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TRI-STATE

August 6, 2025

Ms. Hunter Ridley
Environmental Protection Specialist
Colorado Division of Reclamation, Mining & Safety
Department of Natural Resources
1313 Sherman Street, Room 215
Denver, CO 80203

RE: Colowyo Coal Company L.P.
Permit No. C-1981-019
Permit Revision 05 (PR-05)
Post Mine Land Use Revision

Dear Ms. Ridley,

Tri-State Generation and Transmission Association Inc. (Tri-State), is the parent company to Axial Basin Coal Company, which is the general partner to Colowyo Coal Company L.P. (Colowyo). Therefore, Tri-State on behalf of Colowyo is submitting permit revision 05 (PR-05) to Permit No. C-1981-019.

PR-05 proposes to revise the post mine land use for the Gossard rail loop area to Moffat County Road 51 from Rangeland to Other Treatment Facility area. This proposed revision to the post mine land use is necessary to support planned infrastructure for a water treatment facility that will be constructed in that area in 2026. Details engineering designs and other appliable information for the facility will be submitted to the Division late in 2025 or early in 2026.

Included in this permit revision is a change of index sheet to ease incorporation of this revision into the permit document, and a public notice for the Division's review. If you should have any additional questions or concerns, please feel free to contact Tony Tennyson at (970) 824-1232 or at ttennyson@tristategt.org.

Sincerely,

DocuSigned by:
Chris Gilbreath
D250C711D0BF450...

Chris Gilbreath
Senior Manager
Remediation and Reclamation

CG:TT

Enclosure

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cc: Tom Cummings (BLM)
Tony Tennyson (via email)
File: C. F. 1.1.4.5

CHANGE SHEET FOR PERMIT REVISIONS, TECHNICAL REVISION, AND MINOR REVISIONS

Mine Company Name: **Colowyo Coal Company**

Permit Number: **C-1981-019**

Date: **August 6, 2025**

Revision Description: **PR-05 Post Mine Land Use Revision**

Volume Number	Page, Map or other Permit Entry to be REMOVED		Page, Map or other Permit Entry to be ADDED		Description of Change
1	List of Maps pages ix and x (2 pages)		List of Maps pages ix and x (2 pages)		Referenes to Lower Wilson was correct, and Map 44 name was corrected.
1	Pages 2.05-9 through 2.05-37 (29 pages)		Pages 2.05-9 through 2.05-38 (30 pages)		Section heading was updated and place holder reference to the treatment facility was included. Section 2.05.5 has also been updated. Both additions caused a pagination shift.
1	Page 4-2 (1 page)		Page 4-2 (1 page)		Reference to Lower Wislon was removed from Section 4.02.6.
2A					No Change
2B					No Change
2C					No Change
2D					No Change
2E					No Change
3					No Change
4					No Change
5A					No Change
5B					No Change
6					No Change
7					No Change
8					No Change
9					No Change
10					No Change
12					No Change
13					No Change
14	Map 44		Map 44		Map 44 has been updated.
15					No Change
16					No Change
17					No Change
18A					No Change

CHANGE SHEET FOR PERMIT REVISIONS, TECHNICAL REVISION, AND MINOR REVISIONS

Mine Company Name: **Colowyo Coal Company**
Date: **August 6, 2025**

Permit Number: **C-1981-019**
Revision Description: **PR-05 Post Mine Land Use Revision**

Volume Number	Page, Map or other Permit Entry to be REMOVED		Page, Map or other Permit Entry to be ADDED		Description of Change
18B					No Change
18C					No Change
18D					No Change
19					No Change
20					No Change
21					No Change
22	Map 17		Map 17		Map 17 has been updated.

LIST OF MAPS

LIST OF MAPS

will generally be a dozer blade wide or approximately 25 feet. This allows for the cable equipment to access the corridor for placement and retrieval of the power cable. In addition this allows for small vehicle access for any maintenance activity that may arise.

Along the western limits of the west pit operations, highwall mining activities will be conducted under the existing Tri-State power lines. Colowyo will be responsible for impacts to the power lines as a result of these activities as documented in their agreement. See Exhibit 22. Further information regarding highwall mining is presented in Rule 4.23.

Haul and Access Roads

The haul roads and access road utilized at the Colowyo operation are shown on the Existing Structures Maps 21, 22A, and Map 25G Sheets 1 and 2. The road gradients are shown on the Haul Road "A" Profile (Map 25) and Haul Road "B" Profile (Map 25A). Haul roads, access roads and light use roads are discussed in Sections 4.03.1 through 4.03.3 of this volume (Volume 1) of the original permit as well as Volume 12 of the South Taylor expansion.

The hydrologic calculations for road drainage structures are shown in Exhibit 7, Hydrology Information.

Haul roads as mapped have been in existence since construction in 1976 and 1977.

All haul routes constructed within the immediate mining area are exempt from any construction specifications in accordance with Rule 4.03.1(1)(d)(i).

Ponds, Impoundments, Diversions, and Treatment Facilities

To control runoff, and protect surface and ground water quality, Colowyo has constructed several sedimentation structures and diversion ditches. Map 12 shows the locations of the sedimentation ponds and diversion structures. Most of these sedimentation ponds were constructed in 1978 and 1979 to comply with the performance standards of Subchapter B (Office of Surface Mining Interim Program Standards). The designs and specifications for each structure are presented in Exhibit 7, Hydrology Information and Exhibit 17, Haul Road and Facilities Modifications. All ponds, impoundments and diversions are designed to meet or exceed the requirements of 2.05.3(4) and 4.05.6.

The initial phases in construction of sedimentation pond embankments has been and will be to clear all unstable material and to scarify the entire surface. In no instances was or will coal processing waste be used as an embankment. All fill material was and will be selected to exclude the presence of sod, large roots, and frozen material. The placing and spreading of fill material was and will be started at the lowest point of the foundation.

All ponds, regardless of size, will be examined quarterly for structural weakness, erosion and other hazardous conditions. Maintenance procedures may include mowing or cutting excessive vegetative growth to facilitate inspections and repairs keeping ditches, culverts and spillways free of debris, and removing all combustible material other than mulch and other material required for

erosion control and surface stability. Sediment will be removed from all sedimentation ponds when the volume of sediment accumulates to 60% of the design sediment storage volume or when sufficient volume is not available to treat the predicted runoff and sediment volume from a 10-year, 24-hour storm event.. The accumulated sediment found in the ponds will be removed and placed in existing topsoil stockpiles if the sediment meets the appropriate topsoil criteria, otherwise disposed of in the pit backfill.Sedimentation pond removal is discussed in Section 4.05.

The location of all sedimentation ponds and diversion structures to be constructed within the permit area are shown on Map 12. These maps also show the locations of watershed boundaries from which, along with other sources, the design criteria were established. Generally, ponds and spillways were sized and placed according to such hydrologic factors as required sediment storage volume, rate of flow and volume of flow for the appropriate storm event.

Pond embankments, slopes, spillways and construction methods have been designed according to such engineering factors as structural integrity and stability, slope and surface stability; adequacy in height, size and shape to provide sufficient volume for sediment and detained water and selection of proper spillways and outlet devices, passing of design storm events and proper outflow rates. All ponds have been designed under the direction of a qualified, registered professional engineer.

The purpose of the sedimentation ponds is not only to provide a final measure to prevent additional contributions of sediment outside the permit area, but also to provide a means of compliance with all applicable effluent limitations, especially with respect to total suspended solids or settleable solids, as required.

The effluent quality is regulated by Section 4.05.2 and by the National Pollutant Discharge Elimination System (NPDES) Permit. The NPDES Permit was issued by the State of Colorado Department of Health under the National Pollutant Discharge Elimination System, established as a result of the Clean Water Act (33 U.S.C. Section 1251, et. seq.).

The engineering parameters for the various sedimentation ponds are included in Exhibit 7, Hydrology Information. The engineering design parameters for the various diversion ditches are also included in Exhibit 7, Hydrology Information. Cross sections for the sedimentation ponds and the designs for the emergency and primary spillways are shown in Exhibit 7, Hydrology Information.

Colowyo will manage water from the East Taylor Spring in a treatment facility planned to be constructed at the Gossard rail loop area. Detailed information regarding this treatment facility will be included in this section of the permit prior to ground disturbing activities commencing.

Topsoil Removal Plan

Prior to any mining related disturbances, topsoil will be removed from the site to be disturbed as discussed in Section 4.06 and redistributed or stockpiled as necessary to satisfy the needs of the reclamation timetable.

Topsoil will be removed in the permit area by bulldozers, loaders or scrapers as described in Section 2.05.3.

The sequence and timetable for all topsoil redistribution and revegetation activities is found on the Topsoil Handling Map (Map 28 and 28A). This drawing also shows the location of the topsoil stripping activities for the current term and future terms.

A life-of-mine topsoil balance is estimated in Table 2.05-1.

The time period during the year when topsoil removal, distribution and revegetation operations take place depends solely on the weather. Generally, topsoil removal and distribution operations will begin in the spring when soil conditions allow the movement of topsoil, and may continue until late fall until weather conditions prohibit any further topsoil handling. Revegetation, typically, will take place during the early spring or fall.

Topsoil in excess of the demands of the direct haul operation to regraded spoil is placed in topsoil storage stockpiles. The topsoil storage stockpiles for the mine plan area are shown on the Topsoil Handling Maps 28 and 28A. As can be seen, topsoil stockpiles have been constructed in the permit area to handle material which is in excess of current redistribution needs. The excess topsoil has been removed from the mining areas, from haul roads and from mine facility locations. The planned contemporaneous stockpiling and reapplication will eliminate the need to move topsoil stockpiles from one area to another prior to reapplication onto graded spoil.

