TRI-STATE GENERATION AND TRANSMISSION ASSOCIATION, INC.
HEADQUARTERS: P.O. BOX 33695 DENVER, COLORADO 80233-0695 303-452-6111

August 4, 2020

Mr. Zach Trujillo
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
Minor Revision No. 222
Streeter Wild Land Fire

Dear Mr. Trujillo,

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 minor revision 222 (MR-222) to Permit No. C-1981-019. MR-222 provides documentation of the Streeter Fire (wild land fire), that occurred within a portion of Colowyo's permit boundary on undisturbed lands. The Streeter Fire was not associated with activities from the Colowyo Mine.

Included in this minor revision is a change of index sheet to ease incorporation of this minor revision into the permit document. If you should have any additional questions or concerns, please feel free to contact Tony Tennyson at (970) 824-1232 at your convenience.

Sincerely,

DocuSigned by:
Daniel Casiraro
B70D69F114324DE...

Daniel J. Casiraro
Senior Manager
Environmental Services

DJC:TT:der

Enclosure

cc: Jennifer Maiolo (BLM-LSFO)
Chris Gilbreath (via email)
Tony Tennyson (via email)
Angela Aalbers (via email)
File: C. F. 1.1.1.205 - G471-11.3(21)d

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

Mine Company Name: **Colowyo Coal Company**
Permit Number: **C-1981-019**
Date: **July 30, 2020**
Revision Description: **MR-222 Streeter Fire**

Volume Number	Page, Map or other Permit Entry to be REMOVED		Page, Map or other Permit Entry to be ADDED		Description of Change
1	Table of Contents Page iv (1 page)		Table of Contents Page iv (1 page)		Volume 1 Table of Contents has been updated.
1	Pages 4-33 to 4-46 (14 pages)		Pages 4-33 to 4-46 (14 pages)		A narrative on the Streeter Fire has been inserted into Section 4.12. This caused a pagination shift also.
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					No Change
15					No Change
16					No Change
15					No Change
17					No Change
18A					No Change
18B					No Change

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

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Permit Number: **C-1981-019**
Date: **July 30, 2020**
Revision Description: **MR-222 Streeter Fire**

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

the expansion of the Axial Basin Substation are not associated with Colowyo's mining activities, and will not be required to be permitted nor bonded for in accordance with Rule 3.02.1(2).

In 2018, approximately 22 acres within Colowyo's permit boundary (outside of the disturbance boundary) was affected by the wild land fire caused by a lighting strike. The location of the fire is shown on Figure 4.12-6. The area that was burned is mostly comprised of pinyon juniper and low-density sagebrush. Because the fire was not related to Colowyo's mining activities, Colowyo, as the surface landowner will reseed or managed the post-fire area, as it deems appropriate.

In 2019, the surface landowner replaced a culvert under the Taylor Creek Access Road (please see Map 25C for location of the road) to support long-term access up the Taylor Creek drainage. Minimal ground disturbance was associated with replacing the culvert. Since the activity is related to the surface landowner, it is not permitted and bonded for in accordance with Rule 3.02.1(2).

In 2019, approximately 13.5 acres within Colowyo's permit boundary (outside of the disturbance boundary) adjacent to the Collom Haul Road was affected by the wild land fire caused by highwinds slapping power lines together. The location of the fire is shown on Figure 4.12-7. The area that was burned is mostly comprised of sagebrush. Because the fire was not related to Colowyo's mining activities, Colowyo, as the surface landowner will reseed or managed the post-fire area, as it deems appropriate.

Tri-State Generation and Transmission Association, Inc. owns and operates a 138kV power line that traversers through the east portion of the permit boundary. The 138kV line runs north to south through the reclaimed East Pit, and just east of the reclaimed Section 16 Pit. To ensure access to all pole locations along the power line for maintenance and emergency repairs, Tri-State will be improving existing ranch roads and/or constructing new roads to access their power line within the permit boundary. Most of this activity will take place south of the reclaimed East Pit and outside of Colowyo's ground disturbance and reclamation areas. Nonetheless, some of these access locations will traverse across Phase III released areas (Section 16 reclamation areas) and reclaimed areas including reclamation units EP056 and EP060 (please see annual reclamation report maps for the location of these reclamation units). For the approximate alignment for this access road please see Map 22A. Since these ground disturbing activities are not related to Colowyo's mining activities, the roads will not be permitted and bonded for in accordance with Rule 3.02.1(2).

