUAKER STATE CORPORATION	
Jack W. Corn Quentin E. Wood	Chairman
Conrad A. Conrad Jack W. Corn	President & CEO
James D Berry III Walter B. Cook	Executive Vice President
Gerald W. Callahan Conrad A. Conrad	V.P., Counsel & Corp. Secretary Vice Pres. & CEO
Embert H. DeLong Lee R. Forker	Vice President Director
William C. Hetsley Thomas A. Gardner	Vice President Director
R. Scott Keefer H. Bryce Jordan	V.P., Finance & Treasurer & Chief Financial Officer Director
John R. Sedlacko W. Craig McClland	V. P., Controller Director

QUAKER STATE CORPORATION	
W. Roger McCauley Kenton E. McElhattan	Assistant Treasurer, Banking & Financial Planning Director
Joyce A. McFadden William J. McFate	Assist. Corp. Sec. Director
Delbert J. McQuaide	Director

TABLE 112.100b  
OFFICERS AND DIRECTORS, THE VALLEY CAMP COAL CO

THE VALLEY CAMP COAL CO.	
James D. Berry III	Chairman & CEO
James L. Litman	Vice President-Mining
David E. Lung	Vice President-Finance & Administration, Secretary & Treasurer Vice President Finance
A. Perry Mason	Vice President-Marketing and Services Vice President Marketing
Rex A. Shoup	Assistant Treasurer
Richard Winkler	Assistant Treasurer
Jack W. Corn	Director
Conrad A. Conrad	Director
K. E. McElhattan Quentin E. Wood	Director Director
Lee R. Forker	Director
William J. McFate	Director
Rich Winkler	Director

**TABLE 112.100c  
OFFICERS AND DIRECTORS, VALLEY CAMP OF UTAH**

<b>VALLEY CAMP OF UTAH, INC.</b>	
James L. Litman	Vice Chairman & CEO
????????	President & CEO
David E. Lung	Secretary & Treasurer
Richard K. Sager	Assistant Secretary
John S. Kirkham	Assistant Secretary
James D. Berry, III	Director

Kanawha and Hocking Coal and Coke Company is a subsidiary of The Valley Camp Coal Company, and provides rights necessary for conducting mining operations by Valley Camp of Utah, Inc., through various property agreements. A listing of the officers and directors of Kanawha and Hocking Coal and Coke Company is shown below:

**TABLE 112.100d  
OFFICERS & DIRECTORS, K & H COAL CO**

<b>KANAWHA &amp; HOCKING COAL &amp; COKE COMPANY</b>	
James L. Litman	Executive Vice President
David E. Lung	Secretary & Treasurer
John S. Kirkham	Assistant Secretary
A. Perry Mason	Director

**112.200. RESIDENT AGENT**

The resident agent of Applicant for the purpose of service of notices and orders related to operations under this Permit Renewal is:

????????  
 President & Chief Operating Officer  
 Valley Camp of Utah, Inc.  
 Scofield Route  
 Helper, Utah 84526  
 (801) 448-9456

The resident agent of Applicant pursuant to the laws of the State of Utah for service of civil process is:

C. T. Corporation  
 175 South Main Street  
 Salt Lake City, Utah 84111  
 (801) 364-1228

**112.300. OWNERSHIP**

N/A

**112.400. OTHER OPERATIONS**

Valley Camp of Utah, Inc., has not operated any surface coal mining operation in the United States within the five years preceding the date of this ~~MIRP~~ permit renewal. Valley Camp Coal Co., has operated underground coal mining operations during the stated time period under the same corporate name. A listing of those mines, associated permit numbers and regulatory agencies responsible for the permits is shown below:

**TABLE 112.400a  
 OTHER MINES AND PERMITS**

PERMIT NO.	FACILITY	PERMIT NO.	FACILITY
<b>REGULATORY AUTHORITY: WEST VIRGINIA DEPT. OF NATURAL RESOURCES</b>			
179-70	V.C. No. 10 Mine	4-73	V.C. No. 14 Mine
438-70	V.C. No. 10 Mine	10-73	Prospecting Permit
576-70	V.C. No. 14 Mine	48-73	V.C. No. 10 Mine
586-70	V.C. No. 10 Mine	104-73	V.C. No. 6 Mine
27-71	Prospecting Permit	4-74	Prospecting Permit
333-71	V.C. No. 6 Mine	73-74	Prospecting Permit
26-72	V.C. No. 10 Mine	16-75	V.C. No. 6 Mine
59-72	Prospecting Permit	197-75	Prospecting Permit
118-72	V.C. No. 10 Mine	205-75	V.C. No. 6 Mine
154-72	Witcher Cr. Mine	260-76	V.C. No. 6 Mine
236-72	V.C. No. 14 Mine		

PERMIT NO.	FACILITY	PERMIT NO.	FACILITY
<b>REGULATORY AUTHORITY: WEST VIRGINIA DEPARTMENT OF MINES</b>			
D-145	V.C. No. 9 Tunnel	D-6801	V.C. No. 15 Mine
D-318	Alexander Mine	D-8083	V.C. No. 35 Mine
D-319	V.C. No. 3 Mine	D-8084	V.C. No. 36 Mine
D-4122	V.C. No. 1 Mine	D-8213	V.C. No. 37 Mine
D-5295	V.C. No. 21A Mine	D-8661	V.C. No. 39 Mine
D-5763	V.C. No. 5A Mine	D-8740	V.C. No. 40 Mine
D-5925	V.C. No. 30 Mine	D-8839	V.C. No. 41 Mine
D-6172	V.C. No. 31 Mine	D-8840	V.C. No. 42 Mine
D-6337	V.C. No. 32 Mine	D-10668	V.C. No. 43 Mine
D-6632-S	V.C. No. 32A Mine	4779	#6 Strip Mine
D-66739	V.C. No. 34 Mine	15477	#17 Strip Mine
D-6747-S	V.C. No. 32B Mine	14377	#46 Strip Mine
D-6799	V.C. No. 12A Mine	1880	#45 Strip Mine
D-6800	V.C. No. 15A Mine		
<b>REGULATORY AUTHORITY: MINE SAFETY AND HEALTH ADMINISTRATION</b>			
46-01348	V.C. No. 10 Mine	46-03178	V.C. No. 37 Mine
46-01349	V.C. No. 5A Mine	46-03305	V.C. No. 15 Mine
46-01351-0	V.C. No. 6 Mine	46-03307	V.C. No. 15A Mine
46-01352	V.C. No. 31 Mine	46-03308	V.C. No. 35 Mine
46-01353	V.C. No. 30 Mine	46-03309	V.C. No. 36 Mine
46-01354	V.C. No. 9 Tunnel	46-03867	V.C. No. 46 Mine
46-01440-0	Alexander Mine	46-03886	V.C. No. 39 Mine
46-01482-0	V.C. No. 3 Mine	46-04053	V.C. No. 40 Mine
46-01483-0	V.C. No. 1 Mine	46-04135	V.C. No. 41 Mine
46-01977	V.C. No. 12A Mine	46-04136	V.C. No. 42 Mine
46-02121	V.C. No. 34 Mine	46-05551	V.C. No. 17 Mine
46-02422	V.C. No. 14 Mine	46-05630	V.C. No. 18 Mine
46-02423	V.C. No. 10A Mine	46-05906	V.C. No. 43 Mine
46-02513	V.C. No. 14A Mine	46-06103	V.C. No. 45 Mine

PERMIT NO.	FACILITY	PERMIT NO.	FACILITY
<b>REGULATORY AUTHORITY: WEST VIRGINIA DEPT OF NATURAL RESOURCES</b>			
143-73	V.C. No. 46 Mine	H-318	V.C. No. 17 Road
154-77	V.C. No. 17 Mine	H-348	V.C. No. 17 Road
47-79	V.C. No. 6 Mine	H-473	V.C. No. 15 Road
18-80	V.C. No. 45 Mine	H-473	V.C. No. 43 Road
EM-19	V.C. No. 36 Mine	I-508	Bufflick Tipple
EM-20	V.C. No. 9 Tunnel	I-527	Witcher Bathhouse
EM-21	V.C. No. 12A Mine	I-540	Shrewsbury Office
EM-22	V.C. No. 40 Mine	I-543	KC&NW RR Tipple
EM-23	V.C. No. 15A Mine	P-553	V.C. No. 8 Prep.
EM-24	V.C. No. 15 Mine	R-507	No. 36 & No. 40 Dam
EM-30	V.C. No. 42 Mine	R-523	Donaldson Prep
H-57	Witcher Creek Road	UO-634	V.C. No. 43 Mine

The list of permits, licenses, and identification numbers applicable to the Mine Permit Area is as follows:

**U.S. Geological Survey**  
 2040 Administration Bldg.  
 1745 W. 1700 S.  
 Salt Lake City, UT 84138

~~Mining and Reclamation Plan~~ Permit Application Package. Approval letter dated February 10, 1977. Emphasis on mining operation and coal resources.

**Office of Surface Mining (Western Field Operations)**  
 Reclamation & Enforcement  
 Brooks Tower, Second Floor  
 1020 15th Street  
 Denver, CO 80202

~~Mining and Reclamation Plan~~ Permit Application Package. Included in permit application to the State of Utah. Emphasis on surface operation and reclamation.

**U.S. Environmental Protection Agency**  
 Region VIII  
 999 18th Street  
 Denver Place - Suite 500  
 Denver, CO 80202-2405

Prevention of Significant Deterioration Permit. Not required as per letter dated May 7, 1980, and May 23, 1975, from Utah Dept. of Health.

Oil Spill Prevention Control and Countermeasure Plan. Plan is on file at the Mine Office. Applies to facility drainage, bulk storage tanks, transferring, loading and unloading.

National Pollutant Discharge Elimination System Permits. Number UT-022985 approved ~~March 1, 1988~~ August 19, 1992. Processed by Utah State and approved by EPA.

**U.S. Forest Service**  
Price, Utah 84501

Surface Distribution and Reclamation Plan. Agreement dated September 25, 1979. Emphasis on subsidence and hydrology.

**U.S. Treasury Department**  
Washington, D.C.

Explosive Storage and Useage Permit. When explosives are used they are obtained and handled according to state and federal regulations. Pertains to use of explosives underground.

**U.S. Federal Communication Commission.**  
Washington, D.C.

License for Industrial Radio Service No. 8710393611, 11/17/87.  
License for Private Operational Fixed Microwave Radio Service No. 805830, 7/13/84.

**Mine Safety and Health Administration**  
U.S. Dept. of Labor  
P.O. Box 25367  
Denver Federal Center  
Denver, CO 80225

**TABLE 112.400b**  
**OPERATOR SAFETY PLANS AND ID NUMBERS**

Facility	I.D. Number
Belina No. 1 Mine	No. 42-01279 issued February 12, 1976.
Belina No. 2 Mine	No. 42-01280 issued February 12, 1976.
Valcam Loadout	No. 42-01280 issued November 13, 1986.

Roof Control Plan. Approved September 9, 1988, and reviewed every 6 months.  
Ventilation System-Methane and Dust Control Plan. Approved April 11, 1989, and reviewed every 6 months.

Fan Stoppage Plan. Approved July 28, 1980.  
Firefighting and Evacuation Plan. Exercise every 90 days.

**Utah Department of Health.**  
Division of Environmental Health  
288 North 1460 West PO Box 16690  
Salt Lake City, Utah 84116-0690

Air Quality. Approved by letter, August 17, 1981.

**Utah Division of Oil, Gas, and Mining.**  
355 W. North Temple  
3 Triad Center, Suite 350  
Salt Lake City, Utah 84180-1203

~~Mining and Reclamation Permit Application Package~~ ACT/007/001.

**State Engineer**  
Division of Water Rights  
200 Empire Bldg.  
231 E. 400 S.  
Salt Lake City, Utah 84111

Belina Water Well. Water rights exchange application No.1691.

Utah No. 1. Water Well. Water rights exchange application No.77-17.

**Alpine School District**  
50 North Center  
American Fork, Utah  
84003.

Lease of Culinary Water - March 25, 1976.

**Carbon County**  
Carbon County Courthouse  
Price, Utah 84501

Business License. Mining: Jan. 1, 1989. No. 89044 (ongoing)  
Valcam: Jan. 1, 1989. No. 89045 (ongoing)

**112.500. thru 112.600. PROPERTY OWNERSHIP**

The legal or equitable owners of record of the areas that are affected by, or contiguous to, surface operations and facilities of Valley Camp of Utah, Inc., are shown on, Surface Ownership Map 112.500. A complete listing of Surface Owners and their addresses are shown below:

**TABLE 112.500  
SURFACE OWNERSHIP**

NAMES & ADDRESSES OF OWNERS	NAMES & ADDRESSES OF OWNERS
Alexander, Brent L. & Reese A. Bawden, Alan 1145 S. 2030 E. Price, Utah 84501	Madsen, Della L. & Hilda M. Meadow, Utah 84644
Alpine School District 50 North Center American Fork, Utah 84003	Marakis, Koula & Helen 150 E. 1st S. P.O. Box 805 Price, Utah 84501
Carbon County School District 65 E. 400 N. Price, Utah 84501	Mt. States Telephone c/o US West 5295 So. 300 W. Salt Lake City, Utah 84111
Coastal States Energy Co. 175 East 400 South Salt Lake City, Utah 84111	Oman, Milton A. 61 South Main Salt Lake City, Utah 84115
Hellenic Orthodox Church Price, Utah 84501	Oman, Milton A. & Bessie 61 South Main Salt Lake City, Utah 84115
Jacob, J. Mark & James C. 754 S. Cherry Orem, Utah 84057	Otani, Jack & Sei P.O. Box 501 Clear Creek, Utah 84517
Jensen, Jack L. 1101 North 50 West Orem, Utah 84057	Questar Pipeline Co. c/o Mountain Fuel Supply Co. P.O. Box 11368 Salt Lake City, Utah 84111
Kanawha & Hocking Coal and Coke Company P.O. Box 218 Philadelphia, West Virginia 26059	Radakovich, Robert & Ellen 340 N. 600 E. Price, Utah 84501
Kosec, Louis & Anna Rt. #1, Box 12 Helper, Utah 84526	Rescu-Med, Inc. P.O. Box 1115 Provo, Utah 84601
L.D.S. Church 336 S. 3rd E. Salt Lake City, Utah 84111	Telonis, Evangelos George c/o Angelo Georgedes 761 N. 300 E. Price, Utah 84501

NAMES & ADDRESSES OF OWNERS	NAMES & ADDRESSES OF OWNERS
L&L Agri Business P.O. Box 51 Moroni, Utah 84646	Theis, Anthony J. Rt. 1 P.O. Box 33 New Ulm, Texas 78950
Lutheran High School Assn. 2222 North Santiago Blvd. Orange, CA. 92667	United States of America, Dept. of Agriculture U.S. Forest Service 599 West Price River Drive Price, Utah 84501

The legal or equitable owners of record of the coal to be mined, and the coal contiguous to the coal to be mined, are shown on Coal Ownership Map 112.600. A complete listing of Coal Ownership and their addresses are shown below:

TABLE 112.600  
COAL OWNERSHIP

NAMES & ADDRESSES OF OWNERS	NAMES & ADDRESSES OF OWNERS
Carbon County County Courthouse Price, Utah 84501	Telonis, Evangelos George c/o Angelo Georgedes 761 N. 300 E. Price, Utah 84501
Coastal States Energy Company Nine Greenway Plaza Houston, Texas, 77046	United States of America, Dept. of the Interior, Bureau of Land Management, University Club Building Salt Lake City, Utah, 84138
Kaiser Steel Corporation 300 Lakeside Drive Oakland, California, 94666	Utah Power & Light Company P.O. Box 899 Salt Lake City, Utah, 84110
Kanawha & Hocking Coal & Coke Company P.O. Box 218 Philadelphia, West Virginia, 26059	Western Reserve Coal Company, Inc. c/o Dean Phillips P.O. Box 188 Lewiston, Missouri, 63452
Tanner, Noal 2796 North Arapahoe Lane Provo, Utah, 84601	

The holders of record of any leasehold interest in areas to be affected by surface operations or facilities and the holders of record of any leasehold interest to be mined are discussed and presented in detail in Section

**112.700. MSHA I.D. NUMBERS.**

The Mine Safety and Health Administration identification numbers for the subject mines and support facility are:

**TABLE 112.700  
MSHA IDENTIFICATION**

MINE	IDENTIFICATION NO.
Belina No. 1 Mine	42-01279
Belina No. 2 Mine	42-01280
Valcam Loadout Facility	42-01280

**112.800. INTEREST IN OTHER LANDS**

There are no properties contiguous to the Mine Permit Area which are subject to any pending options or other undisclosed interests held or made by the applicant.

**113. VIOLATION INFORMATION.**

**113.110. SUSPENSION OF PERMIT**

Valley Camp of Utah, Inc., nor any subsidiary, affiliate or persons controlled by or under common control of The Valley Camp Coal Company have had a Federal or State Mining Permit suspended or revoked in the last five years.

**113.120. FORFEITURE OF BOND**

Neither Valley Camp of Utah Inc. or any of the entities or persons referred to in this section have had a mining bond or similar security deposited in lieu of bond forfeited.

**113.200. thru 113.250. INFORMATION REGARDING SUSPENSION OR FORFEITURE**

N/A

113.300. thru 113.350. VIOLATIONS

Valley Camp of Utah, Inc., has not received any violations with respect to surface coal mining operations, but has received the following violations concerning underground coal mining operations:

1. NOV No. 79-5-3-40. Issued by OSM on December 4, 1979. a. "Material placed on downslope below road cut", in violation of 30 CFR 211.40 (b) and 717.14 (c). No penalty points or civil penalty assessed.  
  
b. "Failure to maintain access and haulroads as required", in violation of 30 CFR 717.17 (j) (1) and 211.40 (b). Violation was vacated.  
  
c. "Failure to pass surface drainage from the disturbed areas through sedimentation ponds", in violation of 30 CFR 717.17 (a) and 211.40 (b). Violation was vacated.
2. NOV No. 80-5-18-7. Issued by OSM on January 8, 1980. "Failure to maintain culvert which drains access road", in violation of 30 CFR 717.17 (j) (3) (ii). Violation was vacated. Abatement was completed January 9, 1980.
3. NOV No. 80-5-7-15. Issued by OSM on June 23, 1980. "Failure to salvage topsoil", in violation of 30 CFR 717.20  
  
(a). Final assessment was 29 points and no civil penalty. Abatement was completed July 22, 1980.
4. NOV No. 80-1-3-2. Issued by DOGM on August 7, 1980. a."Failure to pass surface drainage from the disturbed area through a sedimentation pond", in violation of 30 CFR 717.20  
(a). Final assessment was 11 points and \$200.00. Abatement was completed December 19, 1980.  
  
b. "Failure to maintain ditches and culverts", in violation of 30 CFR 717.17(j) (3) (ii). Final assessment was 9 points and no civil penalty. Abatement was completed Aug. 11,1980.
5. NOV No. 80-V-15-12. Issued by OSM on December 10, 1980. "Operating without an approved permit", in violation of PL 95-87, Section 502 (a) and 211.10 (c). Violation was vacated.
6. NOV No. 81-2-5-2. Issued by DOGM on June 1, 1981.  
a. "Failure to post topsoil markers on topsoil or other vegetation supporting material", in violation of UMC 817.11 (g). Final assessment was 24 points and no civil penalty. Violation was terminated July 9, 1981.  
  
b. "Failure to protect topsoil from wind and water erosion, unnecessary compaction or contamination which lessens the capability of the material to support vegetation when redistributed", in violation of UMC 817.23 (b). Final assessment was 24 points and no civil penalty. Abatement was completed July 9, 1981.