Stockpiles are specifically located to avoid erosion from wind and water and additional compaction or contamination. As can be determined from the Topsoil Handling Map (Map 28), all stockpiles are located within stable areas. The piles will be protected from wind erosion by planting a perennial mixture as explained in Section 4.06.3 as soon as conditions allow. Proper seasons of planting will be early spring or late fall. In addition to the planted material, a considerable amount of volunteer growth can be expected to grow on all stockpiled topsoil.

External erosion will be controlled through proper location of the stockpiles. No permanent topsoil stockpiles will be placed in a drainage bottom where external erosion might pose a potential threat.

Unnecessary compaction will be avoided by keeping all but essential traffic off the stockpiled areas. Topsoil signs will identify topsoil stockpiles. Contamination of the stockpiles will be eliminated by the careful selection of sites that are distant from the areas where actual mining activities are occurring. Drainage ways and areas near spoiling and blasting will be avoided where possible.

Overburden and Coal

The complete description of the removal, handling and storage of all overburden material within the permit area is described under the Production, Methods and Equipment Section found at the beginning of Section 2.05.3. The mining sequence for the planned operation is shown on the Mine Plan Map (Map 23A and 23B). Cross sections showing the mining operation during the "steady-state" operation are found on the Mining Range Diagram Map 24B and 24C.

The planned coal production at the Colowyo operation is shown in Table 2.05-2.

Blasting

Colowyo usually engages in blasting of overburden and coal before its removal. A general sequence for drilling and blasting of overburden and coal will proceed as follows:

(1) Establish a drill bench on the overburden.
(2) Utilize the timing model to determine the maximum number of blast holes that will ignite in any 8-millisecond period, this will determine the size of the blast pattern and the maximum amount of explosive to ignite at any 8 ms time period.
(3) Compare this poundage of explosives to the "scale distance formula" result. If the blast design exceeds the criterion of the "scale distance formula," then we will revise the design until compliance is met.
(4) Blast pattern design will then be sent to the field for implementation by the blasters.
(5) Drill blasting pattern.
(6) Load drill holes with explosives.
(7) Blast reports will then be recorded to meet the criteria noted in Rule 4.08.5 (1) thru (18) for surface coal mining operations.
(8) Blast overburden.
(9) Remove blasted overburden with shovel, front-end loader, or dragline.
(10) Clean coal seam.
(11) Drill blasting pattern.
(12) Load drill holes with explosives.
(13) Blast Coal Seam
(14) Remove blasted coal with front-end loaders.

Colowyo will comply with all applicable state and federal laws in its use of explosives. Experienced, trained, certified and competent persons conduct all blasting operations.

Because of the inherent complexities of the Colowyo mining operation, the surface blasting program has been developed to conform with a variety of coal seams and the diverse overburden handling techniques. The coal blasting will vary from coal seam to coal seam because of the different thickness encountered. Three general types of overburden blasting will be required: one for blasting overburden, one for the pre-splitting of overburden to provide for safer highwalls and one for blasting coal.

Approximate blasting patterns for coal and overburden are shown in Table 2.05-4, Blasting Parameters – Overburden (Typical); Table 2.05-5 Blasting parameters – Overburden pre-Split Shot (Typical) and Table 2.05-6, Blasting Parameters – Coal (Typical).

Colowyo will conduct a timing analysis through various methods for each overburden shot utilizing the down hole delay timing, hole-to-hole delay timing, and row to row timing as applicable to verify the maximum number of holes and thereby pounds of explosive detonated per 8 ms time period. This analysis can be conducted by hand or with computer software that predicts

the timing of each hole and the maximum number of holes that will initiate within the prescribed time period.

Examples of the maximum pounds of explosives per 8ms period of time versus the distance to local residences and dwellings of concern is reflected on Map 26A – Blasting Analysis Map. Colowyo has historically calculated the maximum weight of explosives detonated with any 8 ms time period by the following means:

(Max. no. of holes in an 8-ms) x (Max. lbs. of explosives put in any one hole)

The maximum charge weight has been calculated this way to ensure that any blast designed under this criterion would not exceed the allowable amount using the scale distance formula. Thereby, meeting the intent of the law to not exceed the maximum weight of explosives in any 8-ms time period. Colowyo's blast records reflect the maximum weight of explosives using the above method.

The typical blasting parameter tables are merely examples of the programs used in blasting coal and overburden at Colowyo. As such, they are not intended to represent any one blast exactly as conditions in the field dictate the exact design for each blast. For example, an overburden blast may be drilled with an offset pattern, 25 feet x 30 feet spacing and tied in row on row rather than the design shown on Table 2.05-5.

The blast initiation systems that Colowyo uses may vary, but all are noted on the blast report for each blast event. For example one type of blast initiation system is the EZ Dets system. These systems are used to initiate the blast from the certified blaster to the initiation hole and all other holes then tied into that system. An entire initiation system could consist of down the hole caps, delays, and tubing connected to a surface system of cords, delay connectors, and initiation terminal. The system is designed specifically for each blast event to not exceed the requirements of the scaled distance formula or the one hole per 8ms time period requirements. Types of blasting materials and delays to accomplish this are noted on each blast report.

Blasting Records

Colowyo will keep a record of each individual blast by utilizing report formats shown in Figure 2.05-2 - Blasting Report (coal and overburden), Figure 2.05-3 – Colowyo Chargeweight Sheet (overburden only).

These blasting records, along with monthly pit records (hardcopy and electronic copy) can be used to compile all of the information necessary to recreate the blast and contain the data necessary to comply with Rule 4.08.5.

Pre-Blasting Survey

Pre-blasting surveys and assessments of surface structures or other structures will be conducted upon request by residents or owners of dwellings located within one-half mile of the Permit Area. A written report of the pre-blasting survey will be promptly provided to the persons requesting the

survey and to the Division. For properties owned by Colowyo, a pre-blast survey will not be necessary. In a report dated February 19, 1991 Colowyo initiated and reported on a Building Condition Inspection of the Durham Ranch. Although the Durham ranch was located further than one-half mile from the Permit Boundary at that time (approximately 4200 feet) the inspection was nevertheless completed. The Durham Ranch residents were also presented with a copy of the report. On May 20, 1997 an additional copy of the report was presented to the Durhams and also a copy forwarded to the Division. A copy of-the May 20, 1997 letter can be found in Exhibit 14 - Seismograph Measurements.

Public Notice of Blasting Schedule

Colowyo will republish a blasting schedule similar to the one set forth in Figure 2.05-1, Publication of Blasting Schedule, in the local newspaper published in Craig, Colorado. The schedule will be republished at least every 12 months. Before blasting in areas or at times not described in the published blasting schedule, a revised schedule will be promptly mailed to residents or owners of dwellings or persons who might regularly work within one-half mile of the area affected by blasting activities. Colowyo will conduct blasting at times identified in the blasting schedule (Figure 2.06-1), except in those unavoidable, hazardous situations where public or mine safety is involved. Unavoidable hazardous situations are seen to exist if safety requires the following:

(1) Destruction of damaged or deteriorated explosives or detonators in a safe manner;
(2) Disposal of misfires and/or undetonated explosives;
(3) Firing of charged holes as soon as practical after cessation of static electricity or stray conditions where electric detonators are used; and
(4) Firing of charged holes when weather or other conditions indicate the existence of a safety hazard is imminent.

General Blasting Procedures

Colowyo gives warning and all-clear signals of different character that are audible within a range of one-half mile from the point of the blast. Persons working within the permit area and each person who resides or regularly works within one-half mile from the blast area will be informed of the meaning of the signals through appropriate instructions. Access to the immediate area of the blasting site will be cleared and controlled by qualified mine personnel prior to any blast. Colowyo also maintains signs in accordance with 4.02.6. All areas subject to blasting are fenced for livestock.

To protect the public, Colowyo will regulate access to any area possibly subject to flyrock from blasting within the permit area. The mine area will be identified by signs on all access roads restricting entry to unauthorized personnel. Signs identifying the area as a blasting area will describe the warning and all-clear signals. Four series of three short sirens and four series of three long sirens will be sounded before the blast. After checking the blast, the Blasting Foreman will report all clear to the barricade crews.

Colowyo will use the explosive equation of 4.08.4 (10)(c)(i) to limit the pounds of explosive per 8ms period, similar to that shown on the Blasting Analysis Map (Map 26A). Some previous seismographic measurements were made during blasting operations at Colowyo; the results are set forth in Exhibit 14 - Seismographic Measurements. Although seismographic measurements have been made in the past seismographic records will not be used to demonstrate compliance with maximum peak particle velocities. Colowyo has chosen to continue the use of the -scaled-distance formula in Rule 4.08.4(10) (c) (i) to demonstrate compliance with ground vibration requirements.

Colowyo will conduct airblast monitoring to ensure compliance with airblast standards. All blast events will be monitored for airblast. On these reports Colowyo will record the name of the company doing the monitoring, the person taking the periodic airblast reading, the name of the person analyzing periodic airblast records, and the distance of the instrument from the blast. Airblast monitoring will be taken from the closest dwelling to the blast area. An Instantel Inc. MiniMate Series III , model DS-477 are maintained at the Durham Ranch and Wilson Creek resident area. Details regarding the monitor specifications are included in Exhibit 14.