In July of 2020, a wild land fire (named the Streeter Fire) started burning within Colowyo's permit boundary (outside of the disturbance boundary) north of the lower segement of the Streeter Ditch and Streeter Pond. The fire continued to burn north outside of Colowo's permit boundary. The area that was burned within the permit boundary is mostly comprised of pinyon jumipers and sagebrush. Because the fire was not related to Colowyo's mining activities, Colowyo, as the mine operator is not responsible for starting the fire nor managing the areas burned post fire. The surface landowners impacted by the fire will manage the post-fire area, as they deem appropriate.

4.13 CONTEMPORANEOUS RECLAMATION

All reclamation actives, including but not limited to backfilling, grading, topsoil, replacement and revegetation, will be carried out as contemporaneously as practicable with mining operations. Implementation of the reclamation plan, as described in Section 2.05.4, will assure that each step in the reclamation process is completed in a timely manner.

Because of the multi-seam nature of the mining operation described in Section 2.05, backfilling and grading cannot be completed within 180 days following the coal removal. Backfilling and grading will be completed in variance of the 180 day requirement in a manner previously approved and described below, and in Sections 2.05 and 4.14.1. A series of benches will be necessary in the operation to recover the lower coal seams, and an additional series of benches will be necessary to dump the shovel/truck overburden material in a configuration that achieves the topography shown on the post-mining Topography Map (Map 19). When multi-seams are mined, backfilling and rough grading cannot begin until the lower-most seam is mined. See Spoil Grading Map (Map 29), which shows the time frames in which grading will occur.

Topsoil will be removed prior to the mining disturbance according to the timetable established on the Topsoil Handling – South Map (Map 28). As can be observed from this map, the initial topsoil removed at the operation must be stockpiled; however, as the operation progresses, topsoil can be immediately redistributed rather than stockpiled.

Revegetation will commence as soon as the topsoil has been redistributed and prepared for seeding as described in Section 2.05.4. The area will be seeded with the seed mixture described in Section 2.05.4 as quickly as possible.

4.14 BACKFILLING AND GRADING

4.14.1 General Requirements

The mining operations of Colowyo will not employ the use of contour mining methods.

The following sample of calculations show that Colowyo does not have thin or thick overburden as defined in Subsection 4.14.4 or Subsection 4.14.5. These calculations represent the approximate conditions found in the field and show that there is always more than enough overburden to reestablish the original elevation. As explained in the 1983 Annual Report, Colowyo currently uses an average 20% swell factor for planning purposes. Dragline swell is estimated to be 23%, and truck/shovel swell is estimated to be 17%. Approximately 45% of the overburden is removed by dragline, and 55% by truck/shovel. Since all mining at Colowyo was conducted by truck/shovel methods through 1979, the life-of-mine swell factor has continued to increase.

Example: 363 feet overburden, 47 feet coal, (these conditions are found along the western edge of the pit in 1988), 20% swell factor

$$\frac{\text{363 feet} + \text{20\% swell}}{\text{363 feet} + \text{47 feet}} = \frac{\text{final thickness}}{\text{initial thickness}} = 1.06$$

Example: 356 feet overburden, 49 feet coal (these conditions are found along the western edge of the pit in (1988), 20% swell factor

356 feet	+	20% swell	=	final thickness =	1.05
363 feet	+	49 feet		initial thickness	

The original permit application utilized at 17% swell factor to project the anticipated postmining topography.

During the initial permit review process the anticipated swell factor was subsequently revised to 23% to allow for sufficient pit development. At that time, excess swell was anticipated to raise the elevation of the postmining topography by about 5.3 feet, compared to the premining topography. As explained above, in 1984, as part of the 1983 Annual Report, Colowyo further refined its estimates based on measurements to date, and currently uses an overall 20% swell factor for estimating purposes. As indicated in the Annual Reports, the stripping accomplished by draglines can vary from 40% to 45% and from 55% to 60% for truck/shovel. Swell factor will continue to be monitored and the postmining topography adjusted, if necessary. Any adjustments will be minor, will be done gradually and will not affect the reclamation plan or postmining land use. Particularly, drainage channel gradients will not be changed; an entire drainage channel elevation could possibly be revised, but the gradient would remain as designed. If a change would be necessary, the dump plan elevations would be revised as appropriate.