7. NOV No. N81-3-11-2. Issued by DOGM on July 9, 1981. a. "Failure to comply with terms and conditions of interim permit", in violation of UMC 771.19. Final assessment was 30 points and \$400.00. Abatement was completed August 7, 1981.  
b. "Failure to post perimeter markers", in violation of UMC 817.11 (d). Final assessment was 10 points and \$100.00. Abatement was completed July 20, 1981.
8. NOV No. 81-2-10-1. Issued by DOGM on August 5, 1981. "Failure to comply with terms and conditions of permit-failure to minimize erosion to the extent possible", in violation of UMC 771.19 and UMC 817.45. Final assessment was 17 points and \$170.00. Abatement was completed August 21, 1981.
9. NOV No. 81-2-17-1. Issued by DOGM on December 17, 1981. "Operating without a permit, failure to conduct mine operations in accordance with an approved mine plan, unauthorized disposal of underground development waste outside the permit area", in violation of UCA 1953 40-10-9 (1), UMC 771.19, and UMC 817.71 (a). Final assessment was 0 points and no fine. Abatement was completed December 17, 1981.
10. NOV No. 82-1-9-2. Issued by DOGM on July 21, 1982. a. "Failure to operate in accordance with approved plan, failure to maintain sediment", in violation of UMC 817.46 (e), UMC 771.19 and UMC 817.45. Final assessment was 32 points and \$440.00. Abatement was completed October 20, 1982.  
b. "Failure to meet effluent limitations", in violation of UMC 817.41 (c). Final assessment was no points or fine. Abatement was completed before July 1, 1983.
11. NOV No. 82-4-11-1. Issued by DOGM on October 1, 1982. "Failure to maintain sedimentation ponds to prevent short circuiting and ensure that water discharged from the disturbed area complies with all State and Federal water quality limitations. Failure to meet applicable State and Federal effluent limitations", in violation of UCA 40-10-18 (2) (i) (ii), UMC 817.41 (c), UMC 817.42 (a)(7), UMC 817.42 (c) and UMC 817.46 (e). Final assessment was 10 points and \$180.00. Abatement was completed October 1, 1982.
12. NOV No. 83-1-1-1. Issued by DOGM on April 12, 1983. "Failure to comply with applicable water quality effluent limitations", in violation of UCA 40-10-22, UMC 817.41 (c) and UMC 817.42 (a) (f). Final assessment was 27 points and \$340.00. Abatement was completed by July 11, 1983.
13. NOV No. 83-7-4-1. Issued by DOGM on April 12, 1983. "Failure to pass all surface drainage from the disturbed areas through a sedimentation pond, a series of sedimentation ponds, or a treatment facility, before leaving the permit area. Failure to maintain sediment control facilities to prevent to the extent possible additional contributions of sediment to stream flow runoff outside the permit area", in violation of UCA 40-10-18 (2) (i) (ii), UMC 817.42 (a), UMC 817.42 (a) (f), and UMC 817.45 (i). Final assessment was 24 points and \$280.00. Abatement was completed Apr. 26, 1983.
14. NOV No. 83-7-5-1. Issued by DOGM on April 13, 1983. "Failure to post perimeter markers in a manner that clearly marks the perimeter of all areas affected by surface

operations or facilities", in violation of UMC 817.11. Final assessment was no points and no fine. Abatement was completed April 13, 1983.

15. NOV No. 83-7-6-1. Issued by DOGM on July 26, 1983. "Operating without a permit, failure to conduct under-ground coal mining activities in accordance with an approved plan", in violation of UCA 40-8-17 (1), UCA 40-10-9, and UMC 771.19. Final assessment was 48 points and \$920.00. Abatement was completed September 1, 1983.
16. NOV No. C-83-1-1-1. Issued by DOGM on July 26, 1983. "Failure to meet effluent limitations", in violation of UCA 40-10-22, UMC 817.41 (c) and UMC 817.42 (a) (7). Final assessment was no points and no fine. Abatement was completed August 18, 1983.
17. NOV No. N84-7-2-10. Issued by DOGM on February 1, 1984. "Failure to meet effluent limitations", in violation of UCA 40-10-18 (2) (i) (ii) and UMC 817.42 (a) (7). Final assessment of 82 points and \$1120.00.
18. NOV No. N84-7-6-1. Issued by DOGM on April 26, 1984. "Failure to meet effluent limitations", in violation of UCA 40-10-18 (2) (i) (ii) and UMC 817.42 (a) (7). Final assessment was 28 points and \$360.00. Abatement was completed October 28, 1985.
19. NOV No. N84-7-9-1. Issued by DOGM on August 8, 1984. "Failure to meet effluent limitations", in violation of UCA 40-10-18 (2) (i) (ii), and UMC 817.42 (a) (7). Final assessment was 36 points and \$520.00. Abatement was completed September 10, 1984.
20. NOV No. N84-2-23-2. Issued by DOGM on November 15, 1984. "Failure to maintain sediment control measures to function as designed", in violation of UMC 817.45 and UMC 771.19. Final assessment was 27 points and \$340.00. Abatement was completed November 27, 1984.
21. NOV No. N85-2-3-2. Issued by DOGM on March 5, 1985. a. "Failure to maintain runoff diversions in order to pass all surface drainage from the disturbed area through a sedimentation pond", in violation of UMC 817.42 (a) (1), UMC 817.45, UCA 40-10-18 (2) (i) (ii). Final assessment was no points and no fine. Abatement was completed April 12, 1985.  
  
b. "Failure to maintain sediment control measures to function in accordance with approved designs", in violation of UMC 817.45, UMC 771.19, and UCA 40-10-18 (2) (i) (ii). Final assessment was no points and no fine. Abatement was completed May 6, 1985.
22. NOV No. N85-2-10-2. Issued by DOGM on June 27, 1985. a. "Failure to notify the Division within 5 days of receipt of analytical results of NPDES discharge samples, which indicated non-compliance with the applicable effluent limitations", in violation of UMC 817.52 (b) (i) (ii). Final assessment was no points and no fine. Abatement was completed July 12, 1985. b. "Failure to clearly mark buffer zone", in violation of UMC 817.11 (e) and UMC 817.57 (b). Final assessment was no points and no fine. Abatement was completed July 16, 1985.

23. NOV No. N85-2-11-1. Issued by DOGM on July 22, 1985. "Failure to meet applicable effluent limitations", in violation of UMC 817.42 (b) and UCA 40-10-18 (2) (i) (ii). Final assessment was 40 points and \$420.00. Abatement was completed July 12, 1985.
24. NOV No. N85-2-12-1. Issued by DOGM on August 3, 1985. "Conducting mining activities without a permit", in violation of UMC 771.19 and UCA 40-10-9 (1). Final assessment was 24 points and no fine. Abatement was completed April 28, 1985.
25. NOV No. N86-8-2-1. Issued by DOGM on January 17, 1986. "Failure to maintain class 1 road, and to control or minimize erosion and siltation, air and water pollution, and damage to public or private property", in violation of UMC 817.150, UMC 817.153, and UCA 40-10-18 (2) (ii) (j). Final assessment was no points and no fine. Abatement was completed January 30, 1986.
26. NOV No. N86-9-8-1. Issued by DOGM on July 18, 1986. "Failure to pass surface drainage through a treatment facility before leaving permit area", in violation of UMC 817.42 (a) (1), UCA 40-10-18 (i), and UCA 40-10-18 (i) (ii). Final assessment was 13 points and \$130.00. Abatement was completed August 19, 1986.
27. NOV No. N86-9-11-1. Issued by DOGM on September 30, 1986. "Failure to comply with terms and conditions of the approved permit. Failure to collect water monitoring data at the approved frequency", in violation of UMC 771.19 and UMC 817.52. Final assessment was 22 points and \$240.00. No abatement was required.
28. NOV No. N86-9-11-1. Issued by DOGM March 6, 1987. "Failure to prevent to extent possible additional contributions of sediment to stream flow or to runoff outside of the permit area", in violation of UMC 817.45. Final assessment was 23 points and \$260.00. Abatement was completed March 10, 1987.
29. NOV No. N87-26-1-1. Issued by DOGM on April 9, 1987. "Failure to prevent to extent possible, sediment contribution to Whisky Creek or to runoff outside the permit area," in violation of UMC 817.45 (i), UCA 40-10-18 (2) (i) (ii). Final assessment was 22 points and no fine. Abatement was complete April 16, 1987.
30. NOV No. N87-9-12-1. Issued by DOGM on October 21, 1987. "Failure to conduct water monitoring in a manner approved by the Division", in violation of 817.52 (a) (1) and (b) (1). Final assessment was 31 points and \$420.00. No abatement was required.
31. NOV No. 87-9-14-1. Issued by DOGM on November 5, 1987. "Failure to maintain road culverts in such a manner which prevents plugging, collapse, or erosion at inlets and out-lets." In violation of UMC 817.153 (c) (1) (ii). Final assessment was 5 points and \$50.00. Abatement was completed November 11, 1987.
32. NOV No. 88-2-116-2. Issued by OSM on June 23, 1988. 1 of 2 "Failure to provide a registered professional engineer's certification for the construction of the dams and embankments associated with ponds 001A, 002A, 003A, and 004A, in violation of UCA 40-10-1; UMC 817.49 (b). 2 of 2 "Failure to provide a registered professional engineers certification for the construction of the Class I roads at the Belina Mine Complex," in

violation of UCA 40-10-1; UMC 817.150 (d) (i). Final assessment was 9 points each and no fine. Abatement was completed August 8, 1988.

33. NOV No. 88-28-4-1. Issued by DOGM July 7, 1988. "Failure to notify the Division that a NPDES permit effluent limitation noncompliance has occurred," in violation of UMC 817.52 (b) (1) (ii) and UMC 817.41 (c). Final assessment was 30 points and \$400.00 fine. No abatement was required.
34. NOV No. 88-28-9-1. Issued by DOGM on October 20, 1988. "Failure to meet effluent limits during discharge of mine water," in violation of UMC 817.41(c). Final assessment was 1 point and no fine. Abatement was completed January 9, 1989.
35. NOV No. 89-28-4-2. Issued by DOGM on March 16, 1989. Violation 1 of 2, "Failure to conduct mining operations in accordance with the permit and approved mining plan," in violation of UMC 711.19 and UMC 817.46 (Discharge of water through decant pipe at Pond 004a). (Abated)  
Violation 2 of 2, "Failure to store non-coal waste in a designated portion of the permit area," in violation of UMC 817.89. (Abated)
36. NOV, No. 89-28-6-1. Issued by DOGM on April 20, 1989. "Failure to maintain 004a, emergency spillway discharging," in violation of UMC 817.46 (g)(i) and 771.19 (Varmit activity under riprap caused leaking). (Abated)
37. NOV No. 89-12-1-1. Issued by DOGM on April 24, 1989. "Failure to comply with the conditions and terms of the permit to renew MRP in a timely manner," in violation of UMC 771.19, UMC 771.21 (b)(2), and UMC 788.14. (Abated)
38. NOV No. 90-13-2-1. Issued by DOGM on June 27, 1990. "Failure to submit annual summary report," in violation of R614-300-143. (Abated)
39. NOV No. 90-28-4-1. Issued by DOGM on June 25, 1990. "Failure to conduct coal mining operations as described in the approved plan," in violation of R614-301-300-142 and R614-301-528. (Coal stored outside areas designated for coal storage). (Abated)
40. NOV No. 91-15-1-1. Issued by DOGM on May 22, 1991. "Failure to maintain diversion," in violation of R614-301-742.312. (Half pipe diversion had accumulated some debris near the discharge). (Abated)
41. NOV's No. 91-38-2-2, 1 of 2. Issued by DOGM on August 13, 1991. "Failure to maintain diversions," in violation of R614-301-742.300 and 301-742.312. 2 of 2 "Failure to maintain sediment control structures," (Straw bales were washed away during an event). (These violations were Vacated by DOGM)
42. NOV No. 91-39-6-1. Issued by DOGM on July 8, 1991. "Failure to maintain non-coal mine waste in a controlled manner", in violation of R614-301-542.741. (Trash and litter were allowed to accumulate around the waste dumpsters). (Abated)

43. NOV No. 92-39-4-1. Issued by DOGM on April 29, 1992. "Failure to maintain non-coal mine waste in a controlled manner", in violation of R614-301-542.740 and 301-542.741. (Trash and litter were allowed to accumulate around the waste dumpsters). (Abated)

**114. RIGHT OF ENTRY AND OPERATION INFORMATION.**

There is no purchaser of record under a real estate contract of areas to be affected by surface operations and facilities or the coal to be mined.

**114.100. thru 114.300. DESCRIPTION OF DOCUMENTS**

Valley Camp of Utah, Inc., has title to and interest in the subject coal lands by way of warranty deeds, bills of sale, assignments, leases and easements. There are no surface or subsurface rights in the Mine Permit Area which are subject to any pending litigation. The assignments pertaining to the United States Coal Leases are listed below. Note that all locations are based upon the Salt Lake Base and Meridian:

**TABLE 114.100a  
UNITED STATES COAL LEASES**

LEASE NO.	ACREAGE	ISSUED TO	DATE OF ISSUANCE
U-020305	1,439.4	Emmet K. Olson	3/01/62
U-017354	1,028.5	Independant Coal & Coke Co.	1/01/62
U-044076	2,367.8	Armeda N. McKinnon	9/01/65
U-067498	501.0	Independant Coal & Coke Co.	1/01/62

These lease number and property locations can be found on the Coal Ownership Map 112.500. The properties are described based upon the Salt Lake Base and Meridian as follows:

**TABLE 114.100b  
COAL LEASE NUMBER AND PROPERTY DESCRIPTIONS**

LEASE NUMBER	ACRES	TOWNSHIP	RANGE	SECT.	LOCATION
U-020305	1,439.4	13S	6E	13	Lot 7 (SW 1/4 SW 1/4)
				14	SE 1/4 SE 1/4
				23	E 1/2 E 1/2
				24	W 1/2 NW 1/4, SE 1/4 NW 1/4, S 1/2
				25	All Lots 1 thru 4, S 1/2 N 1/2, S 1/2
				26	E 1/2 E 1/2

LEASE NUMBER	ACRES	TOWNSHIP	RANGE	SECT.	LOCATION
U-017354	1,028.5	13S	6E	36	Lots 1 thru 4, N 1/2 S 1/2, N 1/2
		13S	7E	31	N 1/2 SW 1/4
		14S	6E	1	E 1/2 NE 1/4, NE 1/4 SE 1/4
		14S	7E	6	NW 1/4
U-044076	2,367.8	13S	6E	26 27 34 35	W 1/2 E 1/2, W 1/2 Lots 1 thru 4, E 1/2, E 1/2 W 1/2 (excluding Lawrence Reservoir) Lots 1 thru 8, S 1/2 Lots 1 thru 7, NE 1/4, E 1/2 NW 1/4, NE 1/4 SW 1/4, N 1/2 SE 1/4 United States Coal Leases. (cont.)
U-067498	501.0	14S	7E	6 7	Lots 2, 6, 7, SW 1/4 NE 1/4, W 1/2 SE 1/4, E 1/2 SW 1/4 Lots 1, 2, 4, E 1/2 NW 1/4

The assignments pertaining to the lease from Carbon County, Utah, are as follows:

**TABLE 114.100c  
CARBON COUNTY COAL LEASES**

LEASE NUMBER	ACRES	TOWNSHIP	RANGE	SECTION	LOCATION
CARBON COUNTY LEASE	ISSUED TO: North American Coal Corp.				
	DATE OF ISSUANCE: 5/01/69				
	361.2	13S	6E	24	W 1/2 NE 1/4, SE 1/4 NE 1/4
13S		7E	19 30 31	SW 1/4 SW 1/4 W 1/2 W 1/2 NW 1/4 NW 1/4	

LEASE NUMBER	ACRES	TOWNSHIP	RANGE	SECTION	LOCATION
PRIVATE COAL LEASES - Kanawha & Hocking Coal & Coke Co.	ISSUED TO: Valley Camp of Utah, Inc.				
	DATE OF ISSUANCE: 8/01/74				
	480	13S	7E	8	E 1/2 E 1/2
				9	W 1/2 SW 1/4
				16	NW 1/4 NE 1/4, NE 1/4 NW 1/4, W 1/2 NW 1/4, NW 1/4 SW 1/4
				17	NE 1/4 NE 1/4
	ISSUED TO: Valley Camp of Utah, Inc.				
	DATE OF ISSUANCE: 8/01/78				
	80	13S	7E	30	SE 1/4 SW 1/4
				31	SW 1/4 NW 1/4
ISSUED TO: Valley Camp of Utah, Inc.					
DATE OF ISSUANCE: 1/01/81					
80	13S	7E	31	S 1/2 SW 1/4	

The following is a general summary of the chains of title with respect to the coal leases held by Valley Camp of Utah, Inc., within the mine permit area.

#### U.S. LEASE U-020305

A coal prospecting permit was issued to Emmett K. Olson effective March 1, 1958, on the lands covered by this lease. On December 8, 1959, an extension of the permit was requested and the permit was extended for two years through March 1, 1962. Emmett K. Olson was issued a Preference Right Coal Lease on March 7, 1962, effective March 1, 1962. An Assignment from Emmett K. Olson to Malcolm N. McKinnon dated April 24, 1962, was filed on May 1, 1962, effective August 1, 1962.