Airblast monitoring will be recorded on a seismograph report (See Figure 2.05-4) for review by in-house personnel, agency representatives, and requesting publics. The airblast data is recorded under the "PSPL" (Peak Sound Pressure Levels) in decibels (dB).

Additional information concerning the use of explosives is found in Section 4.08.

Disposal of Excess Spoil

Two additional pits have be developed within the permit boundary at Colowyo. One of the pits was developed in Sections 15 and 16, south of the existing operation and the other pit, defined as the West Pit, was developed in Section 4.

The pit in Sections 15 and 16 (Section 16 Pit) was a single seam dragline operation. To develop the dragline operation, an initial cut must be opened near outcrop. A permanent excess spoil fill of approximately 2 million yd^3 of excess spoil was constructed to accommodate the initial cuts. Please see Map 23 for historical mining areas of the Section 16 Pit.

The West Pit was a multiple seam operation utilizing truck/shovel and dragline methods, similar to the East Pit operation. Approximately 45 million yd^3 of box cut material was placed in an external fill (approximately 22 million yd^3) north of the box cut excavation or as backfill (approximately 23 million yd^3) in the initial pit area. Over 3 million yd^3 was moved from the external fill and backfilled within the pit limits of the East and West Pits. Approximately 19 million yd^3 of excess spoil will remain in place as a permanent excess spoil fill, consistent with applicable provisions of Rule 4.09(3).

The West Pit Fill and Section 16 Fill are considered complete and have been mostly if not all Phase III released. No additional excess spoil exists for the West or Section 16 Pits.
Detailed geotechnical investigations were completed for both the West Pit Fill and the Section 16 Fill by CTL/Thompson, Inc. Reports of the investigations are found in Exhibit 19. Construction

plans for the fills, addressing the requirements of Rule 4.09, Disposal of Excess Spoil, can also be found in Exhibit 19.

The topography following mining and reclamation activities is shown on the Postmining Topography Map (Map 19). Cross sections relating the premining and postmining topographic configurations are presented as the Premining and Postmining Cross Section Maps (Maps 20 and 20A).

Coal Handling Structures

Map 1 Surface ownership shows pre-mining contours and Map 19A Postmining Topography Gossard Area shows post-mining contours of the loadout. All facilities not to be included as part of the post-mining land use will be removed (see Section 2.05.5). After the facilities are removed, the land will be regraded to blend with the existing undisturbed topography, retopsoiled and revegetated in accordance with Section 2.05.4.

The detailed description of the various coal crushing, handling and loadout facilities for the Colowyo operation is found under the Mine Facilities Section in 2.05.3. The location of the coal processing facilities is found on the Existing Structures - North Map (Map 21), the Existing Structures - South Map (Map 22) and the Existing Structures- South Taylor Map (Map 22A).

Coal Processing Waste and Non-Coal Processing Waste

Not applicable. Colowyo uses dry crushing facility for coal preparation; no coal processing waste, as defined in Rule 1.04 "DEFINITIONS", is produced from any part of the mining operations.

Underground Development Waste

Not applicable. Colowyo is not conducting an underground operation.

Return of Coal Processing Waste to Abandon Workings

Not applicable. No coal processing waste as defined in Rule 1.04 "DEFINITIONS", is produced from any part of the Colowyo mining operations.

2.05.4 Reclamation Plan

The objective of the reclamation plan is to stabilize the soil, maintain hydrologic function, re-establish appropriate vegetation, and to restore the approximate original contour of the mined area. Ultimately, the areas being mined will be returned to an appropriate and productive post-mining land use, with watersheds having their approximate pre-mining character. In general, the long term appearance and beneficial uses of the mined area will be similar to that which would have been encountered prior to mining activity.

The principal basis of Colowyo's reclamation plan is to rebuild a post mine landscape that mimics the natural terrain features, accounting for local slope aspects, steepness, and topographic features.

By incorporating variation in the terrain, the reclamation system will encourage the establishment, sucession, and persistence of mixed native vegetation communities. These efforts will facilitate the establishment of reclaimed plant communities that meet the designated post mining land use of rangeland, with the subcomponents of grazingland and wildlife habitat. Please see Section 2.05.5 for a detailed description of the post mine land uses at Colowyo.

Areas designated as grazingland for the post mining land use will aim to establish vegetation communities comprised of species primarily selected for palatability and production, with incidental wildlife habitat. The reclamation seed mixes utilized in grazingland targeted areas are designed to establish highly productive stands of native perrennial grasses to support grazing and forage, yet the mixes contain forbs and shrubs to also provide additional benefits for incidental wildlife use. Topsoil replacement depths in grazingland areas vary based on slope, which will encourage species diversity and mimic soil development processes in native soil systems.

Areas designated for wildlife habitat as the post mining land use will aim to establish a sagebrush steppe vegetation community. The reclamation seed mix utilized in sagebrush steppe targeted areas is designed to encourage sagebrush establishment by decreasing perennial grass competition through decreasing the number of grass species and seed numbers, and also incorporating only bunchgrasses (as opposed to sod-forming grasses), with a significant increase in the total amount and relative proportion of sagebrush seed. Reclamation techniques that will encourage the deposition and entrapment of blowing snow (to increase spring soil moisture) are also employed in sagebrush steppe targeted areas, to provide a competitive advantage to sagebrush over perennial grasses. These techniques include taking advantage of site-specific opportunities for the development of convex and concave surfaces along with the potential development of small berms along the contour and approximately perpendicular to prevailing winds. Topsoil replacement depths in sagebrush steppe targeted areas will be reduced relative to other areas, also to decrease competition from grasses.

The reclamation timetable and associated acreages for the various aspects of the mining operation are provided on Table 2.03-1.

In the South Taylor reclamation areas, geomorphic reclamation techniques will be implemented in the final PMT surface. Geomorphic reclamation techniques are used to design and construct a PMT, which beaks up long continuous slopes with smaller watersheds, adds sinuosity to the post mine permanent channels, and creates a landform that is erosionally stable. Part of the final configuration of the South Taylor geomorphic reclamation PMT surface specifically targets topography to harvest wind and snow for reestablishment of tall shrubs and aspens, which are required for the revegetation success of the South Taylor Pit.

Backfill and Grading Plan

As discussed in detail in Section 2.05.3, the mining method implemented by Colowyo is referred to as open-pit multiple seam/single seam dragline mining. The overburden material from the initial boxcut area was deposited in a permanent valley fill. As mining progresses, overburden material from each successive cut is backfilled into the previously mined out area. This cycle was repeated for the entire mining area. Because an open-pit mining technique is used, the regrading and

backfilling of the spoil material is as contemporaneous as possible behind the mined-out area to facilitate proper leveling of the overburden material.

The backfilled mining areas are graded to establish the approximate original contour and to blend in with the undisturbed areas outside the mining limits. Additional information on the backfilling and regrading plan are discussed further in Section 2.05.3 and Section 4.14.

Final grading before topsoil placement will be conducted in a manner that minimizes erosion and provides a surface for the topsoil that minimizes slippage. If spoil compaction is a problem, the spoil will be ripped with a dozer to minimize compaction, assure stability, and minimize slippage after topsoil replacement. Where possible, development of concave landforms (to encourage snow entrapment) will be developed.

Where necessary, the overburden surface will be roughened by ripping or discing etc., to ensure a bond between the topsoil and spoil to reduce slippage. To date there is no evidence of topsoil slippage on reclaimed areas. A few small tension cracks resulting from settling of fill along tie in locations with highwall have occurred in a few areas. However these areas within a year or two after reclamation, soon stabilize and begin to fill in.

The final post mine surfaces are shown on Map 19, 19A, and 19B. Appropriate cross sections that show the anticipated final surface configuration of the reclaimed area, in conjunction with the existing pre-mining topography are shown Maps 20, 20A and 20B.

Topsoil Redistribution Plan

As discussed in Section 2.05.3, prior to any mining-related disturbances, all available topsoil will be removed from the site to be disturbed, and will be redistributed or stockpiled as necessary to satisfy the needs of the reclamation timetable described herein. The topsoil redistrubtion plan is also broken into three distinct timeframes which are pre-2005, 2005 to 2009, and post-2010. Each plan is described in more detail below.

Pre-2005 and 2005-2009 Topsoil Redistribution Plan

Prior to 2005, essentially all reclamation units were covered with an average of 18 inches of topsoil. From 2005 through 2009, reclamation areas received an approximate average of 8 inches of topsoil. Most of these reclamation areas have been Phase III released to date, and the remaining units on schedule for a near future Phase III bond release application.

Post-2010 Topsoil Redistribution Plan

Variable topsoil replacement depth has been utilized at Colowyo since 2010. Post-2010 topsoil replacement is directly tied to the post mine land uses presented in Section 2.05.5, targeting two rangeland components consisting of grazingland and wildlife habitiat (sagebrush steppe).

In grazingland targeted areas (areas with slopes greater than 10%), topsoil will be redistributed utilizing variable replacement depths. Thinner topsoil (approximately six inches) will be replaced on ridge tops, and topsoil replacement depth will gradually thicken moving down the slopes toward the drainage bottoms. This gradation in topsoil depth on slopes recreates native edaphic conditions

and mimics soil development on local landforms. Lower-lying areas (relative to the surrounding landscape), such as natural swales, depressions, and subtle drainageways that tend to catch more snow will also receive deeper topsoil replacement depths. These areas should store greater quantities of moisture, which will increase overall productivity, while providing enhanced opportunities for growth and development of the mountain shrub and snowberry communities (seed is a component of the grazingland seed mix). Even in areas where these shrub species do not initially germinate, the deeper soils systems with increased water holding capacity and altered hydrologic function of localized areas with increased snow capture will mimic the native conditions for mountain shrub and snowberry communities, setting the foundation for succession to progress in these areas over long-term time horizons.

