

**SECTION 30**

**POST-RECLAMATION LAND USE**

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<b>REV. NUMBER</b>	<b>REVISION DESCRIPTION</b>	<b>DATE APPROVED</b>
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## **SECTION 30 POST-RECLAMATION LAND USE**

BHP Navajo Coal Company (BNCC) is committed to reclamation activities that will restore the land disturbed by mining activities to a condition capable of supporting the post mining land use (PMLU). Major objectives in achieving this goal include:

- Objective 1: Restore disturbed lands to a condition capable of supporting the PMLU.
- Objective 2: Conserve and utilize the suitable plant growth media, including topdressing and lighter-textured overburden on affected lands to the extent necessary to meet Objective 1.
- Objective 3: Establish on all affected areas a diverse, effective, and self-sustaining vegetation cover of the same seasonal variety as the native vegetation.
- Objective 4: Reclaim affected areas in an environmentally sound manner and as contemporaneously as practicable with the mining operation.
- Objective 5: Minimize disturbance to the hydrologic balance and restore prominent drainage features of the permit area to approximate the pre-mining conditions.

To achieve these objectives, BNCC will implement the methods and practices discussed in Sections 30 through 39 of the permit application package.

### **30.1 Post-Reclamation Land Use**

The PMLU for the Pinabete Mine Plan permit area (permit area) has been designated as rangeland for the grazing of domestic livestock and wildlife habitat. The grazing PMLU capability of the reclaimed lands is expected to be equal to or greater than the pre-mining capability. This designated land use was developed in agreement with the Navajo Nation and Bureau of Indian Affairs (BIA) ([Appendix 30.A](#)) and is the same as the pre-mining land use.

As reclaimed lands become established, BNCC may utilize grazing as a management option.

### **30.2 Post-Reclamation Land Utility and Capability**

Revegetation success standards for vegetation cover, production, species diversity, and shrub density ensure that a productive and nutritious balance of forage will be available to domestic livestock as well as meeting wildlife species' needs for food and cover habitat. Revegetation success standards for the permit area are presented in Section 37 (Post-Reclamation Vegetation).

To meet basic physiological functions, range livestock and wildlife species require a proper balance of forage nutrition. The plant species used in the revegetation program are selected on the basis of:

1. Adaptability to local environmental conditions
2. Palatability and nutritional value to livestock and wildlife

3. Ability to provide habitat for wildlife

Positive benefits in terms of animal gains and conditioning are realized when the quality of forage is above that which is necessary to meet minimum nutritional needs. Providing forage above nutritional minimums not only improves economic returns, but also allows animals to maintain themselves during seasonal periods when forage quality and quantity is low. Protein, energy, phosphorus, and carotene (Vitamin A) are the four nutrients most critical to range livestock production. In "Nutritive Value of Seasonal Ranges," Cook and Harris (1977) demonstrate that digestible protein is the best indicator of forage quality and is one of the better nutrients associated with animal gains. Forage nutrient quality is directly related to plant growth stage, palatability, and seasonal variations in both of these factors. Proper range and livestock management is therefore related to long-term sustainability of seasonal forage quantity and quality.

The nutrient requirements for digestible protein, energy, phosphorus, and carotene for both sheep and cattle are shown in [Table 30.2-1](#). The nutrient content of the major range forage species contained in the reclamation seed mix is shown in [Table 30.2-2](#). A mixture of warm season grasses, cool season grasses, and palatable shrubs ensures forage of sufficient nutrient quality will be available during both the growing and dormant seasons. A comparison of [Table 30.2-1](#) and [Table 30.2-2](#) shows that vegetation resources of reclaimed areas will provide suitable quality forage during all four seasons. While only minimum maintenance needs may be met during the winter months, forage resources of higher quality during the growing seasons will provide animal gains and conditioning benefits to livestock that may be drawn upon during lean periods.

**30.3 Alternative Post-Reclamation Land Uses**

The post-mine land use will be grazing of domestic livestock and establishment of wildlife habitat. Therefore, BNCC is not proposing an alternative post-mining land use at this time.