On October 29, 1975, a Sublease was entered into between Frank Armstrong and Zions First National Bank, executors of the estate of Malcolm N. McKinnon, deceased, and Armeda N. McKinnon with Routt County Development, Ltd. Pursuant to an Exchange Agreement dated September 15, 1975, Routt County Development, Ltd., entered into a Sublease of the portion of land within the mine permit area to Energy Fuels Corporation. This Sublease was then assigned to Valley Camp Of Utah, Inc. Subsequent to that Assignment the Sublease was assigned to Kanawha and Hocking Coal and Coke Company and a subsequent Sublease was entered into between Kanawha and Hocking Coal and Coke Company and Valley Camp of Utah, Inc. All

of the documents necessary to accomplish these transfers are of record and have been approved by the Bureau of Land Management.

#### U.S. LEASE U-017354

This lease was originally issued to Independent Coal and Coke Company effective September 1, 1956. A modified Coal Lease was issued January 1, 1962, effective September 1, 1956. This modified Coal Lease added lands applied for under Serial No. U-067374 to the above-captioned lease. By Assignment of January 2, 1968, approved effective April 1, 1968, the lease was transferred by Independent Coal and Coke Company to the North American Coal Corporation. North American then assigned this lease to Kanawha and Hocking Coal and Coke Company on June 27, 1973. A Sublease of United States Coal Lease U-017354, U-067374 was entered into between Kanawha and Hocking Coal and Coke Company and Valley Camp of Utah, Inc. An Amendment to Sublease was entered into June 12, 1978, between Kanawha and Hocking Coal and Coke Company and Valley Camp of Utah, Inc. All of the documents necessary to accomplish these transfers are of record and have been approved by the Bureau of Land Management.

#### U.S. LEASE U-044076

A Coal Prospecting Permit was issued to Armeda N. McKinnon on November 1, 1960. This permit was extended for two years from November 2, 1962. On November 2, 1964, Armeda N. McKinnon filed an application for Preference Right Coal Lease and a lease was issued to her on September 1, 1965. On October 29, 1975, a Sublease was entered into between Frank Armstrong and Zions First National Bank, executors of the estate of Malcolm N. McKinnon, deceased, and Armeda N. McKinnon with Routt County Development, Ltd.

Pursuant to an Exchange Agreement dated September 15, 1975, Routt County Development, Ltd. entered into a Sublease of the portion of land within the mine plan area to Energy Fuels Corporation. This Sublease was then assigned to Valley Camp of Utah, Inc. Subsequent to that assignment the Sublease was assigned to Kanawha and Hocking Coal and Coke Company and a subsequent Sublease was entered into between Kanawha and Hocking Coal and Coke Company and Valley Camp of Utah, Inc. All of the documents necessary to accomplish these transfers are of record and have been approved by the Bureau of Land Management.

#### U.S. LEASE U-067498

This lease was originally issued to Independent Coal & Coke Company effective January 1, 1962. An Assignment to the North American Coal Corporation was made January 2, 1968, effective April 1, 1968. North American Coal Corporation assigned the lease to Kanawha and Hocking Coal and Coke Company on June 27, 1973. Kanawha and Hocking Coal and Coke Company is a sister corporation to Valley Camp of Utah, Inc. and the necessary leases will be entered into prior to the conduct of any mining operations on this lease. All of the documents necessary to accomplish these transfers are of record and have been approved by the Bureau of Land Management.

## CARBON COUNTY LEASE

This lease was originally entered into on May 1, 1969, between Carbon County, Utah, and the North American Coal Corporation. On June 27, 1973, the lease was assigned from the North American Coal Corporation to Kanawha and Hocking Coal and Coke Company. A renewal of this lease in favor of Kanawha and Hocking Coal and Coke Company was issued May 1, 1974, for a period of 10 years. A Sublease was entered into January 1, 1978, between Kanawha and Hocking and Valley Camp of Utah, Inc. A renewal of this lease in favor of Kanawha Coal and Coke Company was issued May 1, 1984, for five years and issued May 1, 1989, for five years from Carbon County. The right to enter federal coal leaseholds conveyed by the United States Government is conferred to the lessees by the Mineral Leasing Act of 1920 and the leases themselves. The right of entry for private and county leases is provided through the individual leases.

The right to construct, operate and maintain access roads, and the right to operate and maintain coal storage and loadout facilities near the mouth of Green Canyon, together with all other uses in connection with ongoing operations of the lessee are conferred by the following:

1. A surface lease dated January 1, 1979, and entered into between and by Della L. Madsen and Robert G. and Hilda M. Hammond and Kanawha and Hocking Coal and Coke Company allows use, possession and occupancy of the subject lands for uses in connection with the performance of general business procedures by the lessee.

**TABLE 114.100d  
SURFACE LEASES**

TOWNSHIP	RANGE	SECTION	LOCATION
13S	7E	19 20 29 30	E 1/2 SE 1/4, SW 1/4 SE 1/4, SE 1/4 SW 1/4 W 1/2 SW 1/4 NW 1/4 NW 1/4 E 1/2, NE 1/4 NW 1/4

By a sublease effective January 1, 1981, Kanawha and Hocking Coal and Coke Company granted Valley Camp of Utah, Inc., the right to construct, operate and maintain access roads and conveyor systems over and across said lands.

2. A surface lease and right-of-way agreement dated August 14, 1975, and entered into and by Milton A. and Bessie G. Oman and Kanawha and Hocking Coal and Coke Company allows the construction, use and maintenance and other related activities of an access road, electric transmission line and communication lines with poles and appurtenances, all lying within portions of Sections 17, 18, 19, 20, and 30, T13S, R7E SLB&M. Said lease also provides to the lessee, a 40 acre tract lying within portions of Sections 19, and 30, T13S, R7E, SLB&M, for the purpose of conducting underground coal mining operations

and related activities, including, without limitation, the construction of portals, buildings, and facilities useful to such operations. The rights under this instrument were subleased in their entirety to Valley Camp of Utah, Inc., by a sublease effective January 1, 1981.

3. A surface lease and easement agreement dated August 6, 1976, and entered into and by Helen, Nick and Koula Marakis, and Kanawha and Hocking Coal and Coke Company allows the exclusive use and possession of the surface of the subject lands for access to and egress from all other properties together with all activities related to access roads and conveyor systems required for coal transportation over, in, under, across, and along leased acreage.

**TABLE 114.100e  
SURFACE LEASES AND EASEMENTS**

T13S, R7E SLB&M	
Sec. 8:	E 1/2 E 1/2 less 2 acres, and less highway right-of-way.
Sec. 9:	W 1/2 SW 1/4, less Carbon County Railway right-of-way and less Utah Power & Light Company right-of-way.
Sec. 16:	W 1/2 less 0.18 acres for channel change easement.
Sec. 16:	W 1/2 E 1/2
Sec. 17:	E 1/2 NE 1/4, NE 1/4 SE 1/4 less 8.99 acres highway right-of-way, less LDS church property of 16.75 acres, less 1.52 acres channel change easement.
Sec. 17:	That portion of S 1/2 SE 1/4 and SE 1/4 SW 1/4 lying North of Eccles Canyon Creek.
Sec. 20:	NE 1/4 NE 1/4, less 1.29 acres to Milton E. and Calvin K. Jacob.
Sec. 21:	That portion of N 1/2 NW 1/4 and N 1/2 NE 1/4 lying North of the centerline of Broads Canyon Creek.

By a letter of agreement dated September 13, 1976, Kanawha and Hocking Coal and Coke Company transferred to Valley Camp of Utah, Inc., the rights necessary to conduct its proposed operations within the mine plan area.

4. An easement effective January 1, 1981, between Kanawha and Hocking Coal and Coke Company, and Valley Camp, grants Valley Camp the right to construct, operate, and maintain access roads, conveyor systems and an office building with related facilities on, over and within the following described lands:

**TABLE 114.100f  
EASEMENTS**

T13S, R7E, SLB&M	
Sec. 17:	NW 1/4 NE 1/4, SW 1/4 NE 1/4, less and excluding the Kosec property containing approximately 2 acres. NW 1/4 SE 1/4
Sec. 19:	NE 1/4 SW 1/4

5. An easement effective January 1, 1981, between Kanawha and Hocking Coal and Coke Company and Valley Camp of Utah, Inc., grants the right to construct, operate and maintain access roads, conveyor systems and railroad trackage with related facilities over and across portions of the following described lands:

**TABLE 114.100g  
EASEMENT**

T13S, R7E, SLB&M	
Sec. 17:	S 1/2 SE 1/4

**115. STATUS OF UNSUITABILITY CLAIMS.**

**115.100. AREAS UNSUITABLE FOR MINING**

The Mine Permit Area is not within an area designated unsuitable for underground coal mining and reclamation activities nor is it under study for designation in an administrative proceeding.

**115.200. EXEMPTION**

N/A

**115.300. OPERATIONS WITHIN 300 FT. OF DWELLING OR 100 FT. OF ROAD**

No mining will be conducted within 100 feet of the right-of-way of any public road or within 300 feet of an occupied dwelling, public building, school, church, community, institutional building or public park, or within 100 feet of a cementary. Reclamation at the Valcam Loadout Facility paralleling State Road 96 and where the Belina Haul Road is adjacent to, and intersects State Road 264, is within the 100 feet stipulation. There are no cultural or historical resources eligible for or listed on the National Register of Historic Places.

There are seven archeological or historic sites within or adjacent to the Mine Permit Area.

Valley Camp of Utah, Inc. does not anticipate any significant disturbance of these sites. If such disturbance is necessary documentation will be made and monitoring procedures will be implemented.

The western portion of the Mine Permit Area is situated within the Manti-LaSal National Forest, U.S. Forest Service, U.S. Department of Agriculture.

**116. PERMIT TERM.**

**116.100. STARTING AND TERMINATION DATES**

The applicant is requesting a five (5) year Mine Permit Renewal and the following information is supplied. Mining activities have occurred primarily in the southern portion of the mine permit area. The mine operation has or will operate in both seams in the Mine Permit Area. The following tables show the starting and termination dates of significant events in the history of Valley Camp of Utah operations.

**TABLE 116.100a  
BEGINNING OF OPERATIONS**

ACTIVITIES	BELINA NO. 1	BELINA NO. 2
First Coal Produced	1976	1981
Horizontal Extent of Mine.	540 acres	338 acres
Vertical Extent of Mine.	0' to 1000'	0' to 1050'

**TABLE 116.100b  
LIFE OF MINES**

MINING EXTENT	BELINA NO. 1	BELINA NO. 2
First Coal Produced	Permitted (stand by)	Permitted
Termination of Mining	20-25 Years	20-25 Years
Horizontal Extent of Workings	2494 Acres	2600 Acres
Vertical Extent of Workings	0' to 1127'	0' to 1200'

The approximate total of surface land acres to be affected during the life of all mining activities is 79 acres, which includes the Valcam Loadout Facility, General Office Area, Belina Haul Road, and Belina Mine Site.

**117. INSURANCE, PROOF OF PUBLICATION AND FACILITIES OR STRUCTURES USED  
IN COMMON**

**117.100. CERTIFICATE OF INSURANCE**

Valley Camp of Utah, Inc., is insured for liability through policies (General Liability No. GL 99 48 43, Auto Liability No. BA996190, Workmens Compensation & Employers Liability No. WCK985101) issued by The Home Indemnity Company, et. al. The Utah Division of Oil, Gas & Mining is the certificate holder of record.

**117.200. NEWSPAPER ADVERTISEMENT**

Valley Camp of Utah, Inc., will advertise the filing of this Mine Permit Renewal Application in the Price Sun-Advocate and Emery County Progress on dates determined by UDOGM. Proof of publication ~~was~~ ~~will be submitted in 1990~~ an asAppendix 117.200 to this application. A copy of the advertisement which was submitted for publication is as follows:

**PUBLIC NOTICE**

**For Filing Underground Mining Permit Renewal Application**

Valley Camp of Utah, Inc., wishes to advise the public that it has filed an Underground Mine Permit Renewal Application with the State of Utah Department of Natural Resources, Division of Oil, Gas, and Mining, and the Office of Surface Mining Reclamation and Enforcement, United States Department of Interior. Valley Camp of Utah, Inc. further advises the public of the following:

1. The full name and business address of the applicant is:

Valley Camp of Utah, Inc.  
Scofield Route  
Helper, Utah 84526

2. The Valley Camp of Utah, Inc. Mine Permit Area is located in Carbon and Emery Counties, Utah, approximately 2 miles south of Scofield, Utah; 20 miles (50 miles by road) northwest of Price, Utah, and 110 miles southeast of Salt Lake City, Utah. Scofield is situated in Pleasant Valley and is accessible by an all-weather road, State Highway 96. This highway connects with U.S. Highway 6 at Colton Junction, approximately 15 miles northeast of Scofield, Utah. From Colton Junction, U.S. Highway 6 extends to the northwest to Interstate 15 at Spanish Fork, Utah. From Colton Junction U.S. Highway 6 extends to the southeast to Price, Utah.

The Valley Camp of Utah, Inc., property extends from Green Canyon on the north to Cox Canyon on the south.

3. The land contained within the Mine Permit Area is described as follows:

**TABLE 117.200  
LAND DESCRIPTIONS**

TOWNSHIP	RANGE	SECTION	LOCATION (SLBM)
14S	7E	7 6	NW 1/4, and NW 1/4 of NE 1/4 W 1/2, and W 1/2 of E 1/2
14S	6E	1	E 1/2 NE 1/4, and NE 1/4 of SE 1/4
13S	7E	31 30 21 20 19	SW 1/4, and W 1/2 of NW 1/4 W 1/2 W 1/2, SE 1/4 SW 1/4, and NE 1/4 NW 1/4 Parts of NW 1/4 NW 1/4 Parts of NE 1/4 NE 1/4 S 1/2 SW 1/4, NE 1/4 SW 1/4, and parts of W 1/2 E 1/2, E 1/2 NW 1/4, and NE 1/4 NE 1/4
13S	7E	17 16 9 8	NE 1/4 excluding parts of SW 1/4 NE 1/4 and NE 1/4 NE 1/4, N 1/2 SE 1/4 W 1/2 W 1/2, NE 1/4 NW 1/4, NW 1/4 NE 1/4 W 1/2 SW 1/4 E 1/2 SE 1/4, and a part of SW 1/4 SE 1/4
13S	6E	36 35 25 24	All Parts of E 1/2 E 1/2, and SW 1/4 of SE 1/4 E 1/2, and parts of W 1/2 SE 1/4 and parts of S 1/2 NE 1/4, NW 1/4 NE 1/4, and E 1/2 SW 1/4

4. A copy of the Mine Permit Renewal Application is available for public inspection at the Carbon and Emery County Recorders' Offices and the Utah Division of Oil, Gas and Mining, 3 Triad Center, Suite 350, S.L.C., Utah 84180-1203 (801) 538-5430.
5. Written comments, objections or request for an informal conference concerning the Mine Permit Renewal Application may be submitted to:

State of Utah  
Department of Natural Resources  
Division of Oil, Gas and Mining  
3 Triad Center, Suite 350  
Salt Lake City, Utah 84180-1203

Western Field Operations  
Office of Surface Mining Reclamation & Enforcement  
Brooks Tower Second Floor  
1020 15th Street  
Denver, Colorado 80202

For Proof of Publication see appendix R614-301-117.200.

**117.300. SHARED FACILITIES**

The railroad tracks overlap the Mine Permit Area of Valley Camp of Utah, Inc. and Utah Fuel Co.

**118. FILING FEE.**

N/A

**120. PERMIT APPLICATION AND CONTENTS.**

123. NOTORIZED SIGNATURE VERIFICATION.

Verification of Application by Responsible Official of Applicant

STATE OF UTAH )

: ss.

COUNTY OF CARBON )

I, \_\_\_\_\_, President & Chief Operating Officer of Applicant, having been duly sworn, depose and state that I am authorized to complete and file this Application on behalf of the Applicant and that all of the information contained in this Application is true and correct to the best of my information and belief.

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Printed Name)

Subscribed and sworn to before me this \_\_\_\_ day of \_\_\_\_\_, 19\_\_

\_\_\_\_\_  
NOTARY PUBLIC

Residing at: \_\_\_\_\_

My Commission Expires:

\_\_\_\_\_

### 130. REPORTING OF TECHNICAL DATA

In addition to Valley Camp of Utah, Inc., personnel, the following assisted or were consulted in the preparation of the application:

1. United States Department of the Interior  
Office of Surface Mining, Reclamation and Enforcement  
Western Field Operations  
Brooks Towers, 1020 15th Street  
Denver, Colorado 80202 (303) 837-3773
2. State of Utah, Department of Natural Resources  
Division of Oil, Gas, and Mining  
3 Triad Center, Suite 350  
Salt Lake City, Utah 84180-1203 (801) 538-5340
3. United States Geological Survey, Utah Region  
Salt Lake City, Utah 84115 (801) 524-4585
4. Department of the Interior, Bureau of Land Management  
District and Regional Office  
Salt Lake City, Utah 84116 (801) 524-5348
5. United States Department of Agriculture  
Soil Conservation Service  
Salt Lake City, Utah 84116 (801) 524-5068
6. State of Utah, Department of Natural Resources  
Division of Wildlife Resources  
Salt Lake City, Utah 84116 (801) 533-9333
7. Golder Associates, Inc., Chief Consultants  
4671 Bayard Park Drive  
Evansville, Indiana 47715 (812) 473-2097
8. Vaughn Hansen Associates, Consultant-Hydrology, Geology, Ground Water,  
Surface Water, and Climatology.  
Waterbury Plaza, Suite A, 5620 South 1475 East  
Salt Lake City, Utah 84121 (801) 272-5263  
DBA Hansen Allen & Luce Inc.  
6771 South 900 East  
PO Box 21146  
Salt Lake City, Utah, 84121-0146 (801) 566-5599
9. Dr. Richard Hauck, Consultant-Archeological Resource Inventory  
588 West 800 South  
Bountiful, Utah 84010 (801) 292-7061

10. Cedar Creek Associates, Inc.  
916 Willshire Ave.  
P.O. Box 9957  
Fort Collins, Colorado 80525 (303) 493-4394
11. Dr. Joseph Murdock, Brigham Young University, Consultant-Vegetation  
and Soils  
110 B-49  
Provo, Utah 84602 (801) 378-2583
12. Dr. Clyde Pritchett, Brigham Young University, Consultant-Wildlife  
340 MLBM  
Provo, Utah, 84602 (801) 378-2419
13. Dr. Stanley Welsh, Consultant-Endangered Plant Species  
129 North 1000 East  
Orem, Utah 84057 (801) 378-2289
14. Dr. Clayton White, Brigham Young University, Consultant-Raptors and  
Ornithology, 161 WIDB  
Provo, Utah 84602 (801) 378-2263
15. Dr. Robert Winget, Brigham Young University, Consultant-Aquatic Ecology,  
115 Page Building  
Provo, Utah 84602 (801) 378-4372
16. Dr. Patrick D. Collins, Mt. Nebo Scientific Research & Consulting  
P.O. Box 337  
Springville, Utah 84663 (801) 489-6937

**132. TECHNICAL ANALYSES**

All technical analyses have been completed under the direction of qualified registered professionals.