In wildlife habitat (sagebrush steppe) targeted areas (flatter areas with less than 10% slopes), topsoil replacement depth will target an average of four inches, with a more uniform application depth to encourage proper seeding depth and conditions for sagebrush establishment. To encourage snow capture and increase spring soil moisture, reclamation techniques will attempt to take advantage of site-specific opportunities for the development of convex and concave surfaces along with the potential development of small berms along the contour and approximately perpendicular to prevailing winds.

General Topsoil Handling Procedures

Colowyo will ensure proper topsoil resource management through various quality assurance and control procedures. Procedures utilized to account for topsoil volumes include an annual analysis of the topsoil balance, accounting for volumes in stockpiles, current and following year's reclamation areas, the total disturbance area, and the results of topsoil stripping activities each year. Detailed soil maps for the permit area assist operations and guide management in preparation and scheduling for topsoil salvage activities. Topsoil resources are generally segregated by area (East Pit, West Pit, Section 16, South Taylor Area, facilities, Gossard Loadout, etc.), to ensure that these resources are reapplied to the general areas from which they came.

During topsoil removal in advancement of the mining operations, dozers will be utilized to pile up the topsoil so it can be loaded and hauled to stockpile or immediately to a reclamation area. Scrapers may also be employed for topsoil removal as deemed appropraiote. Topsoil salvage is guided by the existing soil maps and resources available to Colowyo personnel. Topsoil salvage is avoided during times of soil saturation, as a best management practice to avoid overly compacting the soil.

Topsoil stockpiles are revegetated as soon as is practicable to prevent losses from wind and water erosion. Stockpiles are seeded with a mix of native reclamation species to stabilize the stockpile. All stockpiles are properly labeled as topsoil to avoid mishandling, and detailed as-built information is collected to accurately calculate stockpile volumes as a quality control procedure. All topsoil stockpiles are protected with a ditch and berm around their perimeter to conserve the resource.

When topsoil is to be reapplied following stockpiling, topsoil is normally loaded from stockpile with loaders and trucks, and then hauled to the backfill reclamation areas, where it is dumped and graded for final placement. Topsoil hauled in trucks will be dumped strategically to minimize

handling and disturbance, and then pushed out with dozers and/or scrapers until spread to the appropriate locations and depths. Reapplied topsoil will be graded in a manner that maintains surface roughness to help minimize sheet flow and erosion while also creating microtopography to assist vegetative diversity on the reclamation. On steeper slopes (typically greater than 10% slope) Colowyo will also employ the use of contour furrows and cross ripping following topsoil laydown to create slope breaks and increase surface roughness on otherwise long and straight slopes.

At the discreation of Colowyo, native soil, collected from the local ecosystems, will be used to inoculate reclamation areas with beneficial mycorrhizae. Mycorrhizae are symbiotic relationships that form between fungi and plants. The fungi colonize the root system of a host plant, providing increased water and nutrient absorption capabilities while the plant provides the fungus with carbohydrates formed from photosynthesis.

Revegetation Plan

Following the topsoiling of an area, Colowyo will reseed the topsoiled area as soon as is practicable in accordance with the targeted post mining land use as described in Section 2.05.5. Seeding is targeted to occur during in the fall, prior to the first snowfall event (typically mid to late October).

Colowyo typically uses a rangeleand drill to complete seeding on both targeted post mine land uses. However, Colwoyo also has the ability to utilize a Truax (Trillon) drill if deemed necessary. At times, broadcast seeding may be required on steeper areas, wet areas, very rocky areas, or simply on areas that were missed by the other seeding equipment. If seeding cannot be completed prior to seasonal snowfall, broadcast seeding may occur in the spring as soon as ground conditions allow. Broadcast seeding of the sagebrush steppe areas may also be seeded directly into snowbanks if winter or spring conditions allow. When broadcasting is utilized and ground conditions allow, a very light tine harrow or similar equipment may be dragged behind the seeder to facilitate improved soil to seed contact.

Seed Mixes

Two seed mixes are utilized at Colowyo, with each mix designed to facilitate revegetation meeting the designated post mining land use of rangeland, subcomponents of grazingland and wildlife habitat (sagebrush steppe). The mixes have been adapted over time in response to changing regulatory requirements, and thorough evaluations of quantitative emergence and dominance data from reclaimed and released reclamation areas. The mixes represent the seasonal varieties and lifeforms present in the pre-mine area, and are comprised almost entirely of native species. The lone introduced taxon included in both seed mixes (cicer milkvetch), which provides excellent forage for wildlife and livestock, is very successful on Colowyo's existing reclamation, and is an excellent species for providing necessary habitat requisites for a variety of insects that in turn are especially important to other wildlife.

Grazingland Seed Mixture

The reclamation seed mixture for post mine areas targeting grazingland is presented on Table 2.05-7. The grazingland seed mixture contains sufficient diversity for ecological stability, erosion control for steeper slopes, and will meet the goals of the designated post mining land use. The seed mixture contains a variety of grasses, forbs and shrub species well adapted to the soil and

moisture conditions found at Colowyo. The seed mixture includes species capable of occupying the anticipated micro-habitats encountered in the reclaimed areas. This seed mixture will be quickly effective for erosion control in young reclamation, while also facilitating the desired post-mining vegetative community with the same seasonal varieties and lifeforms of the pre-mined area.

The species and seeding rates indicated on this grazingland mix have been adapted from an analyses of the success of past mixes, and the resulting emergence and dominance data within previously successful revegetated areas.

Wildlife Habitat Seed Mixture
The reclamation seed mixture for areas targeting wildlife habitate (sagebrush steppe) is presented in Table 2.05-8. The sagebrush steppe seed mixture also contains sufficient diversity for ecological stability. This mixture contains a variety of grasses, forbs and shrub species well adapted to the soil and moisture conditions found at Colowyo and should provide both the structural diversity and life form diversity necessary for the designated sagebrush steppe wildlife habitat. The seed mixture includes species capable of occupying the anticipated micro-habitats encountered in the reclaimed areas and contains sufficient sagebrush seed to hopefully encourage at least some emergence each year, and occasional substantial emergence when climatic conditions are favorable.

Similar to the seed mixture for grassland areas, the species and seeding rates indicated on this sagebrush steppe mix resulted from in-depth analyses of past mixes and the resulting emergence and dominance within successful revegetated areas at Colowyo. Furthermore, it is anticipated that the reduced competition from grasses, especially sod-forming species such as thickspike wheatgrass, will result in elevated diversity and better performance from slower growing species.

Although not yet identified as an issue on Colowyo's reclamation, because the amount of grasses (and all sod-formers) has been substantially reduced for this sagebrush steppe mix, it is possible that on occasion, grass emergence may not be satisfactory for erosion control or life form diversity. If this scenario occurs in the future, a supplemental inter-seeding with the grassland mix may be utilized to increase the grass and forb component of the specific area. This activity is allowed under Rule 4.15.7 (5)(g).

Contingency Seed Substitutions
Table 2.05-9 provide a list of contingency species for Table 2.05-7 and Table 2.05-8, should certain taxa be unavailable or unwarranted in any given year.

Fencing

Where Colowyo deems appropriate, smaller areas within a larger areas seeded to wildlife habitat may be fenced to encourage shrub development and to limit browsing by local wildlife.

Mulching Techniques

Mulching techniques are not currently employed at Colowyo, except in rare instances. During the

initial permitting processes, Colowyo proposed that on slopes flatter than 4h:lv that rather than utilize a hay mulch, a stubble mulch or no mulch be used on reclaimed areas. The use of mulch on these relatively flat slopes was demonstrated to be of no value towards reclamation at the Colowyo site. The application of mulch was identified to produced problems with delayed germination on the reclaimed areas, rather than solving an assumed erosion problem, which is addressed through other methods.

Mulches tend to shade the soil, thus slowing the rise in soil temperature needed for germination of seeds. At Colowyo, the higher elevation and typical late spring snows result in cooler spring temperatures and delayed soil thawing. By eliminating the use of mulch, the soil temperature is increased earlier in the spring, thus enabling the seeds to germinate earlier when soil moisture conditions are optimum, immediately following snowmelt. Earlier growth also results in further root development by the plants, aiding survival through the dry and hot summer months.

Without the use of a mulch, erosion control has been maintained with surface manipulation methods such as contour furrows, drainage benches and permanent drainage channels. The initial reclamation at Colowyo that began in 1978 is indisputable evidence that the methods used at Colowyo have proven highly successful in controlling erosion on slopes as steep as 3h:lv until vegetative cover has established. Where deemed necessary by Colowyo (e.g., sagebrush steppe targeted areas, south-facing slopes, high wind areas, etc.), mulching techniques (or other practices such as chisel plowing, or discing on the contour) will be reinstated as necessary.

Irrigation

No irrigation is planned for areas to be seeded.

Pest and Disease Control

Noxious plants, as defined in Section 1.04, will be managed in accordance with the following section – "Weed Management Plan". If insects become a problem to the point where they endanger the successful establishment of the seeded vegetation on the reclaimed area, they will also be controlled using methods suggested by the Colorado State University Extension Service. All herbicides and pesticides utilized will be those that are approved by the appropriate state and federal governmental agencies responsible for the approval and distribution of such agents.