**30.4 Conformance with Land Use Policies and Plans**

The proposed post-mining land use of grazing and wildlife habitat was developed in agreement with the Navajo Nation and the BIA and is consistent with the pre-mine land use ([Appendix 30.A](#)).

The Tiis Tsoh Sikaad (Burnham) Chapter has developed a community land use plan to assist the chapter in long-range planning (Architectural Research Consultants 2005). Although this plan primarily focuses on identifying suitable housing and development areas, it does recognize that livestock grazing is an important practice in the chapter. Some of the goals of the Burnham community are to: identify and set aside suitable lands for grazing and agriculture; promote range management practices that make ranching a sustainable use of the land; and retain existing wildlife. These goals are also represented in the planning policies used to implement the land use plan.

**30.5 Post-Reclamation Land Use Information Collection and Analysis**

BNCC personnel responsible for the collection and analysis of the information contained within this section are listed below.

*Personnel*

Persons or organizations responsible for data collection, analysis, and preparation of this permit application package section:

Kent Applegate  
Vivie Melendez  
BHP Navajo Coal Company

*References*

Architectural Research Consultants, Inc. 2005. Community Land Use Plan for the Burnham Chapter.  
Unpublished report prepared for the Burnham Chapter Community Land Use Planning Committee.

Cook, C.W., and L.E. Harris. 1977. Nutritive Value of Seasonal Ranges. Bulletin 472. Utah Agricultural Experiment Station. Soil Conservation Service. National Range Handbook, U.S. Department of Agriculture. Logan, Utah

Table 30.2-1 Recommended Nutrient Requirements for Cattle and Sheep Under Range Conditions During Gestation and Lactation on a Dry-Matter Basis <sup>1</sup>

Phase of production	Percentage of ration or amount/pound of feed			
	DP <sup>2</sup> %	ME <sup>3</sup> (kcal/lb)	P <sup>4</sup> (%)	Carotene (mg/lb)
Gestation	4.4	665	0.17	0.6
Lactation				
First 8 weeks	5.4	900	0.22	1.6
Last 12 weeks	4.5	700	0.20	1.6

<sup>1</sup> Nutrient requirements are slightly higher for sheep because smaller animals have a somewhat higher metabolic requirement per unit of body weight.

<sup>2</sup> DP = digestible protein

<sup>3</sup> ME = metabolizable energy

<sup>4</sup> P = phosphorus

Source: Cook and Harris 1977



Table 30.2-2 Nutrient Content at Various Stages of Growth for Forage Species Used in Revegetation Seed Mix

Species	Stage of growth	DP <sup>1</sup> (%)	ME <sup>2</sup> (kcal/lb)	P <sup>3</sup> (%)	Carotene (mg/lb)
Alkali sacaton ( <i>Sporobolus airoides</i> )	vegetative	5.3	950	.24	45.00
	flower	7.2	890	.22	-
	mature	3.4	880	.14	25.00
	standing cured	1.4	750	.08	0.67
Fourwing saltbush ( <i>Atriplex canescens</i> )	vegetative	9.4	1180	.21	65.00
	mature	6.5	1060	.19	25.00
	standing cured	5.8	847	.10	18.01
Galleta ( <i>Pleuraphis jamesii</i> )	vegetative	5.6	845	.20	-
	boot	5.4	845	.06	-
	mature	4.4	621	.12	25.00
	standing cured	1.9	429	.08	0.92
Giant dropseed <sup>4</sup> ( <i>Sporobolus giganteus</i> )	vegetative	5.4	1090	.24	46.00
	boot	4.2	973	.22	-
	mature	3.9	933	.10	0.52
	standing cured	1.6	913	.05	0.61
Indian ricegrass ( <i>Achnatherum hymenoides</i> )	vegetative	9.0	1276	.26	35.00
	flower	5.6	992	.25	0.40
	mature	4.2	851	.15	-
	standing cured	1.4	760	.09	0.09
Sand dropseed ( <i>Sporobolus cryptandrus</i> )	vegetative	5.4	1090	.24	46.00
	boot	4.2	973	.22	-
	mature	3.9	933	.10	0.52
	standing cured	1.6	913	.05	0.61
Shadscale ( <i>Atriplex confertifolia</i> )	vegetative	9.1	918	.17	25.00
	mature	8.1	920	.14	22.00
	standing cured	4.4	916	.06	-
Western wheatgrass ( <i>Pascopyrum smithii</i> )	4th leaf	5.0	1068	.20	-
	boot	11.9	1080	.26	60.00
	mature	3.9	1000	.16	-
	standing cured	4.4	995	.10	0.10