The mining plan, as described in Section 2.05.3, was a soundly designed and engineered open pit mining plan, which maximized coal conservation and recovery while minimizing adverse environmental impacts. Because of the multi-seam mining configuration used by Colowyo, an exemption from the 180 day or four spoil ridge limitation was and still is necessary. The mining plan was designed as a continuously moving open pit operation with the mine advancing approximately parallel to the dip of the numerous coal seams. The mining operation progressed from a southward direction with shovels/trucks/ proceeding along the entire length of the mining area uncovering the upper coal seams and the draglines uncovering the lower coal seams. With the numerous benches used in an open pit operation, the mine area was opened for some time, and backfill and grading operations are occurring now in the West Pit.

As the mining operations remove coal seams (In the southward progression), the mining area must be left open until such time as the lower-most coal seam can be recovered. With the mining configuration, the time differences between mining the upper-most seam versus the lower-most seam will obviously be greater than 180 days. As the operation advances, backfilling will be as contemporaneous as practical but not so as to interfere with removal of the lower-most coal seam. Colowyo will rough backfill and grade as shown on the Spoil Grading Map (Map 29) by methodically and actively dumping and backfilling overburden in the West and East pits very close to final contour so that minimal work will be needed to complete final re-grade of these areas in the future. All disturbed areas will be returned to the approximate original contour by grading and backfilling with the use of a dragline, trucks, dozers, scrapers and dozers assisting a dragline. Additional detail of the backfilling and grading for the mining operation is set forth in the discussion under Sections 2.05.3 and 2.05.4.

The area to be mined will be restored to a topography approximating premining grades. The outslopes of the completed fill in Streeter Draw and areas backfilled, as necessary, will utilize terraces and/or contour furrows for erosion control and stability. These terraces and contour

furrows will be constructed according to the requirements outlined in Section 2.06.2. Where applicable, Colowyo will retain all overburden and spoil on the solid portion of existing benches. The final graded slopes will not exceed the approximate original premining slope grade as shown on the Postmining Topography Map (Map 19). Postmining surface drainage channels will be located to minimize erosion and to minimize slippage.

The final pit highwalls will be eliminated in Section 16 by backfilling X seam overburden materials from the West Pit mining area to achieve the final topography. Rehandle of the X seam overburden will be occur concurrently with the advance of the multiple-seam advance during the 2003-2010 period. Also, as mining advances into the final pit, the working area on the pit spoil side will decrease to a point where insufficient spoil room below the proposed postmining contours is available. When that point is reached, material will be temporarily placed above the proposed postmining topography. When the final pass of the West Pit is mined out, this temporarily-placed spoil will be rehandled concurrently with Section 16 virgin and rehandle material to fill and slope the pit to the configuration shown on Map 19 (Postmining Topography). Because the area will be redisturbed by the rehandle activities, that portion of the north end of Section 16 that is above final grade will not be topsoiled or otherwise reclaimed until final reclamation.

Final reclamation of the East Pit will take place via the sequence shown on Map 29 (Spoil Grading – South Area) with the reclamation blocks advancing from east to west or from the topographic bottom to the topographic top of the mining areas. Just as in the West Pit, all disturbed areas will be returned to approximate original contour by grading and backfilling with the use of draglines, trucks, dozers, scrapers and dozers assisiting a dragline. As reclamation of the East Pit progresses, all non-reclaimed areas will be contained so that any residual runoff from these areas will be isolated within the remainder of the East Pit. All methods of erosion control and stability such as contour ditches, contour furrows, internal ditches and internal sumps will be established on an as-needed basis to ensure the integrity of the Prospect Pond and the surrounding areas include the final East Pit Ditch. Closure of the East Pit is dependent on the final reclamation and closure of the West Pit as the western most portion of the East Pit will tie-in with the West Pit in this area.