Weed Management Plan

A listing of Colorado's noxious weeds (A, B, and C lists) as well as an indication of Rio Blanco and Moffat Counties' listed taxa are indicated on Table 2.05-10 along with an indication of those taxa that have been observed on or near the Colowyo mine. As indicated on this table, there are no "A" list taxa known from the area. "A" list taxa must be eradicated. To the contrary, there are seven (7) "B" list (must be managed) taxa known from the environs of the Colowyo Mine as well as three (3) "C" list (management may be required by local governments) species. Of these 10 species, common mullein and poison hemlock from the "C" list, and Russian olive from the "B" list are not overly problematic and will normally not require attention. In fact the Russian olive

was purposefully planted in the reclamation. If "infestations" of common mullein or poison hemlock evolve, they will be treated in the same manner as the more problematic species.

The remaining seven species: hoary cress, musk thistle, Canada thistle, bull thistle, houndstongue, black henbane, and downy brome (cheatgrass) will be the primary focus of the program and will likely receive attention as appropriate at the Colowyo mine. In addition, continued monitoring of reclamation will focus on identification of any new noxious weeds.

For the most part, noxious weeds observed on or near Colowyo reclamation do not achieve "infestation" levels. By infestation, Colowyo means: 1) relative cover contribution of one noxious weed species or a combination of noxious weed species exceeding three percent in a revegetated stand; or 2) a "patch" of any listed species in which the noxious weed component exceeds 25% relative cover and occupies an area larger than 100 square feet on any disturbed area. Rather, noxious weeds tend to occur as scattered individuals or small pockets of individuals. This distribution suggests that spot control will be the only effective procedure that can be utilized.

To manage these seven noxious weed species populations, Colowyo will either perform itself, or contract out, annual weed control activities. Weed control will typically involve herbicide application at the appropriate rates and during the appropriate life stages (as possible) to effect control. Spot applications will be preferred over "blanket" applications to prevent loss of desirable reclaimed taxa such as seeded forbs and shrubs, however, blanket application may be necessary if any infestation areas are observed.

All Colowyo staff remain vigilant for pockets of noxious weeds in the reclamation. If larger concentrations are observed, they will be mapped, recorded with GPS, or other means of identification to facilitate control by weed spraying crews. Both the weed spraying crew and the revegetation monitoring crews will be especially important in this regard.

In addition to revegetated areas, vigilance will be maintained for other locations conducive to noxious weed populations. Such areas include: riparian areas, topsoil piles, major traffic areas, road cuts and fill slopes, ditches, pond embankments, non-use areas, etc.

Weed control measures may include mowing, discing (conventional cultivation), burning, grazing, or applying an approved herbicide. Weedy annual species (such as pennycress) with a single season life cycle provide initial site stabilization and moisture conservation in newly seeded reclamation sites; as such they will not be specifically targeted for control. Historically, seedings on reclaimed sites have greatly out competed annual weed infestations within three or four growing seasons.

Specific control measures will be selected by evaluating the location, growth characteristics and vulnerability of each weed. Management efforts will begin after proper planning and evaluation are performed. Proper use of chemicals applied during weed control is ensured by oversight of weed spraying activities by individual(s) certified by the State of Colorado to handle and apply herbicides.

Measures for Determining Success of Revegetation

Measures for determining successful revegetation are outlined in Section 4.15.

Soil Testing Plan

From conception to the mid-1990's, Colowyo tested for topsoil fertility. In order to assure that the reapplied topsoil would support the proposed post-mining land use of rangeland, a soil sampling program wase implemented. Soil samples were taken randomly over each retopsoiled area and were analyzed for nitrate-nitrogen, phosphorus, and potassium. Historical results indicated adequate nutrient value to support post-mining revegetation.

Colowyo has demonstrated through numerous years of monitoring that topsoil fertility is not a concern at the mine; this is mainly due to the nutrient rich soil that is commonly present throughout the region. As a result, Colowyo has suspended the soil testing program requirements, until such time as Colowyo determines that the soil fertility adversely affects the reclamation and/or the post-mining land use.

As needed, other soil amendments could be considered for addition to the reclaimed areas to support reclamation efforts.

Acid-Forming and Toxic-Forming Materials

No significant acid-forming materials exist within the overburden soil or coal seams to be mined. Therefore, Colowyo will not undertake special handling procedures as described in Section 2:05.3. A detailed description of the chemical characteristics of soils and overburden materials is presented under Sections 2.04.6 and 2.04.9.

For a detailed description of the special handling of spoil material and sampling programs, refer to the Production Methods and Equipment Segment of this section.

Flammable liquids, such as oil and fuel, will be protected from spilling into other areas by earthen, concrete or HDPE lined structures surrounding each storage facility. A spill containment control plan has been developed to protect against spills.

All major equipment on the mine site will be equipped with portable fire extinguishers or automatic fire suppression systems. The water truck used for dust suppression at the mine site could also be used to control most fires.

Sealing of Exploration and Mine Holes

Exploration and mine holes which remain open for use as a water supply well or for use as a groundwater monitoring well will be completed with casing or piezometers at sufficient height above the land surface to prevent drainage of surface water or entrance of foreign material into the well, and will be fitted with caps to prevent the introduction of objects other than monitoring and sampling equipment. When the groundwater monitoring wells are no longer needed or required

for any purpose, each well will be eliminated by plugging with concrete to the surface and removal of the associated surface structure.

Plugging procedures utilized for exploration drill holes that will not be mined through during the current Permit term are as follows:

1. Drill holes drilled deeper than the stripping limit (450-500 feet) will be plugged by pumping cement or heavy solids bentonite Plug Gel or chips through the drill stem from the bottom up to within 3 feet of the ground surface.
2. Drill holes shallower than stripping limits (450-500 feet) may be plugged with the ready-mix concrete method instead the method in #1 to within 3 feet of the ground surface.
3. Drill holes with no water or coal zones may be plugged by backfilling with cuttings, and placing a plug ten feet below the ground surface to support a cement plug or bentonite chips to within 3 feet of the ground surface.

For safety considerations, exploration drill holes that will eventually be mined through during normal mining activites need only be covered with wood, plastic or other such material or otherwise bermed to prevent access until mining operations mine through each hole.

Those holes completed in aquifers will be sealed entirely with cement or other suitable sealant to within 3 feet of the ground surface.

Where possible, the sealed holes will be marked. At times reclamation operations will cover up the sealed drill holes and marking of holes will not be possible.

Within 60 days of the abandonment of a drill hole, approved drilling program or when requested by the Division, the following information will be submitted:

a) Location of drill hole as plotted accurately on a topographic map.
b) Depth of drill hole.
c) Surface elevation of drill hole.
d) Intervals where water was encountered during drilling activities.
e) Diameter of drill hole
f) Type of amount of cement or other sealant used.
g) Name of drilling contractor and license number of rig.
h) How the hole was worked.

Exploration taking place inside and outside of the permit area will be handled through the Notice of Intent (NOI) procedures. See the appropriate NOI for details for each program.

Water and Air Quality Control Techniques

Steps to be taken to comply with the Clean Water Act and other applicable water quality laws and regulations and health and safety standards include a comprehensive drainage and sediment control plan described in Section 2.05.3 and Sections 4.05.1 through 4.05.18. With respect to compliance with the Clean Water Act, Colowyo has a discharge permit from the Colorado State Department

of Health under the National Pollutant and Discharge Elimination System (NPDES). Compliance with this permit will serve to effect compliance with the Clean Water Act and the Colorado Water Quality Control Act. A copy of this submittal is presented in Exhibit 7, Hydrology Information.

Colowyo, likewise, operates under several emission permits from the Colorado Department of Health, Air Pollution Control Division. Fugitive dust control measures will be employed as an integral part of the mining and reclamation operations.

Colowyo conducts air quality monitoring at the site in accordance with the requirements of emission permits approved by the Colorado Air Pollution Control Division. A copy of all applicable emission permits has been included in Exhibit 8 of the application.

Details of pollution control measures are discussed in section 2.05.6.

2.05.5 Post-mining Land Uses

The implementation of the reclamation plan as described in Section 2.05.4 will restore most of the disturbed land to the pre-mining use of rangeland, with two targeted subcomponents of grazingland and wildlife habitat (sagebrush steppe), and one area will have the post-mine land use of Other Treatment Facilities as described in Rule 1.04(81a). Please see Maps 17 and 44 for the approximate locations of the post mine land uses that will be implemented at Colowyo. Please refer to Section 2.05.3 – Ponds, Impoundments, Diversions, and Treatment Facilities for detailed information pertaining to the Other Treatment Facilities area.

Replacement of grazingland will be facilitated by targeting revegetation efforts toward primarily grassland communities. Because grasslands are effective for erosion control, this post mine land use will be implemented on those lands with slopes greater than 10%. Replacement of wildlife habitat will be facilitated by targeting revegetation efforts toward the re-establishment of a sagebrush steppe community. Because early-seral sagebrush steppe is less able to preclude erosion, it will be limited to those lands with slopes less than 10%.

The post mining land use of rangeland for the reclaimed area has been designed to match the pre-mining land uses found in the area. Specifically, Colowyo will reclaim the mined areas to a rangeland condition capable of supporting both domestic livestock and wildlife. One of the objectives of the reclamation plan will be to provide grazing for livestock, and the other objective will be to restore and improve habitats for deer, elk, and sage grouse.