**140. MAPS & PLANS**

Are submitted as required.

**150. COMPLETENESS**

This Mine Permit Renewal Application is submitted as complete.

VALLEY CAMP OF UTAH, INC.  
SCOFIELD ROUTE  
HELPER, UTAH 84526

# **Mid-Term Permit Review**

**Section R645-301-200  
Soils**

**Valley Camp of Utah, Inc.**

**February 1993**

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R645-301-200. SOILS.

210. INTRODUCTION.

The Reclamation Plan (See 540.), is divided into four areas: the Valcam Loadout Facility; General Office Area; Belina Haul Road; and the Belina Mine Site.

220. ENVIRONMENTAL DESCRIPTION.

The Valley Camp of Utah, Inc. Mine Permit Area consists of about six and one-half square miles of land situated in the Wasatch Plateau of Utah astride the Carbon-Emery county line. The property straddles the divide between the headwaters of Huntington Creek on the west and Pleasant Valley on the east. Elevations vary from a low of about 8000 feet in the Pleasant Valley drainage to a high of near 9800 feet on the divide crests. Canyon slopes are steep with rounded summits, and are vegetated.

A presubsidence survey within or adjacent to the Valley Camp of Utah, Inc. Mine Permit Area conducted for Valley Camp Utah, Inc. by Endangered Plant Species through Vaughn Hansen Associates, demonstrates that areas for agricultural or silvicultural production of food and fiber and grazing lands are of such low production that they can be classified as non-renewable resource lands. This survey was conducted by subconsultants under the direction of Vaughn Hansen Associates. This information was reorganized for insertion into the permit by both Valley Camp personnel and Mr. Lynn Kunzler (an employee of the Division) to meet the requirements for the "Renewable Resource Survey". This Section 200 contains the reorganized survey data.

221. PRIME FARMLAND INVESTIGATION.

The Mine Permit Area soils do not meet the requirements as: "The growing season is too short and without irrigation water the moisture requirement for prime farmland cannot be met." As per May 28, 1982 letter by Mr. George D. McMillan, State Conservationist, USDA Soil Conservation Service, P.O. Box 11350, Salt Lake City, Ut. 84147. See Appendix 221 (PFI).

222. THROUGH 223. SOIL SURVEY. (Resource Information)

NOTE: The terminology "Proposed Conveyor Corridor" was previously withdrawn from the MRP text along with the nomenclature and proposed conveyor route from the Soils and Vegetation maps. The site locations of the Vegetation and Soil Study in Eccles & Whisky Canyons were however, retained on the said maps, and results of that study are found in this section and the Biology section of the MRP.

**Vegetation and Soils Study**

This study was and is considered an adequate soil survey and meets the standards of the National Cooperative Soil Survey as of 1980. Mr. Stanley Welsh, Leah Juarros, Joseph R. Murdock, and Elizabeth Neese of Endangered Plant Studies, Inc., in 1980 did the Vegetation and Soils Study for Vaughn Hansen Associates, Inc., Waterbury Plaza-Suite A, 5620 South 1475 East, SLC, Utah dba Hansen Allen & Luce, Inc., SLC, Utah, for Valley Camp of Utah, Inc. the purpose

of the studies were to gather data for the "Report of Vegetation, Threatened and Endangered Plant Species, Soils, and Reclamation Plans for Valley Camp of Utah, Inc., and Lease Area, Carbon-Emery counties, Utah."

These investigations were designed to provide Surface Mining regulations (783.19, 783.21, 783.13, 784.21), U.S. Forest Service requirements, and requirements of the Utah Division of Oil, Gas & Mining. Included in 300 Biology section is a description of the plant communities, a list of plant species by vegetative type, estimates based on random sampling of cover and productivity for areas that could be disturbed and for comparable areas which will not be disturbed, and maps showing vegetative and soil types and sample locations. Soils are described and reclamation potential is also discussed.

Valley Camp of Utah, Inc. lease area soils are developed in vegetation types and topographic features similar in all major respects to the adjacent Skyline lease area soils. Corresponding soils data presented within the text are for the Valley Camp lease area and are based in part on previous extensive studies of the adjacent Skyline lease area. Data for those studies were collected as follows: ~~Based on previous extensive studies of the adjacent Skyline Lease Area, data for those studies were collected as follows:~~

Soils Analysis (methods)--At each vegetation site a soil pit was excavated to the parent material, or to a depth of 60 inches, whichever occurred first. The exposed soil profile provided information for classification of the soils into taxonomic units. Samples were taken from each of the horizons exposed in each pit and were analyzed for major chemical properties.

Soils were classified to family unit according to the system utilized for classification of soils by the Soil Conservation Service (Johnson, 1975). Use of this method has allowed for correlation of these soils to series level with the new Carbon/Emery County soils mapping effort recently completed by the Soil Conservation Service and Forest Service.

Chemical analyses for micro-nutrients were made by testing a soil extract with VVK solution and were measured by use of an atomic absorption analyzer. Ammonium acetate was used to extract sodium, magnesium, and calcium for atomic absorption analysis. The Kjeldahl method was used for determination of percent organic matter. All analyses were conducted in the Agronomy Laboratory at Brigham Young University.

Soil texture was determined by using a Bouyoucus hydrometer method, with sodium hexametaphosphate dispersing agent. Soil reaction was determined on a 1:1 soil/water mixture which was tested in a Corning Ph meter Model 10. Salinity was analyzed by use of a Wheatstone conductivity cell on an extract of each soil sample. Carbonate content was estimated from observations of effervescence following application of a 10 percent solution of hydrochloric acid. The scale of effervescence follows the rating system suggested by the Soil Conservation Service (USDA Soil Survey Manual, 1937). Soil color was obtained by comparing a moist and a dry sample with the standard Munsell soil color charts. Observations of soil structural units also follow the Soil Conservation Service suggested designation as outlined in the Soil Survey Manual.

Local climatic data suggest cryic and frigid temperature regimes. The cryic regime is typically conifer-aspen related, and includes some high meadows. These areas are too cold for cultivation

of crop plants by ordinary means. Frigid designation is given to soils typical of sagebrush types; some crops can be grown on these soils. Most of the soils are in the ustic (moisture arriving in summer) regimes.

All soils have textures ranging from sandy loams to clay loams, and are considered neither unusual for the area in general or for the vegetation types these soils support. A comparison of spruce-fir and aspen soils, which as broad categories make up more than 80 percent of the lease area soils, shows that the Ph and salinity measurements are probably normal for this climatic regime with the Ph range from mildly acidic to neutral. There is a slight difference in soil reaction between spruce-fir (pH 5.0) and aspen (pH 6.0) soils. It is characteristic that the evergreen conifer types are more acidic than the deciduous forest of aspen.

Even the most saline soil measured in the lease area, with an EC x 10 measurement of 1.88, is considered extremely low when compared to agricultural soils. A slight difference between soils is noted when depths are compared. The solum of aspen extends to an average depth of 20 inches at nine locations and to 18 inches at seven locations of the spruce-fir type. This corresponds to the average depths of measurements in aspen of 19.9 inches and of 18.1 inches in spruce-fir soils. It is also apparent that soils in aspen communities are more fertile in the commonly applied fertilizer elements nitrogen, phosphorus, and potassium, and also in most micro-nutrients. The levels of iron, magnesium, and manganese are considered to be adequate for growth of native vegetation, even though somewhat below amounts reported for average soils in the Western United States (Shacklette, et al. 1971). Moderate amounts of zinc, calcium, and potassium indicate that adequate quantities of these minerals are present, except in sagebrush soils.

High amounts of calcium, especially in the B-horizon of spruce-fir soils are not considered a problem in immobilization of phosphorus due to the acid pH of these soils. Concentrations of calcium in sagebrush and aspen soils could become a problem in phosphorus relations if soils are altered to become more basic. Nitrate nitrogen is low in quantity, as was expected for these soil types. Average amounts of nitrate nitrogen are inadequate in all soils of the region, and in all horizons. All areas would respond to addition of nitrogen.

In summary, the most important fertilizer to be applied in reclamation is nitrogen. The addition of nitrogen should be timed with suitable moisture content in the soils, which usually occurs in the fall and spring.

The Soils Map 223.100 of the area indicates soils mapping units of the lease area. These units are designated by upper case letter A through E and are mapped at an Order Three intensity. Adjacent soils are designated by lower case letters a through v and are mapped at an Order Two intensity. A dashed line is used to enclose these mapping units. Taxonomic classification of the soil sample is summarized as follows:

#### MAP 223.100

TAXONOMIC CLASSIFICATION

MAP UNIT	TAXONOMIC CLASSIFICATION	SAMPLE SITE
A	Loamy-skeletal, mixed Mollic Cryoboralfs (Apr 1990) Fine-loamy, mixed Typic Cryoboralfs.	3
B	Fine loamy, mixed Argic Pachic Cryoborolls (Apr 1990) Loamy-skeletal, mixed Typic Argiborolls.	11
C	Loamy-skeletal, mixed Argic Cryoborolls (Apr 1990) Fine-loamy, mixed Argic Cryoborolls.	12
D	A complex of units B and C (Apr 1990) B&C	
E	A complex of units A, B, and C (Apr 1990) A,B,C	
a	Loamy-skeletal, mixed Mollic Cryoboralfs (Apr 1990) Same as A	
b	Fine loamy, mixed Argic Pachic Cryoborolls (Apr 1990) Same as B	11
f	Similar to B with 30% of the soils having a slope greater than 60% and as much as 50% rock fragments less than 12 inches. (Apr 1990) Similar to B with 50% rock Fragments.	11
g	Coarse loamy, mixed Pachic Cryoborolls (Apr 1990) Same as B.	10
h	Rock outcrops	
i	Loamy-skeletal, mixed Typic Cryoborolls (Apr 1990) Same.	8
k	Course-loamy, mixed Cumulic Cryoborolls (Apr 1990) Fine-loamy, mixed Calcic Pacic Cryoborolls.	6
l	Loamy-skeletal, mixed Typic Cryoborolls (Apr 1990) Same as i.	5
m	Loamy-skeletal, mixed Typic Cryoboralfs (Apr 1990) Same as A.	4
P	Coarse-loamy, mixed Mollic Cryofluent (Apr 1990) Fine-loamy, mixed Cumulic Cryoborolls.	2

MAP UNIT	TAXONOMIC CLASSIFICATION	SAMPLE SITE
q	Coarse-loamy, mixed Cumulic Cryoborolls (Apr 1990) Fine-loamy, mixed Cumulic Cryoborolls.	1
r	Coarse-loamy, mixed frigid Typic Argiborolls (Apr 1990) Same as B.	15
s	Complex of 10% r, 45% t, and 35% u (Apr 1990) r, t, u.	-
t	Coarse-loamy, mixed frigid Mollic with 15% u and 5% q (Apr 1990) Same as A.	17
u	Coarse-loamy, mixed frigid Typic Haploborolls with 5% r (Apr 1990) Fine-loamy, mixed Cumulic Haploborolls.	18
v	Loamy-Skeletal, mixed Lithic Cryocrepts (Apr 1990) Same as A.	7

MAP UNITS A AND a

These units consist of deep well drained soils that have formed in colluvium and residuum. They are on steep north-facing slopes ranging from 35 to 60 percent. Included is 5 percent rock outcrop and 5 percent similar soils.

The surface texture is loam or very fine sandy loam. Thickness of the mollic epipedon ranges from 2 to 4 inches. The A2 horizon ranges from striping of ped faces to a leached horizon 4 inches thick. Depth of the argillic horizon is 12 to 15 inches. Depth of the C horizon is 18 to 22 inches. Percent of rock fragment by volume in the upper 20 inches ranges from 5 to 15 percent. The lower portion ranges from 35 to 55 percent. Erosion hazard is slight, but severe if disturbed due to surface textures and steep slopes. The potential rating for borrow soil is poor due to thin surface layers, rock fragments content, and steep slopes.

TABLE 222a.  
SOIL ANALYSIS DATA, PROFILE DESCRIPTION, SAMPLE SITE 3  
MAPPING UNIT: A,a

VEGETATIVE TYPE: SPRUCE/FIR  
LOCATION: PERMIT AREA

HORIZ	DEPTH	COLOR		TEXTURE			CLASS	STRUCTURE	PERCENT	
		DRY	MOIST	SAND	SILT	CLAY			ROCK FGTS.	ORG MAT.
0*	2-0	-	-	-	-	-	-	-	-	-
A1	0-3	10YR 5/2	10YR 3/2	33	55	12	s1	<u>1mkpl</u> 2mgr	5gr	6.99
A2	3-7	10YR 7/2	7.5YR 5/4	48	37	15	1	2m sbk	5gr	0.44
B21	7-14	10YR 7/2	10YR 5/4	48	39	13	1	2m&f sbk	5gr	t
B22**	14-20	10YR 7/3	10YR 6/4	49	39	12	1	2m sbk	10gr,5k	t
C	20-52+	10YR 8/4	10YR 6/6	43	39	16	1	m	5s	t
HORIZ	Ph	EFFERVESCENCE	ECX10 00	SOLUBILITY ppm			SAR	PERCENT		
				Ca	Mg	Na		MOIST.SATUR.		
0*	-	-	-	-	-	-	-	-	-	
A1	6.3	eo	0.67	86.9	10.4	10.7	0.14	61		
A2	5.6	eo	0.31	44.8	4.8	9.9	0.19	26		
B21	5.6	eo	0.29	41.8	4.6	11.8	0.23	24		
B22**	5.4	eo	0.26	35.0	5.8	15.0	0.31	21		
C	5.6	eo	0.31	27.8	4.2	20.8	0.48	21		

Taxonomic Classification: Loamy-skeletal, mixed, mollic cryoborans.

\* Decomposing spruce/fir needles and twigs

\*\* 20% 10YR 7/2 and 15% 10YR 6/8 weathering stains

MAP UNITS B, b, AND f

These units consist of deep well drained soils that have formed in residuum and colluvium. They are on steep mountain slopes and benches with slopes of 35 to 50 percent. Included is 4 percent moderately deep similar soils.

Surface texture ranges from loam to a fine sandy loam. The argillic horizon texture ranges from a loam to a clay loam. The texture of the C horizon is variable due to location of weathered sandstone fragments ranging from clay to loam to a sandy clay. There is 5 to 10 percent by volume of rock fragments throughout the profiles. Thickness of surface horizons ranges from 8 to 14 inches. Depth of the argillic horizon ranges from 12 to 18 inches. Depth of the C horizon ranges from 26 to 30 inches, and depth to bedrock ranges from 48 to over 60 inches. Erosion hazard is moderate. Soil creep is evident. If disturbed, erosion hazard is severe due to steep slopes and a past history of down-slope movement. Potential rating for borrow topsoil is poor due to steep slopes. Otherwise, this is a good source. Predominant vegetation is aspen.

TABLE 222b.  
SOIL ANALYSIS DATA, PROFILE DESCRIPTION, SAMPLE SITE 11  
MAPPING UNIT: B,b,& f

VEGETATIVE TYPE: ASPEN  
LOCATION: PERMIT AREA

HORIZ	DEPTH	COLOR		TEXTURE			CLASS	STRUCTURE	PERCENT	
		DRY	MOIST	SAND	SILT	CLAY			ROCK FCTS.	ORG. MAT.
A11	0-3	-	7.5YR 3/2	50	28	22	sc1	2mgr	-	6.98
A12	3-9	-	7.5YR 3/2	53	27	20	sc1	1f sbk	-	4.78
B1	9-14	-	7.5YR 3/2	53	25	22	sc1	2c sbk	-	1.81
B2+	14-24	-	10YR 3/3	51	28	21	sc1	3mpr	2gr	1.44
B3	24-48	-	10YR 4/3	50	28	22	sc1	2c sbk	7gr	0.77
C	28-50	-	10YR 5/4	41	24	25	l	m	5gr 10k	0.41

HORIZ	pH	EFFERVESCENCE	EC X 1000	SOLUBILITY PPM			SAR	PERCENT MOIST. SATUR.
				Ca	Mg	Na		
A11	6.9	eo	0.20	63.5	10.9 <sub>a</sub>	9.6	0.15	49
A12	7.0	eo	0.43	42.6	5.6	11.8	0.23	36
B1	7.1	eo	0.38	34.6	4.0	22.1	0.47	28
B2+	7.0	eo	0.33	27.8	3.0	17.8	0.43	25
B3	6.9	eo	0.32	27.5	2.7	19.8	0.48	25
C	6.7	eo	0.37	35.5	4.0	23.7	0.50	27
R*	-	-	-	-	-	-	-	-

Taxonomic Classification: Fine loamy, mixed Argic Pachic Cryoborolls  
\* Sandstone

MAP UNIT C

This unit consists of moderately deep, well drained soils that have formed in residuum and colluvium. They are on steep mountain slopes of 35 to 50 percent. Included in this unit are 5 percent similar shallow soils, 5 percent rock outcrop, and 3 percent similar deep soils.

Surface texture is silt loam to clay loam. Thickness of the surface ranges from 7 to 11 inches. Depth to the argillic ranges from 15 to 20 inches. Depth to sandstone bedrock ranges from 30 to 40 inches. There is 0 to 5 percent rock fragment by volume in the upper 30 inches. The C horizon ranges from 35 to 55 percent rock fragment by volume. Erosion hazard is moderate at present and severe if disturbed due to steep slopes. Potential rating for borrow topsoil is poor due to steep slopes. The dark surface soil averages 20 inches in depth. Present vegetation is predominantly a grass and forb mixture with a few snowberry and elderberry bushes.