A haulroad corridor from the Administration/Shop area to the South Taylor Pit will remain in place until final reclamation is completed in that area. The corridor is sufficient in width to provide a material balance as the corridor is regraded to the post mine topography. The administration/shop/facilities area will be the last area to be reclaimed. A light duty road intended for post mining use may be left as a postmining feature in this corridor with land owner consent.

In addition, Colowyo controls additional coal reserves west and south of Section 9 and 16, outside of Permit C-81-019, that may be considered for future mine expansion. It is possible that the final plans for Section 16 and Section 9 could change to provide for such expansion, with any plan changes being addressed through an appropriate permit revision.

4.14.2 General Grading Requirements

The final graded slopes at the mining operation will not exceed the approximate original premining slope grade as shown on the Postmining Topography Map (Map 19). Colowyo will retain all

overburden and spoil material on solid portions of existing or new benches. The final highwall at the operation will be eliminated by backfilling overburden into the final pit area.

Small depressions of a holding capacity slightly greater than one cubic yard of water may be used to create a moist micro climate to aid in shrub establishment. See Section 2.05.4, Planting and Seedings Methods for further information regarding these small depressions. Also, several stock watering ponds will be constructed to compliment the postmining land use. Providing a supply of water is an integral part of the grazing postmining land use. Colowyo will not be mining on any slopes above 20° as shown on the Premining Topography Map (Map 18).

Final grading before topsoil placement will be conducted in a manner that minimizes erosion and provides a surface for the topsoil that minimizes slippage. Final grading will be accomplished so that overall grades will not exceed lv:3h. The plan for backfilling and grading is shown graphically on the Spoil Grading Map (Map 29).

4.14.3 Covering Coal and Acid and Toxic Forming Materials

Colowyo will not have any exposed coal seams remaining at the end of mining and reclamation. Colowyo does not have any acid forming materials at the mine. For discussion on acid- and toxic-forming materials, refer to Section 2.04.6. For disposal of noncoal wastes or materials constituting a fire hazard, refer to Section 4.11.4.

4.14.4 Thin Overburden

Colowyo does not have a thin overburden situation as explained in Section 4.14.1.

4.14.5 Thick Overburden

Colowyo does not have a thick overburden situation as explained in Section 4.14.1.

4.14.6 Regrading or Stabilizing Rills and Gullies

The implementation of soil stabilizing practices outlined under Section 4.15.4 will lessen the possibility that erosion can become a serious problem. Colowyo plans to continue using surface manipulation techniques such as chisel plowing to reduce compaction and contour ditches/furrows to minimize overland flow over any long, uninterrupted slope. These methods have been shown to be highly successful in controlling erosion at Colowyo.

Rills and gullies which form in areas that have been regraded and topsoiled and which either (1) disrupt the approved postmining land use or the reestablishment of the vegetative covers or (2) cause or contribute to a violation of water quality standards for receiving streams will be identified during the spring of each year. Regraded and topsoiled areas will be visually inspected and rills and gullies identify. Colowyo will submit a report which provides a general description of the identified rills and gullies, activities undertaken to remediate these areas, time frames of repair, a description of any re-topsoiling and re-seeding activities, and a map idenfying the problem areas

on a scale of 1-inch equals 500-feet. This report will be submitted annually no later than June 15 of each year.

As rill or gully features are identified for remediation Colowyo will utilize appropriate manpower and equipment depending on the ground conditions and the extent of the erosion. This shall include but is not limited to small track dozers, blades, and small rubber tired farm tractors. Repairs will take place within three months of the visual inpsecitons being completed. If ground conditions are such where soil conditions are not favorable, repair will commence as soon as ground conditions allow equipment to access the area without creating additional disturbance. As soon as any repair takes place the area shall be seeded with the appropriate seed mixture. Generally, remediation work will commence when soil conditions are suitable each year.

During repair of any rill or gully Colowyo will first identify and salvage any topsoil that may have been repositioned by erosion. This topsoil will be salvaged, stockpile in a location that is easily accessible by equipment making repairs, and re-applied after the repair of a rill or gully is complete. Once repairs are complete, topsoil will be re-applied to the disturbed area and re-seeded to the appropriate seed mixture. Colowyo is committed to preserving the topsoil resources and utilizing it appropriately through approved reclamation practices.