Comments from the Bureau of Land Management and the State of Colorado approving the post mining land use are provided in Exhibit 1, Documents and Leases.

The observation of hundreds of deer and elk consistently utilizing reclaimed areas at Colowyo confirm success in meeting these goals. It is generally recognized that the herbaceous communities of grasses and forbs found on older reclaimed mining areas and other similar areas in northwest Colorado have in fact attracted these important wildlife species from surrounding native rangelands. Therefore, even though the grassland targeted areas are designed for livestock grazing, they exhibit a considerable component of wildlife habitat benefits as well.

Shrubs will also be replaced through seeding techniques to meet applicable regulatory requirements as described in Section 4.15.8. The post-mining land use is graphically shown on the Post-mining Topography Map (Map 19).

To support the proposed post-mining land use, small water impoundments (stock ponds) will be constructed to encourage an even distribution of grazing animals over the reclaimed site and to enhance the areas for wildlife. These small structures will also replace the existing water rights associated with the stock ponds that existed pre-mining. If necessary, Colowyo will submit designs for these small impoundments to the Division prior to their construction.

Also, to provide access in the area for ranching purposes, the access road from Highway 13 will be left in place after mining is complete, and a number of "ranch roads" will be provided on the reclaimed area to approximate the roads that were in the area before mining. The access road will be narrowed from 26 to 12 feet, the asphalt removed, sideslopes reduced to 4:1 and the sides revegetated.

The consideration of rangeland as a post-mining land use is identical to the discussion in Section 2.04.3. The limitations on changing to an alternative land use are fully discussed in that Section.

The Other Treatment Facilities area will not be reclaimed and will contain a long-term water treatment facility. Detailed information regarding the water treatment facility can be found in Section 2.05.4 – Ponds, Impoundments, Diversions, and Treatment Facilities.

2.05.6 Mitigation of Surface Mining Operation Impacts

Air Pollution Control Plan

Colowyo maintains fugitive dust control measures as an integral part of all mining and reclamation activities. Presently, Colowyo operates under numerous Emission Permits issued from the Colorado Department of Health, Air Pollution Control Division, as more particularly described in Section 2.03.10. Copies of all applicable emission permits issued by the Colorado Department of Health are available onsite and can be reviewed by request. Colowyo conducts air quality monitoring at the site in accordance with the requirements of the emission permits.

The principal fugitive dust control practices employed by Colowyo are as follows:

Roads

Colowyo employs a dust suppression program for in pit roads and other unpaved roads which primarily involves periodic watering. Mine water trucks run periodically as needed over the roads wetting down any dusty conditions. During the dryer months of the year, the water trucks will wet down the roads which are being utilized a minimum of two or three times per shift. If determined to be necessary as an addition to periodic watering, a chemical dust suppression agent may be used during the dry months on the primary in pit roads. To this date, however, chemical stabilization of the unpaved in pit roads has not been successful for more than a short period of time due to

changing weather conditions and the use of heavy haulage trucks.

Colowyo has surfaced “in-pit” roads with gravel or crushed rock; however, no roads in the pit area will be paved with asphalt. Asphalt could not sustain the enormous weights of the haulage equipment currently in use. Likewise, crawler equipment would rip the asphalt surface causing an extremely hazardous condition for all equipment and personnel. All roads in the mining operation will be constantly maintained by a motor grader, scraper, or rubber tired dozer to remove any coal, rock, or any other debris. Smooth and clean road surfaces are essential for not only minimizing dust, but also for allowing efficient, safe and economic use of haulage equipment.

The haul roads have been paved with asphalt to provide for emission control. The paved roads include approximately five miles of road from State Highway 13to the main office building, the road from the main office building to the Gossard coal loadout, and the road from the shop facility to the Gossard coal loadout.

A strict speed control will be implemented for all roads to control dust and to provide for safe operation of the equipment.

Most haul road embankment slopes and adjacent areas have been mechanically stabilized and seeded with a mixture shown in Table 7, Reclamation Seed Mixture. Mechanical stabilization has consisted of furrowing, chiseling, "cat tracking" and mulch, depending on accessibility to the slopes.

No travel of unauthorized vehicles will be allowed on anything other than established roads. All overburden haulage equipment will be restricted only to appropriate roads.

Colowyo does not plan to cover any of the haul trucks because the roundtrip between the coal crushing facility and the active mining area will be relatively short, and the loaded trucks will be moving slowly. Also, care will be taken by the front-end loader or shovel operators not to overfill any of the haul trucks so as to cause excessive fugitive dust.

Coal Crushing Facility

Coal will be hauled from the various mining areas in haulage trucks to the primary crusher facility as shown on the Existing Structures - South Map (Map 22). Following primary crushing, the coal is hauled to the Gossard Loadout facility, as shown on the Existing Structures - North Map (Map 21).

The coal crushing and conveying operations at the primary crusher and the Gossard Loadout have been equipped with a water spraying system at all coal transfer points. A four-sided enclosure-bas-been installed on the truck dump at the primary crusher to prevent excessive dust emissions. The secondary crusher at the Gossard Loadout has a bag house to control coal dust emissions. A stacking tube with metal doors is also used to minimize coal dust emissions at the 100,000 ton crushed coal stockpile. The air quality control measures at the coal crushing handling and loadout facilities have been approved by the Colorado Department of Health, Air Pollution Control Division.

Colowyo maintains several areas for coal storage near the shop facilities and also near the Gossard Loadout. Inactive storage piles have been sloped and compacted to prevent wind erosion and spontaneous combustion. If coal dust becomes troublesome in the active coal storage piles, a mobile water truck with a high pressure pump and nozzle is available for dust suppression.
No thermal dryers are used in the coal crushing and handling facilities.

Disturbance

Colowyo, in as much as practical, minimizes the area of land disturbed at any one time. Topsoil is removed only to the extent necessary to accommodate the mining operations. Through the mine plan, the rehandling of both topsoil and overburden is kept to a minimum. Reclamation of disturbed areas will commence as contemporaneously as possible.

As necessary, mobile water truck will be assigned to work in topsoil or overburden removal operations to keep any dusty conditions under control. Planting of special windbreak vegetation in the permit area is not planned.

Blasting

Sequential blasting is utilized as a standard practice to reduce the amount of unconfined particulate matter produced.

Complete blasting information is set forth in Section 2.05.3 and Sections 4.08.1 through 4.08.6.

Fish and Wildlife Plan

Prior to and during the early years of mining, Colowyo implemented wildlife management and range management programs to offset the potential impacts of mining on wildlife and to improve the rangeland in surrounding areas which had deteriorated after years of overgrazing. Other protection measures were also implemented to minimize any possible effects of the increased mining activity.

Also, during the early stages of pre-planning for the mining operation, Colowyo adopted a policy to return the land to a condition capable of supporting the diverse wildlife populations that the area currently supports. The assumption in the late 1970s was that shrub reestablishment would play a key role in wildlife habitat mitigation. These early efforts were unique in that revegetation with shrub species, especially native shrub species, had never been an integral part of pre-mine planning in the West. Virtually no information was available and very little was known about the growth requirements of native species. To reach these early objectives, Colowyo implemented revegetation and wildlife habitat use studies designed to determine the feasibility and techniques of revegetating disturbed areas with native shrub vegetation adapted to northwest Colorado. However, after decades of experience, it has become obvious that reestablishment of shrubs on the reclaimed area is not critical to encourage wildlife use such as by elk.

For example, in recent years it has been observed that elk herds of between 200 and 400 animals

utilize the reclaimed grasslands of the mine as foraging habitat. These numbers increase to between 2000 and 4000 animals during the hunting season and then slowly drop off as the snow depths increase and the elk herds migrate to lower elevations. The animals return in the Spring for the early green-up. This occurs for at least three reasons: 1) elk are primarily grazers (grass consumers) by nature, 2) there is abundant, high quality grass on the reclaimed areas especially in comparison to surrounding country which exhibits very little if any grassland acreage and relatively low grass production in shrublands, and 3) elk have learned that harassments (such as hunting) are minimized on mining areas (refuge effect) which allows them to forage in relative peace. Likewise, mule deer populations have been observed on reclaimed grasslands at elevated densities (40-60 animals on a daily basis during the Spring, Summer, and Fall periods). Similarly, 15-20 pronghorn utilize the reclamation on a daily basis during the Spring and early Summer periods.

Following the winter, it has been observed in early spring that forage utilization on the reclamation often ranges between 70 and 90 percent, especially near water sources. In fact, utilization is often so elevated that both elk and mule deer turn to the few unfenced shrubs that have been established about the reclaimed area and cause extensive hedging damage. Over the years it has been observed that such hedging eventually leads to the death of most of these over-utilized shrubs.

Because of the dependence on these areas, and the shrub populations, efforts by Colowyo (as indicated in the previous portions of Section 2.05) have continued to improve reclamation techniques. As discussed in this revision, new and significant strides are being taken to re-establish sagebrush steppe communities as well as grassland areas. Many of these new measures will benefit not only the large game animal segment of the wildlife community, but also other components such as sage grouse and sharp-tailed grouse populations that are dependent on sagebrush and other woody species for forage and cover.

Impacts of Mining Operations on Wildlife Resources Within the Mine Plan Area

Several short term negative impacts to wildlife are to be expected in the permit area. Removal of vegetation communities and habitats will be the most direct impact, resulting in a reduction of forage and cover. Non-mobile species will be destroyed in localized areas as vegetation and topsoil are removed. Mobile species will be temporarily displaced until mined areas are reclaimed. As the mine progresses, some changes in topography will occur through the removing of vegetation, rock outcroppings, draws, etc. which form natural shelters.