TABLE 222c.  
SOIL ANALYSIS DATA, PROFILE DESCRIPTION, SAMPLE SITE 12  
MAPPING UNIT: C

VEGETATIVE TYPE: GRASS/FORB/ELDERBERRY  
LOCATION: PERMIT AREA

HORIZ	DEPTH	COLOR		TEXTURE			CLASS	STRUCTURE	PERCENT	
		DRY	MOIST	SAND	SILT	CLAY			ROCK FCTS.	ORG. MAT.
A11	0-4	10YR 3/2	10YR 3/2	22	45	33	c1	2m gr	2gr	5.31
A12	4-8	-	7.5YR 3/2	32	38	30	c1	1m sbk 2fgr	2gr	4.19
B21	8-19	-	10YR 4/2	34	35	31	c1	2c sbk	4gr	2.52
B22+	19-29	-	10YR 4/2	34	36	30	c1	2m pr	5gr	2.23
C	29-33	-	10YR 5/5	39	34	27	1	m	10gr 15k 20s	0.83
R*	33+	-	-	-	-	-	-	-	-	-

HORIZ	pH	EFFERVESCENCE	EC X 1000	SOLUBILITY PPM			SAR	PERCENT
				Ca	Mg	Na		MOIST. SATUR.
A11	6.7	eo	1.28	26.1	24.8	15.7	0.26	44
A12	6.5	eo	0.44	47.7	5.4	14.7	0.27	39
B21	6.8	eo	0.33	34.1	2.9	16.8	0.37	35
B22+	6.8	eo	0.32	31.5	3.2	18.4	0.42	34
C	6.7	eo	0.35	36.8	4.0	17.6	0.37	29
R*	-	-	-	-	-	-	-	-

Taxonomic Classification: Loamy-skeletal, mixed Argic Cryoborolls  
\* Sandstone

MAP UNIT g

This unit consists of moderately deep, well drained soils that have formed in colluvium. They are on steep mountain sides with slopes of 35 to 50 percent. Included in this unit is 6 percent of Map Unit k, Cumulic Cryoborolls, and 2 percent rock outcrop.

Surface texture ranges from a loam to a fine sandy loam. C horizon texture ranges from a loamy very fine sand to a fine sand. Percent rock fragment by volume ranges from 10 to 15 at the surface and 35 to 70 in the C horizon. Depth to sandstone bedrock ranges from 25 to 38 inches. Erosion hazard is moderate at present and severe if disturbed due to surface texture and steepness of slopes. The potential rating for borrow topsoil is poor due to slope steepness. Present predominant vegetation is aspen.

TABLE 222d.  
SOIL ANALYSIS DATA, PROFILE DESCRIPTION, SAMPLE SITE 10  
MAPPING UNIT: g

VEGETATIVE TYPE: ASPEN  
LOCATION: PERMIT AREA

HORIZ	DEPTH	COLOR		TEXTURE			CLASS	STRUCTURE	PERCENT	
		DRY	MOIST	SAND	SILT	CLAY			ROCK FCTS.	ORG. MAT.
A1	0-6	10YR 4/2	10YR 3/2	63	21	16	sl	3f gr	10gr	7.83
AC	6-20	10YR 5/2	10YR 3/2	64	22	14	sl	2f sbk 2mgr	10gr 5K	2.81
C	20-31	10YR 6/3	10YR 5/4	64	22	14	sl	lm sbk	20gr 30K 20s	0.58
R*	31+	-	-	-	-	-	-	-	-	-

HORIZ	pH	EFFERVESCE NCE	EC X 1000	SOLUBILITY ppm			SAR	PERCENT MOIST. SATUR.
				Ca	Mg	Na		
A1	6.6	eo	0.67	97.1	13.8	6.9	0.09	41
AC	6.7	eo	0.47	65.6	6.6	9.4	0.15	30
C	6.4	eo	0.35	49.1	4.5	10.7	0.20	23
R*	-	-	-	-	-	-	-	-

Taxonomic Classification: Coarse loamy, mixed Pachic Cryborolls  
\* Sandstone

MAP UNIT H

This unit consists of rock outcrops with less than 5 percent soil associated within the area. The soils dispersed among the rocky areas are similar to those described in Table 222e. Because of the similarities no chart of soils features has been prepared for this mapping unit.

TABLE 222e.  
SOIL ANALYSIS DATA, PROFILE DESCRIPTION, SAMPLE SITE 7  
MAPPING UNIT: h

VEGETATIVE TYPE: SAGEBRUSH  
LOCATION: PERMIT AREA

HORIZ	DEPTH	COLOR		TEXTURE			CLASS	STRUCTURE	PERCENT	
		DRY	MOIST	SAND	SILT	CLAY			ROCK FGTS.	ORG. MAT.
A1	0-5	10YR 4/2	7.5YR 3/2	51	31	18	1	2f gr	15gr 15k 10s	5.25
B2	5-16	10YR 5/3	10YR 4/3	50	33	17	vfsl	2f sbk	5gr 30k 15s	1.32
R*	-	-	-	-	-	-	-	-	-	-

Horiz	Ph	Effervescence	EC x 1000	Solubility ppm			SAR	Percent Moist. Satur.
				Ca	Mg	Na		
A1	7.1	eo	0.83	133.4	16.8	12.5	0.14	41
B2	7.1	eo	0.54	84.5	11.7	12.0	0.16	31

Taxonomic Classification: Loamy-skeletal, mixed lithic Cryocrepts  
\* Sandstone

MAP UNIT i

This unit consists of deep, well drained soils that have formed in residuum. They are on moderately steep mountain slopes of 15 to 35 percent. Included in this unit is 8 percent of similar soil with 4 to 8 inches of mollic epipedon and 3 percent of a similar soil with 16 to 26 inches of mollic epipedon.

Textures in the surface are loam to very fine sandy loam.

Textures in the C horizon are very fine sandy loam to loamy fine sand. Thickness of the surface horizon ranges from 8 to 14 inches. Depth to the C horizon ranges from 20 to 40 inches. Rock fragment content by volume is 5 to 15 percent in the surface horizon, 15 to 30 percent in the B horizon and 35 to 50 percent in the C horizon. Erosion hazard rating for the topsoil is fair due to the percent rock fragment and slope steepness. In some places where the surface layer is less than 20 inches the rating is poor. At present the dominant vegetation is aspen and grass.

TABLE 222f.  
SOIL ANALYSIS DATA, PROFILE DESCRIPTION, SAMPLE SITE 8  
MAPPING UNIT: i

VEGETATIVE TYPE: ASPEN  
LOCATION: PERMIT AREA

HORIZ	DEPTH	COLOR		TEXTURE			CLASS	STRUCTURE	PERCENT	
		DRY	MOIST	SAND	SILT	CLAY			ROCK FGTS.	ORG. MAT.
0*	1-2									
A11	0-2	10YR 4/2	7.5YR 3/2	59	26	14	sl	1mkl 2fgr	5gr	6.53
A12	2-10	10YR 5/3	7.5YR 3/2	58	25	17	sl	2fobk 2mgr	10gr 5k	3.51
B2	10-23	10YR 6/3	7.5YR 4/4	59	26	15	sl	2m sbk	20gr 10k	1.58
C	23-48	2.5YR 7/4	10YR 5/4	47	29	24	ll	m	15gr 20k k100	t
CR**	48-60+	-	-	-	-	-	-	-	-	-

Horiz	pH	Effervescence	EC x 1000	Salubility ppm			SAR	Percent
				Ca	Mg	Na		Moist Satur.
0*								
A11	6.9	eo	0.96	121.4	17.4	9.47	0.11	67
A12	6.8	eo	0.49	55.4	6.1	10.2	0.17	29
B2	6.7	eo	0.33	40.3	2.9	15.2	0.31	22
C	6.3	eo	0.31	35.0	3.4	18.6	0.40	30
C	5.6	eo	0.31	27.8	4.2	20.8	0.48	21

Taxonomic Classification: Loamy-skeletal, mixed typic Cryoborolla.  
\* Decomposing leaves and twigs \*\*Weathering conglomerate

MAP UNIT k

This unit consists of very deep, well drained soils that have formed in alluvium and colluvium. They are on toe slopes of steep and very steep mountain sides. Slopes range from 15 to 35 percent. Included is 3 percent of a similar soil with 15 to 25 percent cobbles throughout the profile.

Surface horizon textures are silt loam, loam, or very fine sandy loam. The C horizon textures are very fine sandy loam to loamy fine sand and begin at 30 to 36 inches depth. Rock fragment by volume ranges from 0 to 15 percent at the surface and 15 to 35 percent in the lower horizons. Erosion hazard is moderate at present and will be moderate if disturbed due to the location of the fans. The potential rating for topsoil is good. There is a thick surface and there are few rock fragments in the top 40 inches. Prodominant vegetation at present is aspen, snowberry, and elderberry.

TABLE 222g.  
SOIL ANALYSIS DATA, PROFILE DESCRIPTION, SAMPLE SITE 6  
MAPPING UNIT: k

VEGETATIVE TYPE: ASPEN  
LOCATION: PERMIT AREA

HORIZ.	DEPTH	COLOR		TEXTURE			CLASS	STRUCTURE	PERCENT	
		DRY	MOIST	SAND	SILT	CLAY			ROCK FRGTS	ORG. MAT.
A11	0-4	10YR 4/2	7.5YR 3/2	59	25	16	sl	3f gr	10gr	6.16
A12	4-14	10YR 5/3	5.5YR 3/2	48	34	18	1	2 f&m sbk	10gr 5k	1.07
AC	14-32	10YR 6/3	10YR 3/3	49	33	18	1	2m sbk	10gr 10k	2.72
C	32-48+	10YR 6/3	7.5YR 4/4	52	31	17	1	1 m&c sbk	10gr 15k 5s	t

Horizon	pH	Effervescence	EC x 1000	Solubility ppm			SAR	Percent
				Ca	Mg	Na		Moist. Satur.
A11	7.3	eo	.84	111.8	18.6	14.1	0.16	45
A12	7.2	eo	.33	40.0	4.6	14.1	0.28	29
AC	7.2	eo	.32	41.0	4.8	14.6	0.29	27
C	7.4	eo	.31	38.7	4.5	14.2	0.29	26

Taxonomic Classification: Coarse-loamy, mixed cumulic Cryoborolls.

MAP UNIT 1

This unit consists of moderately deep, excessively drained soils that have formed in residuum and colluvium. They are on very steep south facing mountain slopes of 60 percent and more. There is 30 percent rock outcrop and 10 percent shallow soils.

Surface texture is loam to very fine sandy loam. The mollic epipedon ranges from 7 to 11 inches in thickness. Depth to sandstone bedrock ranges from 24 to 40 inches. Percent rock fragment by volume ranges from 15 to 30 percent in the surface horizons and 35 to 65 percent in the lower horizons. Erosion hazard is moderate at present and severe if disturbed due to the steep slopes and sparse ground cover. The potential rating for topsoil is poor due to the thin surface layers, large percentage of rock fragments, and very steep slopes. Predominant vegetation is sagebrush and grass.

TABLE 222h.  
SOIL ANALYSIS DATA, PROFILE DESCRIPTION, SAMPLE SITE 5  
MAPPING UNIT: 1

VEGETATIVE TYPE: SAGEBRUSH  
LOCATION: PERMIT AREA

HORIZ.	DEPTH	COLOR		TEXTURE			CLASS	STRUCTURE	PERCENT	
		DRY	MOIST	SAND	SILT	CLAY			ROCK FGTS.	ORG. MAT.
A11	0-3	10YR 4/2	10YR 3/2	30	54	16	s1	2f gr	10gr 5k	2.66
A12	3-8	10YR 5/2	10YR 3/2	54	27	19	s1	1f sbk	10gr 10k	1.86
B	8-24	10YR 7/3	10YR 5/4	56	30	14	s1	2f sbk	10gr 30k 10s	t
C	24-31	2.5YR 7/4	10YR 5/5	52	25	28	sc1	1m sbk	5gr 25k 15s	t
R	31+ *	-	-	-	-	-	-	-	-	-

Horizon	pH	Effervescence	EC x 1000	Solubility ppm			SAR	Percent Moist. Satur.
				Ca	Mg	Na		
A11	7.3	eo	0.72	112.5	17.6	12.0	0.14	34
A12	7.3	eo	0.54	72.4	11.2	12.5	0.18	30
B	7.4	eo	0.37	52.3	8.3	11.2	0.19	25
C	7.4	eo	0.44	9.0	8.5	17.6	0.30	34
R	-	-	-	-	-	-	-	-

Taxonomic Classification: Loamy-skeletal, mixed typic cryoboralfs.  
\* Sandstone

**MAP UNIT m**

This unit consists of deep, well drained soils that have formed in colluvium and residuum. They are on steep slopes that range from 35 to 60 percent. There is 8 percent similar soils included in this unit and 3 percent rock outcrop.

The surface texture is loam or clay loam. The surface is 6 to 10 inches thick. The C horizon begins at 18 to 20 inches. The percent of rock fragment by volume ranges from 5 to 10 in the upper 20 inches and 35 to 75 below 20 inches. Erosion hazard is moderate at present and severe if disturbed due to steepness of slopes. The potential rating for borrow topsoil is poor. There is a large rock fragment content, the surface layer is stony and the slopes are steep. Present vegetation is mostly big sagebrush, snowberry, and an understory of grass.

**TABLE 222i.**  
**SOIL ANALYSIS DATA, PROFILE DESCRIPTION, SAMPLE SITE 4**  
**MAPPING UNIT: m**

VEGETATIVE TYPE: SAGEBRUSH  
 LOCATION: PERMIT AREA

HORIZ.	DEPTH	COLOR		TEXTURE			CLASS	STRUCTURE	PERCENT	
		DRY	MOIST	SAND	SILT	CLAY			ROCK FCTS	ORG. MAT.
A1	0-8	10YR 5/2	10YR 4/2	32	14	54	cl	3f gr	5gr	4.21
B2	8-19	2.5YR 7/2	2.5YR 6/4	22	37	14	cl	3f abk	5gr	t
C1	19-28	2.5YR 7/5	10YR 5/8	38	28	34	cl	2m sbk	15gr 25k	t
C2	28-36	2.5YR 7/2	10YR 6/3**	71	11	18	sl	m	5gr 20k 50s	t

Horizon	pH	Effervescence	EC x 1000	Solubility ppm			SAR	Percent Moist. Satur.
				Ca	Mg	Na		
A1	7.3	eo	0.88	156.5	8.6	14.4	0.15	56
B2	7.6	eo	0.38	62.2	2.7	11.8	0.20	41
C1	7.7	eo	0.47	81.4	4.3	12.5	1.18	35
C2	7.8	eo	0.44	74.2	2.9	8.8	0.14	28

Taxonomic Classification: Loamy-skeletal, mixed typic cryoboralf.  
 \* 20% 10YR 6/8 weathering stains \*\*10% 10YR 6/8 weathering stains

MAP UNIT p

This unit consists of deep, somewhat poorly drained soils that have formed in recent stream alluvium. These soils are on stream floodplains. Slopes range from 0 to 3 percent. There is 8 percent inclusion of soil with gravel layers at a depth of 40 inches and 2 percent inclusion of soils that are better drained.

The ground water table is high during spring runoff at 8 to 10 inches. Texture throughout the profile ranges from silt loam to loamy fine sand. Thickness of lenses ranges between 2 and 8 inches. There is an area of .5 acres where there is a gravel layer at 2 to 4 inches depth. This is believed to have been hauled into a corral area. There is a rating of good potential for borrow topsoil where the water table is below 12 inches. Otherwise, wetness is restrictive. At present, the predominant vegetation is a grass and forb mixture.

TABLE 222j.  
SOIL ANALYSIS DATA, PROFILE DESCRIPTION, SAMPLE SITE 2  
MAPPING UNIT: p

VEGETATIVE TYPE: DISTURBED  
LOCATION: PERMIT AREA

HORIZ.	DEPTH	COLOR		TEXTURE			CLASS	STRUCTURE	PERCENT	
		DRY	MOIST	SAND	SILT	CLAY			ROCK FCTS.	ORG. MAT.
A1	0-5	10YR 4/2	10YR 2/2	46	34	20	1	3f gr	-	6.67
AC	1-12	10YR 5/2	10YR 5/2*	32	41	27	1	2m sbk	-	5.77
C1**	12-25	10YR 5/2	10YR 4/3	47	33	20	s1	2c sbk	-	4.31
C2	25-57	10YR 6/2	10YR 4/1	59	26	15	s1	m	-	1.96
C3	57-67	10YR 6/2	10YR 5/2	72	15	13	s1	m	65 gr	2.25

Horizon	pH	Effervescence	EC x 1000	Solubility ppm			SAR	Percent Moist. Satur.
				Ca	Mg	Na		
A1	6.2	eo	3.22	745.0	71.7	15.0	0.07	47
AC	7.2	eo	2.20	455.7	46.1	14.2	0.08	44
C1	7.0	eo	2.34	499.2	66.6	16.0	0.09	42
C2	7.2	eo	1.66	348.2	45.1	20.6	0.14	35
C3	6.8	eo	2.26	499.2	61.4	24.2	0.14	33

Taxonomic Classification: Coarse-loamy, mixed, mollic Cryofluvent

\* Mottles begin at 8 inches

\*\* C horizons are stratified layers of sands and silts that vary in thickness and in texture.

## MAP UNIT q

This unit is moderately deep to gravel, and moderately well drained. These soils have formed in recent alluvium, and areas on stream terraces. Slopes range from 0 to 3 percent. There is 10 percent inclusion of similar soils in this unit.

The ground water is high during spring runoff at 18 to 24 inches. The surface texture is silt loam to loam. The C horizon texture is loam to loamy very fine sand. Depth to the gravel ranges from 28 to 36 inches. Erosion hazard is slight at present and will remain slight if disturbed. There is a rating of fair potential for borrow topsoil. The course texture in some lenses may be too sandy and the increase of coarse fragments below 40 inches depth makes reclamation potential of the borrow area fair. The present predominant vegetation is a mixture of sagebrush, grasses, and forbs.