Remediated areas will be monitored for one year following repair, and should the area appear to be stabilized monitoring will be discontinued for that area. Areas that continue to exhibit unstable conditions will be remediated again and monitored for another year.

4.15 REVEGETATION REQUIREMENTS

4.15.1 General Requirements

Colowyo will establish on all affected land within the mine plan area a diverse, effective and permanent vegetative cover of the same seasonal variety as that native to the area. On lands revegetated prior to 2008 the vegetative cover will be comprised of native and introduced species that are desirable and necessary to achieve the approved postmining land use as required under Section 4.15.2. The original seed mixture to be planted is shown in Section 2.05 on Table 7, Reclamation Seed Mixture. On lands revegetated in 2008 and thereafter, the vegetative cover will be comprised of native species that are desirable and necessary to achieve the approved postmining land uses as required under Section 4.15.2 (with modest exceptions). However, additional seed mixtures, revegetation metrics, and bond release protocols designed to target specific post-mining land use components are presented within the context of this section (4.15) as well as the reclamation plan, Section 2.05.

Remaining discussions under this section (4.15) will refer to “pre-2008” versus “post-2008” revegetation plans, efforts, specifications, and bond release protocols. Pre-2008 refers to revegetation activities performed prior to April, 2008). Post-2008 refers to revegetation activities occurring during or after April, 2008.

The details of the revegetation plan are discussed in Section 2.05.4.

4.15.1(4) Vegetation Monitoring

The monitoring plan to evaluate the success of shrub conducive efforts including direct seeding of sagebrush, natural reinvasion by sagebrush, as well as herbaceous vegetation success is as follows:

1. To facilitate identification, sampling of herbaceous vegetation will take place during the peak of the growing season when the vegetation reaches the mature stages. This period of time is generally from late June to late August.

2. Unlike sampling for bond release purposes, sampling will not be required to meet statistical adequacy.

3. During the first growing season of a reseeded area, a visual determination of seeded and volunteer species will be performed. From-this information, any apparent revegetation issues will be determined for the seeded species, and unsatisfactory stands of any component can be identified for corrective action. In addition to this visual evaluation, a semi-quantitative procedure will be implemented to evaluate seedling emergence. This procedure involves unbiased placement of several small quadrat frames at multiple locations across the reclaimed unit and counting the number of emergent plants by life form within each quadrat. Conversion to the number of emergents per square foot facilitates an assessment of the eventual success of the seeding effort.

   During the second and fourth growing season of a reseeded area, herbaceous cover and woody plant density information will be gathered. This information will be gathered at the species level and will reflect the effectiveness of the seed mixture and volunteer species. Colowyo will also monitor areas seven years old and every third year thereafter (year 10, 13, etc.) to assess their status toward approaching the maturity necessary for bond release testing. Seven year and older monitoring will also utilize ground cover and density sampling, but will include a modest current annual production sampling effort to facilitate evaluation of progress toward meeting this variable and to allow a determination of carrying capacity should a program of livestock grazing be implemented. After 7 years of growth and where practicality dictates, revegetation units may be combined into logical management units for sampling / monitoring purposes, rather than remaining autonomous. Monitoring will cease following Phase III bond release.

4. The data and an assessment of the monitoring results will be submitted in the Annual Reclamation Report. A map will be included to delineate the reclaimed areas being sampled each year. The Annual Reclamation Report will also provide details regarding restricted interseeding or other mitigative measures implemented as a result of the vegetative monitoring program.