Disturbance of soils will affect soil profiles, micro-climate, and other soil properties.

The backfilling and grading as required in Section 4.14.2 will assure that topographic features and drainage patterns will be returned to approximate original contour.

Wildlife species inhabiting the permit area that have the most potential for being affected include deer, elk, sage grouse, and raptors. However, experience to date has shown that all of these species have adapted to the presence of the Colowyo operation, resulting in minimal direct impact. Most of the mitigation measures, protection measures, and habitat improvement techniques are directed toward this wildlife group.

Range and Wildlife Management Programs

Data collected during pre-mine studies during 1974 - 1976 indicated overuse by cattle, deer, and elk. A majority of the browse species (serviceberry, oak, snowberry, bitterbrush, sage, chokecherry) showed overutilization to varying degrees. (It has been evident both past and present that many of the shrubs are in a decadent condition.)

The results of past poor range management practices and heavy browse use have been a reduction in growth with less available forage. In addition, species such as oak and serviceberry have grown taller, with palatable growth being limited to a height which can be reached only by the largest animals.

As oak and serviceberry have grown taller, large windbreaks have been created. In the winter, these areas hold the snow, which becomes deep enough to limit all access by deer and elk. Thirty years of observations on the permit area have shown that winter use of the mountain shrub type by elk and deer is highly dependent on snow depth and severity of winter weather conditions. The use of serviceberry has been limited to shrubs near the edges of the stands where less snow buildup occurs. Depending on snow depth, elk and deer populations tend to concentrate on south facing hill slope areas where snow depth is minimal.

Colowyo began fencing the boundaries of the Federal lease during the fall of 1976. The fencing was completed during the summer of 1977. At this time all cattle were removed from the lease area. The fencing was completed as part of an overall grazing management program to improve the rangeland after several years of over-grazing. In 1991, Colowyo constructed a similar fence to provide a boundary for the areas added to the Permit and to exclude grazing in this area.

Disturbed Areas

Disturbed acreage has been kept to a minimum in the permit area by proper planning for the location of mine support facilities, haul roads, and pit advance. The mining methods, as discussed in Section 2.05.3, allow for a minimum amount of disturbance on an annual basis (less than 100 acres per pit), when compared to strictly one or two seam mines with similar production levels which disturb several hundred acres annually per pit. Topsoil and vegetation are removed during the summer and fall months to allow for only enough disturbance to facilitate mining advance through June of the following year.

Habitat Improvement Program

Prior to start-up of mining, Colowyo initiated a big game habitat improvement program in January 1976. The purpose of this on-going program was to increase range carrying capacity by increasing available browse and increased access to herbaceous species. Another objective of the program was to provide increased forage on selected undisturbed areas on and adjacent to the mine site to draw wildlife away from newly reclaimed areas until the vegetation became established. A third benefit was to improve enough habitat prior to and during mining in order to offset the temporary loss of habitat from mining.

The technique for habitat improvement involved using a rubber tired or tracked dozer during the winter months, preferably when there was minimal snow cover and the ground was frozen, to shear off the dormant shrubs a few inches above ground level.

The shrubs tended to shear or break off easily when the ground was frozen leaving the root systems undisturbed. During the following spring, vigorous new growth from root sprouting occurred, and easy access was provided for deer and elk. This technique has had the additional effect of allowing grasses and forbs to establish stands that will compete with the shrubs, thus prolonging heights useable by wildlife. Approximately 30 acres of overmature decadent shrubs, i.e., serviceberry, oak, and chokecherry was "brushed" on an annual basis through 1986.

Although no specific data has been collected on these areas, general observations have shown that the areas are heavily utilized by both deer and elk. On all of the areas, any new shrub sprouting is kept down to a height of only a few inches. The one-acre plot that was cleared of vegetation and fenced in 1977 for testing by the Meeker Environmental Plant Center can be used as a good comparison of the differences between browsed and unbrowsed areas that have had similar treatments. Several of the unbrowsed shrubs that have grown up from root sprouting in the Plant Center plot have attained heights of up to four feet in just a few years. Over a five-year period, we feel the cumulative effects of improving 50-75 acres per year for deer and elk use has been increasingly successful in meeting the objectives of increasing available forage and drawing wildlife away from reclaimed areas.

This wildlife mitigation program is considered a success and was discontinued at permit renewal as reclaimed areas are now attracting a large population of local wildlife populations. Also, suitable areas within the permit for this mitigation had been increasingly difficult to find. Much of the habitat suitable for improvement had already received treatment.

Sagegrouse Mitigation

In a preliminary findings document dated December 11, 1981, the Division requested additional information on sagegrouse use of the Colowyo permit area and a description of habitat mitigation measures. Colowyo submitted the following response, dated May 25, 1982, which satisfied the remaining concerns of the Division.

Sagegrouse Mitigation

I. Ongoing Mitigation Offsetting Current Loss of Sagegrouse Habitat Due to Mining.

Prior to 1976 due to the prior landowners' grazing practices, the rangeland both within the permit area and surrounding areas was in an overgrazed condition.

After 1976 the following changes in the management of the land, then owned by Colowyo, took place which indirectly increased the sagegrouse nesting and brood rearing

capacity of the overall area. This increased carrying capacity of the sagegrouse habitat provides the mitigation for any displaced sagegrouse population during mining.

1. From 1976 until 1979 all livestock grazing was stopped in order to allow the range to rest and to return to a more productive state. The immediate benefit to sagegrouse was the increased production of herbaceous vegetation which, along with insects, is an important component to the sagegrouse brood population diet. A secondary benefit was the end of any nest trampling and end of disturbance and heavy grazing around watering areas due to livestock grazing.

2. During 1976 a fence was constructed around the Federal coal lease which eliminated all further livestock grazing in this area. Since 1976 to the present, sagegrouse have continued to benefit as described as #1 above.

3. All other areas outside of the lease fence (approximately 6,000 acres) have been grazed since 1979 at 60% of carrying capacity. This rate would allow for an increased sagegrouse brood population over that which the area supported in an overgrazed condition.

4. Since 1976, numerous areas of thick, decadent stands of the mountain shrub vegetation within and adjacent to the lease area have been cleared of brush as part of the big game mitigation program. As a result of the brushing, the production of succulent herbaceous vegetation has increased, offering more forage for the sage grouse brood population.

   The above changes in Management practices of the rangeland around the Colowyo mining area contribute to the increased capability of supporting any displaced sage grouse nesting and brooding population. No additional treatments to mitigate for a displaced sage grouse population are in effect, nor would other methods likely be as effective.

II. Post-mining Mitigation for Sagegrouse

As stated in the Permit Application, sage grouse use of the area to be mined is for nesting and brood rearing purposes.

According to information contained within the Bureau of Land Management Technical Note #330, "Habitat Requirements and Management Recommendations for Sage Grouse," the most important factor for nesting habitat in the sagebrush vegetation type is sagebrush. Within this vegetative community, the majority of sage grouse nests occur under sagebrush. It is assumed that within the mountain shrub vegetative community, sage grouse nest would be found under the mountain shrub components as well as sagebrush.

The most important factor for brooding habitat is the availability of the appropriate foods for the chicks. Also, during the later summer months of brood rearing, the availability of water becomes important.

Within the pre-mine vegetative community, the nesting cover component is assumed to be sagebrush as well as other elements of the mountain shrub community.

Within the post-mining vegetative community, seeded shrubs will supply the necessary requirements for nesting cover.

Within the literature no specific location of nests seem to be indicated other than a preference for less dense and shorter shrubs which seem to indicate a need for quick escape should the hen be flushed unexpectedly. The density and structures of the shrub component within the post-mine community should provide the diversity of cover and density suited to sagegrouse nesting.

Within the pre-mine vegetative community, insects and succulent vegetation provide the majority of the food for the developing chicks. As these food sources mature and dry, the grouse will move to areas still supporting succulent vegetation. These sites include springs, seeps, drainage bottoms and water impoundments. During the late summer and fall months, the important food plants dry up on the upland slopes and the grouse will tend to remain closer to available watering areas where some succulent vegetation is still available. Many of the grouse are then observed in the alfalfa and irrigated meadowlands on areas around the mining area.

Within the post-mine vegetative community, the food component for brood rearing will be provided by insects and succulent vegetation on reclaimed areas early in chick development. Later into the summer months, as food sources dry up on the upland slopes, food will be available near water impoundments and drainage bottoms being returned to the post-mining topography. The literature indicates no optimum distance between nesting sites and food sources. Evidently, the location of nesting sites are independent of food sources, rather, the nesting locations are based on available cover, and the grouse movements are tied to the availability of succulent vegetation.

For the most part, the mitigation measures indicated above had the desired impact of improving conditions for sage grouse on undisturbed areas under Colowyo control. To the contrary, original reclamation plan measures did not result in a sagebrush component consistent with the original projections in many areas of the mine, especially the old reclaimed units that were revegetated with “introduced” pasture grasses. Beginning in the late 1990s and as evident in revegetated units that have been seeded since then, the sagebrush component of reclamation has improved substantially, but is still not up to original expectations. Therefore, substantial changes to the reclamation plan have been introduced in this submittal to hopefully, make another quantum leap forward in the ability to establish sagebrush steppe communities. Many changes in techniques have been proffered including variable topsoil depths, significantly increased amounts of the appropriate sagebrush seed, proper planting techniques to encourage sagebrush, etc. Given success of these techniques elsewhere in the mining industry, the potential is strong that the original projections for sagebrush establishment at Colowyo will be realized from this point forward.