TABLE 222k.  
SOIL ANALYSIS DATA, PROFILE DESCRIPTION, SAMPLE SITE 1  
MAPPING UNIT: q

VEGETATIVE TYPE: SAGEBRUSH  
LOCATION: PERMIT AREA

HORIZ.	DEPTH	COLOR		TEXTURE			CLASS	STRUCTURE	PERCENT	
		DRY	MOIST	SAND	SILT	CLAY			ROCK FCTS.	ORG. MAT.
A11	0-5	10YR 4/2	10YR 2/2	45	31	24	1	3f gr	-	6.02
A12	5-14	10YR 4/2	10YR 2/2	73	4	23	sc1	3f gr	-	3.06
AC	14-24	10YR 5/2	7.5YR 3/2	45	36	19	1	1m sbk/2f sbk	-	1.27
C1	24-31	10YR 5/2	10YR 3/2	48	31	21	1	2c gr	-	1.36
C2	31-42+	10YR 5/3	10YR 3/3	59	21	20	s1	1fsbk	60 gr 4k	1.01

Horizon	pH	Effervescence	EC x 1000	Solubility ppm			SAR	Percent Moist. Satur.
				Ca	Mg	Na		
A11	6.9	eo	2.92	422.4	47.4	13.8	0.08	44
A12	7.3	eo	1.20	235.5	30.4	14.2	0.14	35
AC	7.1	eo	0.97	151.7	32.5	19.4	0.19	30
C1	7.2	eo	0.89	151.8	32.8	26.6	0.25	32
C2	7.3	eo	1.10	204.8	37.3	16.6	0.14	28

Taxonomic Classification: Coarse-loamy, mixed, cumulic cryoborolls.

MAP UNIT r

This type consists of well drained soils that have formed in colluvium and residuum. Slope ranges from 8 to 15 percent.

Elevations range from 8000 to 8100 feet. Present vegetation is predominately stinging nettle. Erosion is slight at present and erosion will be slight if disturbed. Suitability rating for topsoil is fair due to depth to bedrock. Range of characteristics include a surface layer 3 to 5 inches thick with 5 to 15 percent rock fragments by volume. The topsoil is 6 to 10 inches thick with 10 to 20 percent rock fragments by volume. Texture of the subsoil is loam or sandy clay loam. The substratum is moderately deep to bedrock at a depth of 30 to 36 inches. There is 35 to 55 percent rock fragment by volume and a texture of loam or sandy loam in the substratum. Included in this unit are 10 percent of the soils described in Unit p and 5 percent of a deep similar soil.

TABLE 2221.  
SOIL ANALYSIS DATA, PROFILE DESCRIPTION, SAMPLE SITE 15  
MAPPING UNIT: r

VEGETATIVE TYPE: STINGING NETTLE  
LOCATION: PERMIT AREA

HORIZ.	DEPTH	COLOR		TEXTURE			CLASS	STRUCTURE	PERCENT	
		DRY	MOIST	SAND	SILT	CLAY			ROCK FGTS.	ORG. MAT.
A1	0-4	10YR 3/2	10YR2.5/1	33	47	20	Loam	2f gr	10 gr	7.04
B2+	4-12	10YR 5/3	7.5YR 3/2	31	44	25	Loam	2m pr	15 gr	1.40
C1	12-23	10YR 7/3	10YR 4/4	36	44	20	Loam	massive	30 gr 15 cob	t
C2	23-34	10YR 6/4	10YR 4/4	37	41	41	Loam	massive	25 gr 15 cob 5 stone	t
R	33	-	-	-	-	-	-	-	-	-

Horizon	pH	Effervescence	EC x 1000	Solubility ppm			SAR	Percent Moist. Satur.
				Ca	Mg	Na		
A1	7.28	eo	.43	146.0	28.5	17.9	0.18	66
B2+	7.46	eo	.27	36.2	5.9	6.9	0.14	34
C1	7.61	eo	.20	20.2	4.4	9.4	0.25	28
C2	7.48	eo	.26	22.9	4.5	13.9	0.35	26

Taxonomic Classification: Typic argiborolls, coarse-loamy, mixed, frigid

MAP Unit s

This is a complex consisting of 45 percent of the soil described in Unit t, 35 percent of the soil described in Unit u, and 10 percent of the soil described in Unit r.

**MAP UNIT t**

This unit consists of well drained soils that have formed in residuum. Slopes range from 8 to 15 percent. Elevation ranges from 8000 to 9100 feet. Present vegetation is predominately Douglas Fir and Engelmann Spruce.

Erosion is slight to moderate at present and the erosion hazard will be moderate if disturbed. Suitability rating for topsoil is fair due to depth to bedrock. Range of characteristics include a surface layer 1 to 4 inches thick with 0 to 5 percent rock fragments by volume. The subsoil is 15 to 20 inches thick with 0 to 5 percent rock fragments by volume. The texture of the subsoil is sandy loam or loam. The substratum is moderately deep to bedrock at a depth of 30 to 36 inches. There are 20 to 35 percent rock fragment by volume and a texture of loam to sandy clay loam in the substratum. Included in this unit are 15 percent of the soil described in Unit u to 5 percent of the soil described in Unit q.

**TABLE 222m.  
SOIL ANALYSIS DATA, PROFILE DESCRIPTION, SAMPLE SITE 17  
MAPPING UNIT: t**

VEGETATIVE: SPRUCE/FIR  
LOCATION: PERMIT AREA

HORIZ.	DEPTH	COLOR		TEXTURE			CLASS	STRUCTURE	PERCENT	
		DRY	MOIST	SAND	SILT	CLAY			ROCK FGTS.	ORG. MAT.
A1	0-2	10YR 3/2	10YR 2/2	35	44	21	Loam	3f gr	0	7.82
B21	2-11	10YR 4/2	10YR 3/3	35	41	24	Loam	2f sbk	5 gr	3.09
B22+	11-20	10YR 5/2	7.5YR 3/3	32	44	24	Loam	1f sbk	3 gr	1.35
C	20-33	10YR 6/3.5	10YR 4/4	35	40	25	Loam	massive	20 gr 5 cob	0.27
R	33	-	-	-	-	-	-	-	-	-

Horizon	pH	Effervescence	EC x 1000	Solubility ppm			SAR	Percent Moist Satur.
				Ca	Mg	<sup>1</sup> Na		
A1	7.20	eo	0.68	104.0	17.7	4.96	0.06	75
B21	7.36	eo	0.32	50.7	8.5	5.60	0.10	41
B22+	7.48	eo	0.21	31.4	4.4	6.24	0.14	36
C	7.31	eo	0.19	29.3	4.8	7.68	0.17	30

Taxonomic Classification: Mollic eutroboralfs coarse-loamy, mixed, frigid with 15% u and 5% q

MAP UNIT u

This unit consists of well drained soils that have formed in residuum. Slopes range from 2 to 8 percent. Elevations range from 8000 to 8900 feet. Present vegetation is predominately aspen.

Erosion is slight at present and the erosion hazard will be slight when disturbed. Suitability rating for topsoil is fair due to depth to bedrock. Range of characteristics include a surface layer 8 to 12 inches thick with 0 to 5 percent rock fragment by volume. The substratum is moderately deep to bedrock at a depth of 35 to 40 inches. Texture is clay loam or sandy clay loam. Rock fragments by volume range from 10 to 20 percent. Included in this unit are 10 percent of a similar deep soil and 5 percent of the soil described in Unit t.

TABLE 222n.  
SOIL ANALYSIS DATA, PROFILE DESCRIPTION, SAMPLE SITE 18  
MAPPING UNIT: u

VEGETATIVE TYPE: ASPEN  
LOCATION: PERMIT AREA

HORIZ	DEPTH	COLOR		TEXTURE			CLASS	STRUCTURE	PERCENT	
		DRY	MOIST	SAND	SILT	CLAY			ROCK FGTS	ORG. MAT
A11	0-3	10YR 3/2	10YR 2.5/2	33	41	26	Loam	3m gr	3 gr	7.15
A12	3-9	10YR 4/2	10YR 2.5/1	37	37	26	Loam	3m sbk	0	2.76
B21	9-15	10YR 5/3	7.5YR 3/35	41	24	Loam	2c sbk	0	0	0.61
B22	15-23	10YR 6/3	10YR 3/3	35	40	25	Loam	2m pr	5gr 10cob	t
C1	23-32	10YR 6/4	10YR 3/3	35	37	28	Clay/Loam	1f sbk	15gr	t
C2	32-37	10YR 6/4	10YR 4/4	31	36	28	Clay/Loam	massive	15gr	t
R	37	-	-	-	-	-	-	-	-	-

Horizon	pH	Effervescence	EC x 1000	Solubility ppm			SAR	Percent Moist. Satur.
				Ca	Mg	Na		
A11	7.23	eo	0.80	134.0	19.30	4.96	0.05	57
A12	7.33	eo	0.41	61.9	9.14	6.72	0.11	39
B21	7.41	eo	0.28	36.5	5.49	7.52	0.15	32
B22	7.45	eo	0.21	27.7	4.46	6.88	0.16	27
C1	7.26	eo	0.23	32.5	6.03	10.2	0.54	27
C2	7.16	eo	0.30	21.3	3.98	16.80	0.44	33

Taxonomic Classification: Typic haploborolls

MAP UNIT v

This type consists of shallow, excessively drained soils that have formed in colluvium and residuum. They are on steep to very steep mountain sides. Slopes are 35 to 60 percent. Included is 3 percent of a moderately deep similar soil and 8 percent rock outcrop. Textures range from loam to loamy very fine sand. Depth to fractured bedrock is 14 to 20 inches. Rock fragments range from 35 to 55 percent.

Erosion is moderate at present and the erosion hazard will be severe if disturbed due to sparse vegetation and steep slopes. The potential rating for borrow topsoil is poor due to steep slopes, thin surface layers and the amount of rock fragments. Predominant vegetation is sagebrush with a grass understory.

TABLE 222o.  
SOIL ANALYSIS DATA, PROFILE DESCRIPTION, SAMPLE SITE 7  
MAPPING UNIT: v

VEGETATIVE TYPE: SAGEBRUSH  
LOCATION: PERMIT AREA

HORIZ.	DEPTH	COLOR		TEXTURE			CLASS	STRUCTURE	PERCENT	
		DRY	MOIST	SAND	SILT	CLAY			ROCK FGTS.	ORG. MAT.
A1	0-5	10YR 4/2	7.5YR 3/2	51	31	18	1	2f gr	15gr 15k 10s	5.25
B2	5-16	10YR 5/3	10YR 4/3	50	33	17	vfs1	2f sbk	5gr 30k 15s	1.32
R*	-	-	-	-	-	-	-	-	-	-

Horizon	pH	Effervescence	EC x 1000	Solubility ppm			SAR	Percent Moist. Satur.
				Ca	Mg	Na		
A1	7.1	eo	0.83	133.4	16.8	12.5	0.14	41
B2	7.1	eo	0.54	84.5	11.7	12.0	0.16	31

Taxonomic Classification: Loamy-skeletal, mixed lithic Cryocrepts  
\* Sandstone

(Welch, et.al., Endangered Plant Studies, Inc., 1980)

224. SUBSITUTE TOPSOIL.

Refer to 231.200 through 231.300.

230. OPERATION PLAN.

## 231. GENERAL REQUIREMENTS.

### 231.100.

The Valcam Loadout Facility was established prior to the topsoil requirement; however, some "substitute topsoil" was harvested, analyzed, and approved. This material is stored at the Belina Mine Site.

#### NOTE:

Inasmuch as regulation complexity set forth by the Division staff for an inquisitive field trial prohibits such a voluntary trial, Valley Camp withdraws the proposal and will utilize the material as fill during some phase of reclamation.

In 1988, materials excavated from the 001A sediment pond were stockpiled west of the D&RGW railroad tracks northwest of the Valcam Shop. This material is a conglomerate of sediment which migrated from the east side of the railroad tracks. This material was tested for suitability as a potential Vegetation Supporting Material and found to be acceptable by James Leatherwood, Reclamation Soils Specialist, UDOGM for a field site trial in the Fan Portal 1 area. The material received a fair to poor rating based on low saturation percentage (16.5%) and high silt content (50%), respectively.

Prior to placement of this material, the backslope will be scarified to the extent possible mechanically, to allow blending with the proposed VSM when placement occurs. The Fan Portal 1 area will be seeded with the Valcam Loadout Facility Permanent Seed Mix. The potential of this material will be evaluated through the proposed onsite field trial. Monitoring could be accomplished at the same time as the Reclamation Test Plots.

The stockpiled material has been protected with straw bales and seeded with a temporary seed mix, Yellow Sweetclover (*Melilotus officinalis*) PLS, Alfalfa (*medicago stiva*) PLS and Cereal Oats recommended by Lynn Kunzler, Reclamation Biologist, UDOGM.

The General Office Area and the Belina Haul Road were constructed pre-law, with the General Office Area to be retained as a field office for Kanawha Hocking Coal & Coke Company after reclamation. The Belina Haul Road being pre-law as well, no topsoil was preserved, but exhibits the same natural revegetation capabilities as does the Belina Mine Site and Valcam areas.

The majority of the topsoil, at the Belina Mine Site, was moved prior to the topsoil requirements, however, the remaining topsoil salvaged has since been used for reclamation around the Belina Mine Site. The material has been stabilized with vegetation and erosion control measures. The VSM stockpile contains approximately 975 cu. yds. of soil "substitute topsoil", which came from the enlargement of the 002A sediment pond, near the truckscale at the Valcam Loadout Facility. The volume of soil was approximated using the AEA method. The excavated material met the criteria of and was approved by the Division.

231.200.

~~There are no plans at this time to obtain topsoil from an off site source. A Vegetation Supporting Material (VSM) derived from the site will be utilized. The major sources of this Vegetation Supporting Material have been identified as:~~

~~The pad immediately above 004A Sediment Pond;~~

~~Selected areas in the Valcam Loadout Facility.~~

~~The estimated quantity of VSM available at the Belina Mine Site is 36,000 cubic yards, and 20,000 cubic yards at the Valcam Loadout Facility.~~

~~Reclamation personnel from Morrison Knudsen Company reviewed the analyses of the proposed Vegetation Supporting Material and found no indication that the materials are unsuitable for use as a Vegetation Supporting Material. The physical and chemical properties of the materials are generally acceptable in comparison to the topsoil salvaged at surface mines in the western states. The suitability criteria are those used by the Wyoming Department of Environmental Quality, Land Quality Division.~~

~~Selected samples show high clay content, but these zones are within 4 feet, vertically, of zones containing coarser textured material, high clay zones would be blended during the recontouring process. The "high clay zones" should not present any real problems as only minimal cutting of the interpad slope will be necessary as depicted on the reclamation drawings.~~

~~A low pH (5.5) value occurs in one of the samples. This should not present a problem as the same sample shows a positive acid base potential of 10.3 tons of calcium carbonate per 1000 tons of soil. The low pH may have resulted from the high iron content of the material causing an iron oxide coating on the undisturbed calcium carbonate nodules. This would temporarily reduce the rate of reaction, allowing a low pH in the presence of excess carbonate.~~

~~Toxic constituents are not present at critical levels. Boron levels are less than 0.5 ppm. Molybdenum and selenium concentrations are below 0.2 ppm. Conductivity and SAR are also relatively low.~~

~~All acid base potentials are positive. Soil acidity should not be a problem. Plant nutrients are present at moderate levels. The soil materials will be tested after final placement and fertilizer applied if it is determined to be necessary.~~

~~Soil samples were taken from these areas and analyzed to determine acceptability. September 16, 1986, James S. Leatherwood, Reclamation Soils Specialist, determined these soils met suitability rating as per his memo to the Divisions Technical File. For these soil sample analysis used for determination of acceptability for See Soils Appendix 200.~~

~~There are no plans to obtain topsoil or substitute topsoil from an off-site source. The existing disturbed slopes vacant of topsoil or substitute topsoil, which have been temporarily revegetated, reflect the growing properties of the exposed subsoil strata, and conversely has no indication of incompatible soil characteristics being present. Supplemental to that fact, natural revegetation~~

is occurring on all disturbed area slope planes. It is Valley Camp's position, since this phenomena has taken place and continues to transpire, the VSM area fill materials clearly meet standards set forth for a VSM. During reclamation the excavated materials will theoretically return the soils to the cut areas in the reverse sequence of the original excavation cycle. Harvesting the materials under this concept would place the "Pre-law topsoil and associated soils" last or at least intermingle them the lower strata soils (downcast materials) lastly, improving the cover material ("VSM") characteristics.

Those areas at the Belina Mine Site and Valcam areas studied by Cedar Creek and depicted on Map 231.300 (Sheets 1 through 4), will be scalped to a depth 3" (inches) below the root zone. The area at Belina, west of the Belina No. 1 Conveyor Gallery (S-35) and south of the Belina No. 1 Fan (S-40) will also be scalped to a depth of 3" (inches) below the root zone of the VSM. Scalped materials will be placed directly upon reclaimed areas or temporarily stockpiled and protected if it becomes necessary.

After the recontoured areas are completed and necessary scarifying has been achieved, testing for its soil characteristics relative to the growth potential of the aggregate plant materials will be accomplished. The characteristics are: Ph, Texture, soluble Ca, Na, Mg, cation exchange capacity, nitrate-nitrogen, phosphorus, potassium, boron, and selenium. Should toxic/acid forming materials be detected during reclamation, appropriate measures in accordance with the BTCA will be utilized to ensure the placement of such materials are not detrimental to the environment.

At the Divisions request, when weather permits, in early 1993, Valley Camp has solicited the Carbon County SCS office to evaluate site specific conditions and make a determination if a soil survey would be needed at this point in time to determine suitability of the disturbed area soils for revegetation. If the SCS deems a survey necessary, Valley Camp would then furnish the SCS office with a mylar positive of Potential Map 233, Sheets 1 through 4, Titled: SCS 1993 Disturbed Area Soil Survey, (Scale 1"=100' to depict and describe their survey and results thereof. Upon SCS completing the project, maps and results will be submitted for inclusion in the Reclamation Plan and Appendices, with an additional copy in the "Annual Summary".

231.300.

Valley Camp is confident the disturbed areas soils demonstrate suitability for use as a vegetation-supporting-material as evidenced by the existing slope conditions and vegetation. The reseeded cut slopes and the fill slopes with and without topsoil and having no special attendance withstood two years of 200+ above normal precipitation with no apparent erosion problems followed by several years of aridity since, are supporting vegetation and characterizing natural revegetation on all the perimeter slopes. The only cut slopes not demonstrating suitability are those with a near vertical attitude. See Map 231.300 titled "Suitability of Topsoil Substitutes" illustrating the various slopes. Areas of natural encroachment are depicted on the Vegetation Map 341.300.

MAP 231.300 - (Sheet 1)  
MAP 231.300 - (Sheet 2)  
MAP 231.300 - (Sheet 3)  
MAP 231.300 - (Sheet 4)

231.400.