4.15.2 Use of Introduced Species

For pre-2008 revegetation, (especially pre-2002 revegetation) an examination of the seed mixture approved for the reclamation of rangeland indicates that Colowyo included some introduced

species in the mixture for which regulatory approval was obtained. Introduced species included in the seed mixture were:

(1) Intermediate Wheatgrass (*Agropyron intermedium*)
(2) Siberian Wheatgrass (*Agropyron sibericum*)
(3) Pubescent Wheatgrass (*Agropyron trichophorum*)
(4) Smooth Brome (*Bromus inermus*)
(5) Orchard Grass (*Dactylus glomerata*)
(6) Vinall Russian Wildrye (*Elymus junceus*)
(7) Durar Hard Fescue (*Festuca ovina duriscula*) (Actually Native)
(8) Timothy (*Phleum pratense*)
(9) Kentucky Bluegrass (*Poa pratensis*) (Naturalized Taxon)
(10) Lutana Cicer Milkvetch (*Astragalus cicer*)
(11) Blue Flax (*Linum lewisii*) (Actually Native)
(12) Alfalfa (*Medicago sativa*)

Of the 31 species approved, 21 species are native. On a seed weight basis, 65% of the seeds to be planted are native species seed.

The introduced species were included in the mixture because they were thought to be necessary to control erosion and because they provide forage for wildlife and livestock on the reclaimed area. The research at Colowyo by the Colorado State University (CSU) Agronomy Department has documented the superiority of the introduced species for revegetation purposes compared with other species under similar conditions. The CSU study and two progress reports are set forth in Exhibit 10, Vegetation Information. None of the introduced species are poisonous or noxious. For further discussion of the value of introduced species for obtaining the desired post-mining vegetative community of the same seasonal variety and lifeform of the pre-mined area, refer to Section 2.05.

For post-2008 revegetation, the seed mix is comprised entirely of native species with the specific exceptions described below. Introduced species would only be utilized in four possible circumstances. The first would be reclaimed areas exhibiting a post-mining land use of pastureland (specifically targeting domestic livestock grazing and/or haying operations). The second would be in small areas potentially susceptible to excessive erosion where at the discretion of Colowyo's reclamation coordinator, introduced species would provide the necessary protection. (Prior to use of aggressive taxa to combat areas that are highly susceptible to erosion, an MR or TR (as appropriate) will be obtained from CDRMS to address such circumstances.) The third possible circumstance would be the inclusion of orchard grass at elevated densities in certain locations designed to encourage elk away from other sites. (It has been documented that elk specifically seek this species for consumption.) The fourth circumstance would be inclusion of modest quantities of small burnett or nitrogen fixing legumes such as cicer milkvetch or alfalfa as supplemental forage for deer, elk, and livestock. In addition, cicer milkvetch has proven to be an excellent "habitat" plant for insects that are very important to foraging sage grouse chicks during the brooding period.

4.15.3 Seeding and Planting

The seeding and planting of the disturbed area will be conducted during the first normal period for favorable planting conditions after final preparation for seeding or planting. The planting period and other revegetation metrics for Colowyo are set forth in Section 2.05.4.

4.15.4 Mulching and Other Soil Stabilizing Practices

As addressed in Section 2.05.4, Colowyo currently does not mulch, chisel plow, or terrace, because sufficient surface roughness survives the topsoil laydown process to maintain the appropriate roughness for modeled sediment control conditions. When necessary, chisel plowing, discing, terracing and/or contour furrows could/would be utilized to stabilize, reduce compaction and increase the moisture retention of graded topsoiled areas. Chisel plowing is the most preferred method of initiating surface roughness at Colowyo, beyond the roughness created through topsoil laydown activities. Areas less than 10% slope at Colowyo have been identified as potentially targeted areas for the Sagebrush Steppe land use and will essentially require a smooth seedbed surface. If these Sagebrush Steppe areas occur in large patches in the future and encompass long sweeping slopes, moderate contour furrows will be established to mitigate any future sheet flow and loss of the topsoil resource. Efforts will be made to establish reclamation blocks along the contour of slopes in order to eliminate the loss of the topsoil resource onto spoil areas. All other areas targeted for the grazingland land use will generally be on slopes greater than 10% and depending on the size of each reclamation unit will need to be chisel plowed (or ripped with a dozer) at a minimum if topsoil laydown activities do not produce sufficient surface roughness to limit the excessive formation of rills on first and second year reclamation blocks by "normal" seasonal runoff events. Contour furrows will be created with regular frequency on slopes greater than 20% and less frequently on areas between 10% and 20% slopes depending on the length of the slope and the size of individual reclamation blocks as determined by topsoil laydown progression in any given year or series of years. Past reclamation efforts undertaken in the East Pit provide a general context to the likely construction frequency of contour furrows in the West Pit and Section 16 reclamation areas. The steeper slopes in the South Taylor area will likely require the construction of contour furrows at a greater frequency than previously mined areas. As indicated under "Mulching Techniques" in Section 2.05.4, use of mulch would be considered a last resort, but is certainly an erosion control metric that may be utilized (where deemed necessary) for long south-facing slopes such as in South Taylor. Spoil will be graded to minimize long, uninterrupted slopes. Replacement of topsoil will be followed by chisel plowing and contour furrowing (when necessary).