Additional Mitigation Measures

The pre-planning for a minimum amount of annual disturbance, the establishment of herbaceous species, the replacement of native shrub species, and habitat improvement techniques are the most important areas for minimizing impacts to wildlife, several other protection measures are in effect.

Electric power lines located in the permit area will be constructed in accordance with the requirements of Section 4.18 to minimize potential electrical hazards to large raptors.

Vehicle use within the permit area is limited to the active mining area and the various support facilities. Off-road vehicle use is kept to a minimum and is usually only authorized for surveying, environmental data collection and monitoring, security, etc. Travel by foot, which causes much more disturbance to wildlife than vehicle traffic, is highly unlikely outside active mining areas.

Hunting with firearms inside Colowyo's permit boundary is allowed and is strictly managed by Colowyo.

Speed limits in the mine area are limited to reduce the likelihood of collisions between vehicles and wildlife. Colowyo employees are fully aware of the possibility of encountering wildlife on and -around the mine site and take special care to avoid these species.

In summary after several years of mining at Colowyo, the question is no longer whether coal mining at Colowyo has had an adverse impact on local wildlife populations. The population of deer and elk in the vicinity of Colowyo is reaching record levels. There is little doubt that wildlife populations are drawn to the reclaimed areas because of the availability of quality herbaceous vegetation. The immediate vicinity around Colowyo has become well known as a wildlife refuge, particularly during big game seasons.

The issue now is how can Colowyo assist CPW in efforts to control wildlife populations to a level that can be supported by adjacent ranges. To do so, in 1990 we have entered into a cooperative effort with the CPW to establish a "Ranching For Wildlife" area located south of Hayden. Colowyo has also cooperated with the CPW in allowing public hunters access to company properties in Axial Basin Ranch to increase harvest of local cow elk populations.

The concern for wildlife mitigation has clearly evolved from a concern for the impact of mining on the wildlife population to a concern for involving Colowyo in managing increasing populations especially for big game animals, particularly elk. As one of the large landowners in the region, Colowyo will continue to work with the CPW to assist where possible to manage local big game populations.

With regard to sage grouse populations, Colowyo believes that the new revegetation metrics presented within this submittal will more completely address the concern for negative impacts to area populations and brooding habitat. As this new reclamation technology progresses and adapts into the future, it is anticipated that sage grouse use of reclaimed lands will return to pre-mining

levels, or perhaps return to elevated levels as has been experienced at certain Wyoming mining operations.

Related to this mitigation and emphasis on wildlife populations, focus must be maintained on the fact that Colowyo is the landowner on the overwhelming majority of disturbed acreage. Were it not for the need for permitting of coal mining operations, and the desire to be a responsible steward of the land, the company could select to manage lands in a manner similar to other Western ranching operations that emphasize red meat production from livestock with little concern for the needs of wildlife.

Protection of Hydrologic Balance and Water Quality

Based on the data, other references available and reclamation plans previously presented in this section, the Colowyo Mine will not adversely affect the hydrologic balance or water quality of the adjacent areas.

The Colowyo Coal Company intends to use all practical methods to maintain the hydrologic balance and water quality in its present state and may improve the surface water characteristics as a result of reclamation procedures. The focus of this discussion will center on the permit area as it is the area of mining disturbance.

The hydrologic balance, previously discussed, will be protected through a number of procedures designed to mitigate any potential impact from mining. Temporary and permanent diversions will route runoff away from disturbed areas to minimize erosion and sediment loss. Temporary channels are designed to safely pass the runoff from a 10-year, 24-hour precipitation event and, where necessary, will be constructed using bank stabilization methods including energy dissipators, sediment traps, and dug outs or a combination of these methods. Drainage culverts will also use energy dissipators at the outlets if necessary so that runoff will not cause additional erosion and subsequently increased total suspended solids (TSS) levels. Detention ponds will be used to detain runoff water from the disturbed areas to allow the TSS to settle out and to attain acceptable concentrations for other parameters consistent with the requirements of the NPDES Permit. Any Small Area Exemptions (SAE's) employed will be designed to minimize contributions of TSS to the hydrologic balance.

Infiltration and percolation of precipitation in the mine area may be enhanced by the reclamation techniques of contour furrowing on hillsides and the continued excellent revegetation success at Colowyo. Infiltration rates for the pre-mined and post-mine condition of the land were presented earlier. Striffler and Rhodes (1981) showed through field measurements, using an intense rainfall simulation, that infiltration capacities of the mulched and revegetated areas were much greater than the pre-mine estimates. Runoff from the revegetated and contour-furrowed areas has been minor to date, as documented by Colowyo Mine personnel. Flows from Streeter Gulch will be moderated with the detention pond.

Moderated flows will continue to pass through the historic drainages. Recharge of the limited groundwater systems in the mine will not be inhibited and may be enhanced through the use of the above techniques.

Groundwater protection, per se, is not necessary in the permit area as essentially no continuous groundwater system exists. Perched aquifers of limited nature will be impacted only in the mine area property. This water will be evaporated. The quantity of groundwater is minimal as evidenced by the lack of water in test holes and the dry active pit.

Protection of water quality will also be maintained at the present variable limits through the use of the reclamation procedures listed above. Groundwater will not be affected as the supplies are minimal. Surface water will not be significantly impacted in the mine area. An ongoing monitoring program is maintained by the Colowyo Coal Company to verify the conclusions in the permit application. Sampling stations are maintained and samples collected in accordance with the water monitoring plan approved by the Division. Refer to the annual reclamation reports for results of the sampling program.

Flow volumes in the Goodspring Creek Alluvial Valley Floor may be impacted by the Colowyo Mine through exercise of water rights. However, the impact is expected to be minimal as the water rights used are owned by the Colowyo Coal Company and are not an integral part of any ranching or farming operation. The Colowyo Augmentation Plan will mitigate the effects on any other water rights and will provide for flows downstream of the affected area. Quality of water in Good Spring Creek will not be affected by the exercise of the water rights.

As discussed under Hydrologic Balance-Permit Area, changes in flow volumes caused by mining and reclamation operations will be less than the accuracy range of present day flow measuring equipment.

In summary, the Colowyo Mine will not significantly affect the hydrologic balance or water quality of the general area or the permit area and the affect to the hydrologic balance within the permit area will be insignificant. Temporary increases in TDS and associated common ions are expected to affect quality in backfilled spoils within the permit area. Refer to annual reports for additional information regarding hydrologic monitoring.

Protection of Public Parks and Historical Places

No public parks are located within the permit or adjacent areas; therefore, no public parks will be affected by the proposed mining operations. Likewise, the proposed mining operations will not effect any places included on or eligible for listing in the National Register of Historical Places.

Because no public parks or historic places, included on or eligible for listing on the National Register of Historical Places, will be adversely affected, this Section of the regulations is not applicable to this permit application.

Surface Mining Near Underground Mining

No surface mining activities within the permit area will be conducted within 500 feet of an underground mine. Map 31, Red Wing Mine provides additional information.

Previous underground mining has taken place in the vicinity of the Colowyo operation; this previous mining is discussed in Sections 2.04.3 and 2.04.4

4.02.4 Duration of Maintenance

Colowyo will maintain signs and markers throughout the life of the operation or post new signs and markers as necessary.

4.02.5 Stream Buffer Zone Markers

All major operations near Good Spring Creek have ceased. Stream buffer zone signs have been posted as appropriate. Stream buffer zone signs will also be placed along Taylor Creek and Jubb Creek as deemed appropriate.

4.02.6 Blasting Signs

Colowyo displays signs reading “Blasting Area” along any blasting area that comes within 50 feet of any road within the permit area or within 100 feet of any public road right-of-way. The blast warning and all-clear signals are clearly explained at the main entrance to the permit area from Highway 13/, where the Collom paved haul road crosses Moffat County Road 51, at the upper entrance to South Taylor Pit along Moffat County 51, at the entrance to the Upper West Fork of Good Springs Creek, and at the Jubb Creek entrance on Moffat County Road 32.

4.02.7 Topsoil Markers

Colowyo clearly marks all stockpile topsoil with signs reading “Topsoil.”

4.03 ROADS

The following sections deal with roads defined per Rule 1.04 (111).

4.03.1 Haul Roads

Haul roads at the Colowyo operation will be utilized and maintained to control or minimize erosion, siltation, air and water pollution, and damage to public or-private property. The main Haul Road A for the Colowyo operation is shown on Maps 21 and 25G. The main Haul Road A runs from the pit area (traffic crossover) to the Gossard Loadout; the approximate length of this haul road is four miles. The profile for haul road A is shown on the Haul Road "A" Profile (Map 25).

The Haul Road B runs from State Highway 13 west to where it intersects Haul Road A and is shown on Existing Structures - North Map (Map 21) and Haul Road "B" Profile (Map 25A). The approximate length of the road is 1.4 miles.

The roads used in the actual mining area constantly change as the operation progresses. The “in-pit” roads are maintained by a motor grader and are regularly wetted to minimize dust. Any drainage off the "in-pit" roads will be retained in the pit or diverted to the drainage and sediment control structures located on the Hydrology - South Map (Map 12). The reclamation timeline is shown on Map 29 – Spoil Grading. Reclamation will include regrading the road embankments