The topsoil storage area at the Belina Mine Site is closely surrounded by dense forest exhibiting a medium amount of deadfall and heavy ground cover. This provides excellent protection against wind erosion as well as rapid snow melt in the spring.

Drainage control ditches encompass the storage area to direct any migration of material toward the bermed basin at the east end of the stockpile. The bermed basin also denies vehicle access on to the stockpile.

Straw bales are have been utilized on the north facing side of the stockpile to assist in containment, should a stockpile slope failure occur. The stockpile has been successfully vegetated with the approved temporary seed mix and no longer requires straw bales for containment.

## 232. TOPSOIL AND SUBSOIL REMOVAL.

### 232.100. THROUGH 232.720.

No additional disturbance is planned for the Mine Permit Area, however, should new disturbance become necessary, the topsoil and subsoils ~~Vegetation Supporting Materials~~ involved will be handled in accordance with UDOGM Regulations.

## 233. TOPSOIL SUBSTITUTES AND SUPPLEMENTS.

The vast majority of the disturbance transpired pre-law and the fact the (soils) materials for reclamation will be derived from the fill areas required to reestablish the Whisky Creek channel negate the need for another attempt to satisfy the regulations dealing with a permit application.

When the reconstruction of the disturbed area has been satisfied and prior revegetation, a sample matrix will be designed, approved, and implemented to confirm soil suitability for those areas not receiving the "proven soil" excavated from those areas depicted on the Soils Map 231.300. Those areas requiring sampling will be sampled for, pH, texture, soluble Ca, Na, Mg, cation exchange capacity, nitrate-nitrogen, phosphorus, potassium, boron, selenium, acid/toxic forming properties, waste oil and grease (EPA 418.1 or 413.1), gasoline and diesel (EPA 8015 modified or 620) and associated benzene, toluene, ethylene, xylene, naphthalene (BTEX (N)), EPA 8020), and naphthalene (BTEX (N)) tests, where needed. Those areas containing "proven soil" are depicted on Soils Map 231.300, Sheets 1 through 4.

### 233.100. THROUGH 233.400.

As described in 231.200 and 231.300 of this section, suitability of the "overburden materials" has been evidenced by virtue of existing vegetation within the disturbed areas. Further investigation at this time is not essential. Refer to 231.200.

## 234. TOPSOIL STORAGE.

### 234.100. THROUGH 234.320.

Reclamation of each disturbed area will take place during the first appropriate season following the time when that area becomes available for such activities. Certain affected areas, such as cut and fill slopes on roads, operation pads, and outside slopes of sediment ponds, which required disturbance early in the operational life of the mines, appear to be stable and are revegetated but will be reevaluated by Valley Camp and the Division to determine practicality and magnitude of redisturbance of these areas prior to the commencement of reclamation, are stabilized and revegetated. Other affected areas occupied by support facilities will not be reclaimed until the conclusion of mining activities. Refer to 231.100.

## 240. RECLAMATION PLAN.

### 242. SOIL REDISTRIBUTION.

#### 242.100.

After demolition, cleanup, and the loose coal placement demolition and cleanup has occurred, slopes which require recontouring will be scalped (as described in 231.200) of Vegetation-Supporting Material (VSM) with the aid of paddle wheel scrapers, dozers, and or backhoes. This material will be stockpiled on the lower pad area near the truck loop may need to be stockpiled on the lower pad area or near the Belina No. 1 fan while recontouring takes place. The qualifying materials potential VSM harvested during construction of the Whisky Creek Channel, will placed upon the newly configured slopes.

Once an area has been prepared (maximizing roughness); for Vegetation-Supporting Material, redistribution of the VSM will be spread as uniformly as possible over the area. All VSM, whether stored or reharvested during reclamation, will be disc or broken up prior to placement. Spreading of VSM will not occur unless planting and mulching can follow immediately.

VSM redistribution will begin as soon as ground conditions allow in the spring, followed immediately by seed bed preparation, fertilization if required, (See 300. SOILS), fall planting and mulching. Test plots have been implemented to demonstrate the suitability of in-situ materials and the necessary depth of cover needed. See Test Plot Program (Ref. 341.300).

Results from these test plots will be utilized at least in part as well as the SCS recommendations and Division Guidelines to determine actual specifications for revegetation of the disturbed areas.

Upon reclamation, Valley Camp agrees that constructed slope angles will not exceed those of the surrounding hillsides, that reclamation contours will match those found naturally at the point of contact, and where possible, reclaimed contours will be constructed at slope angles less than those found naturally. Ripping depth required for successful vegetative growth and soil stability will be determined at the time of reclamation when more accurate determinations of soil conditions can be determined.

242.110. THROUGH 242.130.

Refer to 340. Reclamation Plan. (Methology)

242.200. THROUGH 242.320.

The regraded land will be treated if necessary to reduce potential slippage of the material. ~~and to promote root penetration. Refer to 232. Topsoil and Subsoil Removal for Topsoil Replacement.~~

**243 SOIL NUTRIENTS AND AMENDMENTS.**

~~Nutrients and Soil amendments will be applied to the initially redistributed material when necessary to establish the vegetative cover.~~

244.100. THROUGH 244.200.

Refer 340. Reclamation Plan.

244.300. THROUGH 244.320. RILLS AND GULLIES.

All rills or gullies ~~over nine inches deep~~ which form in areas that have been regraded and topsoiled and which either, ~~disrupt the approved postmining land use or the reestablishment of the vegetative cover, or cause or contribute to a violation of water quality standards for receiving streams will be filled, regraded, or otherwise stabilized; topsoil will be replaced; and the areas will be reseeded or replanted.~~ ~~occur, will be filled with straw, graded and reseeded, or otherwise stabilized.~~ All slopes will be monitored for such failures and corrected immediately when detected.

250. PERFORMANCE STANDARDS.

251. THROUGH 252.

All topsoil and Vegetation-Supporting Materials, will be stockpiled, maintained, and redistributed according to ~~230. through and 240.~~

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# **Mid-Term Permit Review**

**Section R645-301-300  
Biology**

**Valley Camp of Utah, Inc.**

**February 1993**

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R645-301-300. BIOLOGY

310. INTRODUCTION.

320. ENVIRONMENTAL DESCRIPTION.

The Valley Camp of Utah, Inc. Mine Permit Area consists of about six and one-half square miles of land situated in the Wasatch Plateau of Utah astride the Carbon-Emery county line. The property straddles the divide between the headwaters of Huntington Creek on the west and Pleasant Valley on the east. Elevations vary from a low of about 8000 feet in the Pleasant Valley drainage to a high of near 9800 feet on the divide crests. Canyon slopes are steep with rounded summits, and are vegetated.

321. VEGETATION INFORMATION.

The Valley Camp of Utah, Inc., properties and adjacent areas occur within the aspen-spruce-fir phase of the boreal forest biome, with representatives of cool desert shrub, riparian, and, to a lesser extent, mountain brush community types present as significant though minor components. The vegetation map is referred to as Vegetation Map 323.100.

The spruce-fir community, a type mainly on north-facing slopes is dominated by Engelmann spruce and subalpine fir, with variants supporting admixtures of aspen and wet meadow subtypes characterized by species of sedges and grasses. Often broad transitional zones occur between the dense spruce-fir forest and adjacent aspen communities. Occasionally stands of the spruce-fir type are almost entirely single species dominants due to past logging or other successional influence. In greater abundance are stands containing all age classes of both spruce and fir species. The spruce-fir type, including areas transitional into aspen, constitutes some 40 percent of the Mine Permit Area.

TABLE 321A  
PLANT COMMUNITIES OF THE VALLEY CAMP  
LEASE AREA BY PERCENT OF AREA COVERED.

Vegetation Type	Map Designation	Percent
Spruce-Fir	SF	37.8
Aspen	A	21.0
Grass-Forb-Elderberry	GFE	12.8
Sagebrush	SB	21.9
Fringed Sage	FS	0.4
Disturbed	D	6.1
TOTAL		100%

321.100.

The forest floor is frequently subjected to dense shade promoting a near-complete lack of understory foliage. Grasses and sedges are most commonly represented by *Agropyron Caninum*, *Stipa* spp., *Bromus Carinatus*, and *Carex Hoodii*. Principal forbs in the spruce-fir community include *Arnica Cordifolia*, *Lathyrus Lanzwertii*, *Osmorhiza Depauperata*, and *Fragaria Virginiana*. Common understory shrubs are *Rosa Woosdii*, *Sheperdia Canadensis*, and *Symphoricarpos Oreophilus*.

TABLE 321.100A  
SPECIES LIST BY PLANT COMMUNITY TYPES FOR:

LEGEND

- |                                  |                                    |
|----------------------------------|------------------------------------|
| R - Valley Camp Project; Riparin | SS - Snowberry - Sagebrush         |
| SF - Spruce - Fir                | SB - Sagebrush                     |
| A - Aspen                        | FS - Fringed sagebrush             |
| GFE - Grass-Forb-Elderberry      | D - Disturbed                      |
| (1) - Seeded on pipeline         | (2) - Seeded on pipeline and roads |

SPECIES		R	SF	A	GFE	SS	SB	FS	D
<i>Abies lasiocarpa</i>			X	X					X
<i>Achillea millefolium</i>		X	X	X	X	X	X		X
<i>Actaea rubra</i>			X						X
<i>Agastache urticifolia</i>				X	X				X
<i>Agoseris aurantiaca</i>				X	X				
<i>Agropyron</i>	<i>caninum</i>	X	X	X	X	X	X		X
	<i>cristatum</i>							1	
	<i>dasystachyum</i>			X					X
	<i>intermedium</i>			2	2				2
	<i>spicatum</i>			X			X	X	
	<i>smithii</i>			X			X		X
<i>Agrostis</i>	<i>scabra</i>			X					
	<i>stolonifera</i>	X		X					X
	<i>variabilis</i>	X		X					X
<i>Alopecurus pratensis</i>				1			1		1
<i>Amaranthus</i> sp.									X
<i>Androsace septentrionalis</i>						X			
<i>Anemone multifida</i>			X	X					X
<i>Antennaria</i>	<i>microphylla</i>			X			X	X	
	<i>rosea</i>		X	X					X
<i>Aquilegia coerulea</i>		X	X						X
<i>Arabis drummondii</i>				X	X		X		
<i>Arctostaphylos patula</i>			X	X					
<i>Arenaria</i> sp.			X						
<i>Arnica chamissonis</i>		X							
<i>cordifolia</i>			X						X
<i>Arrhenatherum elatius</i>				1					1
<i>Artemisia</i>	<i>cana</i>	X					X		X

SPECIES		R	SF	A	GFE	SS	SB	FS	D
	cana var. bolanderi	X			X				
	dracunculus				X				X
	frigida							X	
	tridentata			X			X		X
Aster	chilensis			X	X		X		X
	engelmannii		X						X
	occidentalis	X							
Astragalus	argophyllus				X				
	convallarius						X		
Barbarea orthoceras		X	X						
Bromus	anamolus			X			X		X
	carinatus		X	X	X	X	X		X
	ciliatus		X						X
	inermis			2	2		2		2
	tectorum						X		X
Calamagrostis neglecta		X							
Caltha leptosepala		X							
Capsella bursa-pastoris			X	X					
Cardamine cordifolia		X	X						
Cardaria draba									X
Carex				X					X
	spp.			X					X
	aquatilis	X							
	egglestonii				X				
	geyeri		X	X			X		X
	hoodii			X	X	X	X		X
	kellogii	X							
	lanuginosa	X							
	praegracilis	X							
	microptera	X							
	nebraskensis	X							
	rossii			X			X		
	rostrata	X							
	vallicola					X			
Castilleja	leonardii						X		
	linariifolia			X			X		
	miniata		X						X
Catabrosa aquatica		X							
Cerastium sp.		X							
Chaenactis douglasii				X					X
Chenopodium fremontii				X	X	X	X	X	X
Chorispota tenella					X				
Chrysothamnus	nauseosus					X	X		
	viscidiflorus				X	X	X	X	X
Cirsium	scariosum (foliosum)	X	X	X	X	X	X		X
	vulgare								X
Clematis hirsutissima							X		
Cleome serrulata					X				
Claytonia lanceolata			X		X				

SPECIES	R	SF	A	GFE	SS	SB	FS	D
<i>Collinsia parviflora</i>		X	X	X		X		X
<i>Collomia linearis</i>			X	X	X			X
<i>Comandra umbellata</i>						X		
<i>Corallorhiza</i> sp.			X					
<i>maculata</i>	X							X
<i>Crepis acuminata</i>					X			
<i>Cryptantha</i> sp.						X		X
<i>crassisejala</i>		X	X	X				X
<i>gracilis</i>			X					X
<i>Cynoglossum officinale</i>			X					X
<i>Dactylis glomerata</i>	X		2			2		2
<i>Delphinium</i> <i>menziesii</i>			X	X				
<i>occidentale</i>	X		X	X				X
<i>Deschampsia caespitosa</i>	X							
<i>Descurainia</i> <i>californica</i>	X		X	X		X		X
<i>pinnata</i>			X	X				
<i>Disporum</i> <i>trachycarpum</i>		X						X
<i>Draba</i> sp.			X					
<i>Eleocharis</i> sp.	X							
<i>Elymus glaucus</i>		X	X					X
<i>Epilobium</i> <i>alpinum</i>	X	X						
<i>paniculatum</i>			X			X		
<i>angustifolium</i>		X						X
<i>Equisetum arvense</i>	X							
<i>Erigeron</i> <i>engelmannii</i>		X						X
<i>lonchopyllus</i>	X							
<i>speciosus</i>				X				
<i>subtrinervis</i>				X				
<i>superbus</i>		X						X
<i>Eriogonum umbellatum</i>						X		
<i>Erysimum asperum</i>			X	X	X	X		X
<i>Fragaria virginiana</i>	X	X	X					X
<i>Frasera speciosa</i>		X				X		X
<i>Fritillaria atropurpurea</i>				X				
<i>Galium</i> sp.			X					X
<i>bifolium</i>		X						X
<i>boreale</i>		X						X
<i>trifidum</i>			X	X				
<i>Gayophytum</i> <i>nuttallii</i>			X	X	X	X		
<i>ramosissimum</i>		X	X			X		X
<i>Gentianella amarella</i>	X							
<i>Geranium</i> <i>fremontii</i>		X	X			X		X
<i>richardsonii</i>	X		X					X
<i>Geum macrophyllum</i>	X							
<i>Gilia</i> sp. (annual)						X		
<i>aggregata</i>						X		
<i>Glaux maritima</i>	X							
<i>Glyceria striata</i>	X							
<i>Goodyera repens</i>		X						X

SPECIES	R	SF	A	GFE	SS	SB	FS	D
Habenaria sparsiflora	X							
Hackelia floribunda		X	X	X	X	X		X
patens						X		
Helenium hoopesii	X	X	X	X	X	X	X	X
Heliomeris multiflora			X			X		X
Heracleum lanatum	X	X						
Hieracium scouleri			X					
Hordeum brachyantherum	X			X				
jubatum		X	X	X				X
Hydrophyllum capitatum		X		X				
Iva axillaris	X							
Juncus arcticus	X							
ensifolius	X							
longistylis	X							
Juniperus communis			X					X
osteosperma						X		
Koeleria nitida				X				
Lactuca serriola			X					
Lappula occidentalis			X	X	X	X		X
Lathyrus lanzwertii		X	X	X	X	X	X	X
pauciflorus		X	X					X
Lepidium densiflorum				X				
Ligusticum porteri						X		X
Linanthus harknessii				X				
Lithnophragma bulbifera			X					
Lonicera involucrata	X	X						
utahensis	X	X						X
Lupinus sp.		X						X
Lupinus argenteus	X							
sericeus						X		
Luzula parviflora	X							
Machaeranthera bigelovii		X	X			X		X
canescens				X				
Madia glomerata				X				
Mahonia repens		X	X			X		X
Medicago sativa			X	X		X		X
Melica bulbosa			X	X		X		
Mertensia ciliata	X	X	X	X				X
Mimulus guttatus	X							
Mitella sp.		X						X
stenopetala	X							
Moneses uniflora		X						
Monolepis nuttallianus						X		X
Muhlenbergia filiformis	X							
richardsonis						X		X
Nemophila breviflora			X					X
Orthocarpus tolmei						X		
Osmorhiza chilensis		X						
depauperata		X	X					X

SPECIES		R	SF	A	GFE	SS	SB	ES	D
	occidentalis		X	X	X				
Pachystima	myrsinites	X	X						X
Penstemon	humilus						X		
	procerus	X					X		
	subglaber			X			X		
	watsonii		X	X	X	X	X	X	X
	whippleanus		X	X					
Phacelia	hastata			X	X	X	X		X
	heterophylla			X		X	X		X
	sericea						X		X
Phleum	alpinum	X							
	pratense	X							2
Phlox	caespitosus						X		
Physocarpus	malvaceus		X						
Picea	engelmannii		X						
	pungens	X	X	X					X
Pinus	flexilis							X	
Plagiobothrys	scouleri	X							
Poa	sp.		X						X
	bulbosa								X
	canbyi			X					
	fendleriana			X			X	X	X
	interior			X					
	nervosa				X				
Poa	palustris			X					X
	pratensis	X	X	X	X		X		X
	reflexa	X	X	X	X				X
	sandbergii						X		
Polemonium	foliosissimum	X	X	X			X		X
	pulcherrimum	X				X			
Polygonum	aviculare						X		X
	bistortoides			X	X				
	douglasii	X				X			X
	kelloggii						X		X
	sawatchense			X	X		X		X
Populus	tremuloides		X	X					X
Potentilla	anserina	X							
	fruticosa	X					X		
	glandulosa				X				
	gracilis	X		X	X		X		X
Prunus	virginiana			X			X		X
Pseudotsuga	menziesii		X			X			
Pyrola	secunda		X						X
Ranunculus	alismaefolius	X							
	inamoenus		X						X
	testiculatus			X					
Ribes	cereum		X	X		X	X		X
	hudsonianum			X					
	inerne						X		

SPECIES	R	SF	A	GFE	SS	SB	FS	D
montigenum	X	X		X				
viscosissimum	X							
Rorippa curvipes	X							
Rosa woodsii		X				X		X
Rubus idaeus	X							
parviflorus		X						X
Rudbeckia occidentalis			X		X	X		X
Rumex acetosella								X
crispus								X
salicifolius	X			X		X		X
Salix geyeri	X							
lutea		X						X
rigida	X							
Sambucus coerulea		X	X					X
racemosa	X	X	X	X	X	X		X
Saxifraga odontoloma	X							
Scrophularia lanceolata			X			X		X
Senecio eremophilus		X						X
integerrimus	X		X	X		X		X
multilobatus			X			X		X
serra			X	X		X		X
Shepherdia canadensis	X	X						X
Sitanion hystrix							X	
Silene antirrhina					X			
menziesii		X	X			X		X
Smilacina stellata		X	X			X		X
Solidago missouriensis		X						X
parryi		X						X
Stellaria jamesiana		X	X	X		X		X
Stipa columbiana	X	X	X	X	X	X		X
comata		X						X
lettermannii		X	X	X	X	X	X	X
Symphoricarpos oreophilus		X	X	X	X	X	X	X
Taraxacum officinale	X	X	X	X				X
Tetradymia canescens							X	
Thalictrum fendleri		X	X	X	X	X		X
Thermopsis montana			X					
Thlaspi montanum		X						
Tragopogon dubius	X		X			X		
Trifolium kingii			X					
repens	X							
Trisetum spicatum		X		X				
wolfii	X							
Urtica dioica	X	X	X	X		X		X
Vaccinium membranaceum		X						X
Valeriana edulis		X	X	X				
Veratrum californicum	X	X	X	X				
Verbascum thapsus			X			X		X
Veronica serpyllifolia	X							

SPECIES		R	SF	A	GFE	SS	SB	FS	D
Vicia americana			X	X	X		X		X
Viguiera multiflora				X			X		X
Viola	adunca		X						X
	canadensis		X						
	praemorsa			X	X				

The aspen community is a forest type with *Populus Tremuloides* as the principle tree species. About 21 percent of the lease area is dominated by aspen alone. South-facing slopes and ridges are the main localities of this community. Rather large open areas are interspersed among the aspen stands and are dominated by grasses, forbs, and elderberry. These grass-forb-elderberry communities occupy about 13 percent of the lease area. Species diversity in the aspen community is great, with 20 species reported present. The main ground layer species are much the same as those of the grass-forb-elderberry community, with which the aspen community is considered transitional. The combined aspen and grass-forb-elderberry community is very large, constituting about 34 percent of the general lease area.