The use of these soil stabilizing practices on areas currently undergoing reclamation at Colowyo has been very effective in controlling surface runoff, thereby preventing surface erosion and gullies. The efficacy of these mechanical techniques will continue to be closely monitored as changes to the reclamation program are initiated.

4.15.5 Grazing

All the lands reclaimed by Colowyo will not be grazed by livestock for a period of at least three years after seeding or planting and will be managed to promote the postmining land use.

Grazing by livestock will not commence until Colowyo has demonstrated to the satisfaction of the Division that the vegetation on the reclaimed surface is adequately established and can be expected to withstand grazing pressures. Any grazing studies undertaken by Colowyo will not preclude or interfere with postmining vegetation sampling as required in section 4.15.8.

4.15.6 Field Trials

Aspen and Tall Shrub Establishment Areas

As a result of negotiations with CPW and DRMS, Colowyo has committed to implementing three field trials. Based upon initial estimates of disturbance to aspen and tall shrub habitats in the South Taylor area, a determination was made that the establishment of 20 acres of aspen habitat and 20 acres of tall shrub habitat (combination of thin and thick topsoil locations) be established in the South Taylor reclamation area (mining disturbance area). As a result of subsequent changes to the mine plan, approximately (7% or 14 acres) of the aspen and (41% or 347 acres) of the tall shrub habitat previously targeted for disturbance will no longer be affected. A reduced area of (18.5) acres of aspen and (12.0) acres of tall shrubs will now be pursued at Colowyo. The field trials are meant to provide information to Colowyo, DRMS and the CPW about the appropriate expectations for success/failure of establishing these habitat types at Colowyo in the context of a ten year bond clock and also to provide some baseline information that can be used to modify practices and the plant materials used to meet the current expectations (acres of each habitat type identified above). Another potential use of the information provided by these trials may be to provide Colowyo with an avenue for relief of the aspen and tall shrub establishment area expectations for South Taylor should efforts prove to be unsuccessful despite the incorporation of best management practices.

The standard interim revegetation monitoring techniques and practices (performed by a third party) applied to the other reclamation areas at Colowyo will be utilized annually to measure progress of the trials through and beyond 2016, when Colowyo, DRMS and CPW will revisit the expectations for further larger scale establishment of these habitat types once reclamation activities begin in earnest in the South Taylor area (currently expected post 2017). All data will be captured, collated and presented as part of the Annual Reclamation Report provided to DRMS. Alternative methods for complying with the aspen and tall shrub establishment areas may be negotiated with CPW after the 2013 growing season should initial 2011 planting and potential subsequent 2012 re-seeding/replanting efforts prove unsuccessful.

1) Colowyo agrees to establish one small (one acre) aspen establishment area on associated disturbance in an area where the original lithology has been previously disturbed. The location of this area will be in the immediate proximity of the South Taylor X coal pod as portrayed below and on Map 28. The location for this trial represents elevation and aspect characteristics that are very similar to the aspen areas disturbed in the South Taylor area. Slope characteristics are more moderate than the native areas disturbed, but for purposes of implementing and monitoring this trial it was determined essential that access and stability of the test location be manageable. Actual results from the trial should yield information that can be used to apply additional stability and/or sediment control measures on larger areas if this attempt is successful. The specific implementation plan of the site is as follows:

a) The area will be regraded in accordance with PMT requirements.