Table 30.2-2 (continued)

Species	Stage of growth	DP <sup>1</sup> (%)	ME <sup>2</sup> (kcal/lb)	P (%)	Carotene (mg/lb)
Winterfat	vegetative	9.0	960	.27	35.00
<i>(Krascheninnikovia lanata)</i>	boot	8.2	842	.18	25.00
	mature	6.1	749	.19	20.00
	standing cured	6.0	488	.14	5.00
Scarlet globemallow	vegetative	12.2	1344	.18	-
<i>(Sphaeralcea coccinea)</i>	full leaf	9.4	1270	.18	-
	mature	8.1	1264	.15	-
	standing cured	6.6	928	.15	-

<sup>1</sup> DP = digestible protein.

<sup>2</sup> ME = metabolizable energy.

<sup>3</sup> P = phosphorus.

<sup>4</sup> Sand dropseed values were also used for Giant dropseed because of the species similarity and the unavailability of specific values for Giant dropseed.

Source: Cook and Harris 1977

**Appendix 30.A**

Land Use Correspondence

## INTER-OFFICE CORRESPONDENCE

TO: A. F. GEIGER

DATE: April 5, 1971

FROM: A. KING

COPIES TO:

 B. Grant Files

REFERENCE: Contract No. # 14-20-603-2505  
Mining Lease - Tribal Indian Lands

The Amendment # 4 was passed 68-0 at a regular chapter meeting at the Nenahnezad Chapter on April 4, 1971. Although it took two meetings and a total of about six hours discussion on the amendment, the following were the peoples' main concern;

1. Reclamation in all areas that are mined, so eventually they will be able to reuse the land for grazing. They were assured the company will make all efforts to knock down the spoil piles and make it safe enough so the land will be reuseable.
2. Employment of as many Navajos as we possibly can take. It was mentioned that there are many non-Navajos employed where a Navajo should be working. They were told that we employ Navajos where they are qualified, but we have to have experience and trained personnel on all technical positions.
3. Compensation for their grazing rights and personal property on leased lands. They were advised that the tribe will make appraisal of the grazing land, property, and we are sure they will be fair and make proper compensation.

The meeting was very orderly, but was slow at times. Everything was settled in a friendly atmosphere.

A. King

cc. J. S. Anderson  
C. C. Dietrich



# United States Department of the Interior

## BUREAU OF INDIAN AFFAIRS

Shiprock Agency

P.O. Box 966

Shiprock, New Mexico 87420

IN REPLY REFER TO:  
Economic Development  
Land Operations

March 4, 1983

Navajo Mine  
William Skeet  
Environmental Coordinator  
P.O. Box 155  
Fruitland, New Mexico 87416

Dear Mr. Skeet:

The intent of this correspondence is to clarify the land use status of the area presently under lease by Utah International (Navajo Mine).

The predominant use of the area in question has been in the form of livestock grazing. Although dryland farming has been attempted, these endeavors have been very limited in scope and have met with marginal results.

Furthermore, the physical and chemical characteristics of the soil types in the area, when coupled with the lack of available irrigation water, precludes the existence of prime farmland in the vicinity of the lease.

If I can be of any further assistance, please do not hesitate to contact me.

Respectfully,

Jerry W. Thomas  
Natural Resource Manager