The sagebrush and fringed sagebrush vegetative types occupy 22 percent of the Mine Permit Area, and occur mainly on shallow soils. Collectively, these types are remarkably diverse, with some 110 species of vascular plants reported. Snowberry is often a major component in the sagebrush community. Fringed sagebrush is dominant only on rocky semi-barrens of ridge crests at high elevations.

The riparian community type consists of continuous narrow strips of wetland vegetation along the major drainages, as in the valley bottoms of Eccles Canyon, and along minor tributaries. Total areal extent of the riparian type is very small. Dominant species on these wetlands are redtop grass, silver sagebrush, sedge species, grasses, and numerous forbs.

Disturbed areas, constituting 6 percent of the lands studied, are present in the Mine Permit Area, some of which have been treated to reclamation procedures. Both introduced and native species were observed growing along pipeline corridors, roadways, and drill pads.

321.200.

Species lists and vegetative and soils data summaries are based in part on extensive adjacent Skyline Project lease area studies. The plant communities and soils occupy the same topographic positions and in all major respects are similar to the Valley Camp of Utah, Inc. area. Sites representative of major vegetative types occurring in the Mine Permit Area were selected for intensive analysis. In each vegetative type permanent transects, each 100 meters in length were established at validation sites along the roads and at vegetatively comparable reference sites. The transects in the reference areas are permanently marked with steel rebar stakes. These will serve as points for future reference. Vegetative analysis of the disturbed portal area was not conducted. Reference areas adjacent to the disturbed areas and representative of the original communities were selected and analyzed.

Stratified random sampling was employed, in which locations of transect lines and plots within homogeneous portions of the vegetative types were randomly determined. From twenty to forty 2 by 5 dm rectangular plots were placed along each transect. Randomness was insured by using a table of random numbers to select three plots within each ten-meter section of the transect. At each reference and validation site in the aspen, grass-forb-elderberry, and spruce-fir communities the sampling procedures followed those outlined by Daubenmire (1957) for the canopy coverage method. For each species of forb, grass, or shrub the canopy was projected as cover of the ground, and such cover was estimated in six cover classes. Total cover, frequency percent, and composition percent were computed for the species along each transect. Spruce-fir and aspen sites were studied further by application of the quarter method of Curtis (1956), which gives relative cover and relative density values. Tree species dynamics were studied by selecting trees in each size class encountered in the quarter method for diameter, height, and age measurements. Ages of trees were determined by counting core sample rings extracted from the tree with a Swedish increment borer. Average increments of growth in diameter per year were measured.

Productivity measurements of grass and forb species were made using 0.96 square foot plots with weight estimates made on each species as outlined in the Range Analysis Handbook (USDA, 1970). The weight estimate of each species in 10 randomly selected plots allows for determination of the total pounds of productivity available for grazing in each forb community. These studies were omitted in the spruce-fir community due to a lack of meaningful ground cover.

In order to evaluate adequacy of sample size, the following formula (Harper, 1980) was utilized:

$$N(\text{min.}) = (1.64s / .01x)^2$$

where:

x = the total understory canopy cover per quadrant

With a sample size of N(min.) a 10 percent change in vegetative cover can be detected with a 90 percent confidence level. For details see Snedecor & Cochran, 1967, page 58. Reference areas have been evaluated for similarity to validation sites using the following similarity index formula (Bonham, et al, 1980; Krebs, 1972; Harper, 1967):

$$S = 2w / (a+b)$$

where:

- S = similarity between the potential reference area and the inventory unit.
- a = total number of species in the reference area
- b = total number of species in the inventory unit
- w = number of species in common between a and b

This method requires a subjective decision concerning level of similarity required to accept a reference area.

VEGETATION SUMMARY FOR THE MINE PERMIT AREA

The Valcam Loadout Facility and General Office areas are disturbed to the extent that little if any natural communities are fully represented. The immediate environs of the Valcam Loadout Facility area had supported before disturbance a sagebrush-grass type similar to the sagebrush communities studied along the Eccles Canyon portion of the permit area, where 34 species contributed to a total cover of 130 percent. Shrub species, with *Artemisia tridentata* dominant, contributed a composition percentage of 61; *Agropyron spicatum* and other grasses contributed 31 percent. See Table 321.200a thru 321.200dd for transect data summaries. Table 321.200ee summarizes tree growth data.

TABLE 321.200a  
PLANT COMMUNITY CHARACTERISTICS

SITE 1A VALIDATION		VEGETATION SPRUCE FIR	
TAXA	% COVER	% FREQ.	% COMP.
<b>GRASSES</b>			
<i>Stipa columbiana</i>	20.4	55	38
<i>Carex</i> sp.	9.0	50	17
<i>Stipa lettermanii</i>	6.2	10	12
<i>Agropyron caninum</i>	6.1	30	11
<i>Poa pratensis</i>	2.9	20	6
<i>Bromus anomalus</i>	1.1	20	2
<i>Poa</i> sp.	.1	5	T
Total Grass	45.8		86
<b>FORBS</b>			
<i>Helenium hoopesii</i>	3.2	10	6
<i>Collinsia parviflora</i>	.9	10	2
<i>Galium boreale</i>	.8	5	2
<i>Silene menziesii</i>	.8	5	2
<i>Machaeranthera bigelovii</i>	.2	10	T
<i>Viola adunca</i>	.2	10	T
<i>Gayophytum ramosissimum</i>	.1	5	T
<i>Epilobium angustifolium</i>	.1	5	T
<i>Penstemon watsonii</i>	.1	5	T
<i>Taraxacum officinale</i>	.1	5	T
<i>Cryptantha crassisejala</i>	.1	5	T
Total Forbs	6.6		12
<b>BROWSE</b>			
<i>Mahonia repens</i>	.9	10	2
Total Browse	.9		2
Totals	53.3		100

TABLE 321.200b  
TREE PRODUCTIVITY

SITE 1b  
REFERENCE

VEGETATION  
SPRUCE-FIR

TAXA	MEAN DISTANCE (ft)		RELATIVE FREQUENCY		DENSITY PER ACRE		
Picea pungens Populus tremuloides	11.6		40% 60%		129.5 194.3		
	<b>&lt;1" Diameter</b>		<b>&gt; 1" Diameter</b>				
	<b>&lt;3' tall</b>	<b>&gt;3' tall</b>	<b>1"-3"</b>	<b>3"-6"</b>	<b>6"-12"</b>	<b>12"-15"</b>	<b>&lt;15"</b>
Picea pungens Populus tremuloides			2 3	5 13	4 6	2	3

TABLE 321.200c  
PLANT COMMUNITY CHARACTERISTICS

SITE 1b  
REFERENCE

VEGETATION  
SPRUCE-FIR

TAXA	% COVER	% FREQ.	% COMP.
<b>GRASSES</b>			
Stipa columbiana	19.6	55	53
Agropyron caninum	5.8	15	16
Carex sp.	5.0	30	14
Bromus carinatus	.8	5	2
Poa pratensis	.8	5	2
Stipa lettermannii	.8	5	2
Total Grass	32.8		89
<b>FORBS</b>			
Silene menziesii	2.6	10	7
Lathyrus lanzwertii	.9	5	2
Stellaria jamesiana	.2	10	1
Viola adunca	.2	15	1
Galium boreale	.1	5	T
Hackelia floribunda	.1	5	T
Helenium hoopesii	.1	5	T
Total Forbs	4.2		11
Totals	37.0		100

TABLE 321.200d  
TREE PRODUCTIVITY

SITE 1b  
REFERENCE

VEGETATION  
SPRUCE-FIR

TAXA	MEAN DISTANCE (ft)	RELATIVE FREQUENCY		DENSITY PER ACRE			
Picea pungens Populus tremuloides	11.8 ft.	52%	48%	162.9 150.4			
	<1" Diameter	>1" Diameter					
	<3'tall	>3'tall	1"-3"	3"-6"	6"-12"	12"-15"	>15"
Picea pungens Populus tremuloides			4 1	3 12	5 6	2	7

TABLE 321.200e  
PLANT COMMUNITY CHARACTERISTICS

SITE 2a  
VALIDATION OPENING

VEGETATION  
ASPEN OPENING  
(stinging nettles)

TAXA	% COVER	% FREQ.	% COMP.
<b>GRASSES</b>			
Poa pratensis	24.5	80	16
Stipa lettermannii	7.8	25	5
Stipa columbiana	7.6	20	5
Agropyron caninum	5.0	10	3
Carex geyeri	4.4	10	3
Bromus carinatus	1.9	5	1
Agropyron smithii	.8	5	T
Muhlenbergia richardsonis	.8	5	T
Total Grass	52.8		33
<b>FORBS</b>			
Urtica dioica	53.4	95	34
Collinsia parviflora	19.1	45	12
Lappula occidentalis	10.0	60	6
Gayophytum ramosissimum	8.2	45	6
Helenium hoopesii	8.0	15	5
Cryptantha sp.	4.8	25	3
Cirsium foliosum	1.6	15	1
Total Forbs	105.1		67
Totals	157.9		100

TABLE 321.200f  
PLANT COMMUNITY CHARACTERISTICS

SITE 2b VALIDATION OPENING		VEGETATION ASPEN OPENING (stinging nettles)	
TAXA	% COVER	% FREQ.	% COMP.
<b>GRASSES</b>			
Poa pratensis	42.1	90	26
Stipa lettermannii	4.9	25	3
Muhlenbergia richardsonis	3.1	5	2
Koeleria cristata	1.9	5	1
Agropyron caninum	1.6	15	1
Total Grass	53.6		33
<b>FORBS</b>			
Helenium hoopesii	39.5	80	24
Urtica dioica	31.6	50	19
Gayophytum ramosissimum	14.8	65	9
Lappula occidentalis	6.2	55	4
Cirsium foliosum	6.0	40	4
Collinsia parviflora	4.0	35	3
Polygonum kelloggii	2.6	10	2
Polygonum sawatchense	1.8	20	1
Cryptantha sp.	1.2	25	1
Achillea millefolium	.1	5	T
Phacelia heterophylla	.1	5	T
Polygonum aviculare	.1	5	T
Total Forbs	108.0		67
<b>BROWSE</b>			
Artemisia cana	.8	5	T
Total Browse	.8		0
Totals	162.4		100

TABLE 321.200g  
PLANT COMMUNITY CHARACTERISTICS

SITE 3a VALIDATION		VEGETATION ASPEN	
TAXA	% COVER	% FREQ.	% COMP.
<b>GRASSES</b>			
Poa pratensis	32.2	40	24
Stipa columbiana	21.9	65	17
Stipa lettermannii	11.8	45	9
Carex sp.	10.9	35	8
Agropyron caninum	7.1	25	6
Agrophyron dasystachyum	5.8	15	4
Muhlenbergia richardsonis	.8	5	1
Total Grass	90.5		69

SITE 3a  
VALIDATION

VEGETATION  
ASPEN

TAXA	% COVER	% FREQ.	% COMP.
<b>FORBS</b>			
Helenium hoopesii	16.9	55	13
Cirsium foliosum	12.1	50	9
Gayophytum ramosissimum	3.9	10	3
Cryptantha crassisejala	.9	10	1
Penstemon watsonii	.9	10	1
Polygonum sawatchense	.9	10	1
Vicia americana	.8	30	1
Arabis sp.	.1	5	T
Fragaria virginiana	.1	5	T
Stellaria jamesiana	.1	5	T
Total Forbs	36.7		29
<b>BROWSE</b>			
Populus tremuloides	.9	10	1
Symphoricarpos oreophilus	.8	5	1
Total Browse	1.7		2
Totals	128.9		100

TABLE 321.200h  
TREE PRODUCTIVITY

SITE 3a.  
VALIDATION

VEGETATION  
ASPEN

TAXA	MEAN DISTANCE (ft)		RELATIVE FREQUENCY			DENSITY PER ACRE	
Populus tremuloides	8.3		100			633.1	
	<1" Diameter		>1" Diameter				
	< 3' tall	> 3' tall	1"-3"	3"-6"	6"-12"	12"-15"	>15"
Populus tremuloides			28	12			

TABLE 321.200i  
PLANT COMMUNITY CHARACTERISTICS

SITE 3b REFERENCE		VEGETATION ASPEN	
TAXA	% COVER	% FREQ.	% COMP.
<b>GRASSES</b>			
Stipa lettermannii	25.0	65	27
Stipa columbiana	20.9	55	22
Poa pratensis	19.0	45	20
Agropyron caninum	10.1	25	10
Carex sp.	7.8	45	8
Bromus carinatus	3.9	10	4
Bromus anomalus	1.9	5	2
Koeleria cristata	.8	5	T
Stipa comata	.8	5	T
Total Grass	90.2		93
<b>FORBS</b>			
Helenium hoopesii	2.6	10	3
Cirsium foliosum	.9	20	1
Gayophytum ramosissimum	.8	5	1
Vicia americana	.5	20	T
Taraxacum officinale	.2	5	T
Achillea millefolium	.1	5	T
Silene menziesii	.1	5	T
Total Forbs	5.2		5
<b>BROWSE</b>			
Mahonia repens	.8	5	1
Symphoricarpos oreophilus	.8	5	1
Total Browse	1.6		2
Totals	97.0		100

TABLE 321.200j  
GRAZING PRODUCTIVITY

SITE 3b REFERENCE PLOT SIZE: 0.96 sq. ft.		VEGETATION ASPEN	
TAXA	DRY WT. PROD.	% COMP.	
<b>GRASSES</b>			
Stipa lettermannii	7.6	20	
Poa pratensis	6.8	18	
Agropyron caninum	1.4	T	
Carex sp.	.9	2	
Stipa columbiana	.4	1	
Muhlenbergia richardsonis	T	T	
Total Grasses	17.1	44	
<b>FORBS</b>			
Cirsium foliosum	11.7	30	
Helenium hoopesii	9.5	25	
Gayophytum ramosissimum	T	T	
Polygonum sawatchense	T	T	
Total Forbs	21.2	55	

SITE 3b  
 REFERENCE  
 PLOT SIZE: 0.96 sq. ft.

VEGETATION  
 ASPEN

TAXA	DRY WT. PROD.	% COMP.
<b>BROWSE</b> Populus tremuloides	.6	1
Total Browse	.6	1
Totals	38.9	100

Est. Potential Prod. for site 389 lbs/ac.

TABLE 321.200k  
 TREE PRODUCTIVITY

SITE 3b  
 REFERENCE

VEGETATION  
 ASPEN

TAXA	MEAN DISTANCE (ft)		RELATIVE FREQUENCY			DENSITY PER ACRE	
Populus tremuloides	9.4		100%			496	
	<1" Diameter		>1" Diameter				
	>3' tall	>3" tall	1'-3"	3"-6"	6"-12"	12"-15"	>15"
Populus tremuloides				16	24		

TABLE 321.200l  
 PLANT COMMUNITY CHARACTERISTICS

SITE 4a  
 VALIDATION

VEGETATION  
 SAGEBRUSH

TAXA	% COVER	% FREQ.	% COMP.
<b>GRASSES</b>			
Poa ampla	7.7	20	7
Poa fendleriana	7.0	27	7
Agropyron spicatum	6.1	67	6
Carex sp.	3.8	13	4
Bromus carinatus	1.3	7	1
Poa secunda	1.3	3	1
Stipa viridula	1.3	3	1
Bromus reflexa	.5	3	T
Stipa comata	.5	3	T
Bromus tectorum	.1	3	T
Total Grass	29.6		27

SITE 4a  
VALIDATION

VEGETATION  
SAGEBRUSH

TAXA	% COVER	% FREQ.	% COMP.
<b>FORBS</b>			
Geranium richardsonii	2.7	13	3
Penstemon sp.	2.2	10	2
Aster sp.	1.5	10	1
Stellaria jamesiana	1.5	10	1
Cirsium sp.	1.3	10	1
Viola sp.	.3	10	T
Brickellia sp.	.1	3	T
Delphinium sp.	.1	3	T
Oenothera sp.	.1	3	T
Total Forbs	9.8		8
<b>BROWSE</b>			
Symphoricarpos oreophilus	25.7	67	25
Artemisia tridentata	21.2	47	21
Amelanchier alnifolia	6.3	13	6
Rosa woodsii	6.3	3	6
Purshia tridentata	5.4	10	5
Prunus virginiana	2.2	7	2
Chrysothamnus viscidiflorus	.5	3	T
Total Browse	67.6		65
Totals	107.0		100