b) The area will be tested for overburden suitability as per requirements.
c) At least 48 inches of topsoil will be placed to replicate common topsoil depth conditions in the surrounding area in stands of this nature. Once the topsoil has been placed, it will be cross-ripped with a dozer or by other appropriate means to ensure the material is in a loose, rough condition to encourage infiltration of rain/snowmelt and root development.
d) The entire trial area will be seeded with the modified Sagebrush Steppe Mix as seen below. Weedguard fabric or it's equivalent will be placed in rows (at intervals of approximately 22 feet) and will be used to severely reduce competition between the containerized plantings and annual weeds and grasses. Please see the "Expected Field Implementation Plan for Aspen/Tall Shrub Field Trials" illustration below.
e) Commercially available 2-3 foot containerized aspen stock will be used for planting purposes from the most similar source elevation available in the area. Based on the volume of containerized plants included in the trial (550), and the expectations of success, a number of (300) live aspen plants within the trial during 2016 will be considered a successful demonstration of Coloywo's ability to proceed further with additional plantings. Supplemental planting of aspen will be initiated in year 2012 should survival of the 2011 plantings be less than 350 stems/acre. Alternative methods for demonstrating compliance with the establishment of aspen habitat in South Taylor will be initiated with the Colorado Division of Wildlife during 2013, should failure of this trial continue.
f) Aspen will be placed through the weed barrier by hand (or by mechanical means if practical and economically feasible) as per best practices with regards to depth, etc. Proper planting holes are important in transplant survival. Holes should be two to three times wider than the root ball. If the soil is clay and the sides of the hole become glazed during digging, the sides of the hole should be roughened with a spade. Holes should be prewatered before planting in dry soils. This prevents initial postplant water from migrating away from the root ball. Every effort will be made to plant at the same depth that the tree or shrub was growing in its previous location. Damaged roots will be clean-cut with a sharp blade prior to planting. If any circling or kinked roots are discovered during the transplanting procedure, they will be severed to prevent future girdling of the plant. Every effort will be made to orient the tree or shrub in the same direction, relative to the sun, as it was facing in the previous location. Plantings will be performed in the fall by properly trained personnel. Aspen planting densities will be one plant every four linear feet within a row.
g) Colowyo will place contour furrows immediately above approximately every third fabric row (approximately every 66 feet). The trial will exhibit alternating bands of modified Sagebrush Steppe mix (approximately 17 feet), fabric/containerized plantings (4-5 feet wide), modified Sagebrush Steppe mix (approximately 17 feet), fabric/containerized plantings (4-5 feet), modified Sagebrush Steppe mix (approximately 12 feet), contour furrow (approximately 5 feet). This pattern should allow for specific emphasis on containerized plantings establishment while minimizing the risk of excessive erosion during the period of early establishment of the trial area.
h) An "elk proof" exclusionary fence will be erected around the perimeter of the entire trial area to protect it from ungulates.
i) As this area will not be receiving supplemental watering, in the event of stand failure the area will revert back to sagebrush steppe for purposes of Phase III bond release in the future, with the exception that the requirement for 50% of the required 375 shrubs in this

area be big sagebrush (Section 4.15.8), this requirement will reasonably be dropped, due to the reduction in sagebrush seed included in the mix applied.

2) Colowyo agrees to establish one small (one acre) tall shrub establishment site that that displays a thicker topsoil condition. The location of this area will be in the immediate proximity of the South Taylor X coal pod as portrayed below and on Map 28. The location for this trial represents elevation and aspect characteristics that are very similar to the Tall Shrub areas disturbed in the South Taylor area. Slope characteristics are more moderate than the areas disturbed, but for purposes of implementing and monitoring this trial it was determined essential that access and stability of the test location be manageable. Actual results from the trial should yield information that can be used to apply additional stability and/or sediment control measures on larger areas if this attempt is successful.

a) The area will be regraded in accordance with PMT requirements.

b) The area will be tested for overburden suitability as per requirements.

c) At least 48 inches of topsoil will be placed to replicate common topsoil depth conditions in the surrounding area in stands of this nature. Once the topsoil has been placed, it will be cross-ripped with a dozer or by other appropriate means to ensure the material is in a loose, rough condition to encourage infiltration of rain/snowmelt and root development.

d) The Sagebrush Steppe mix has been modified to reduce the volume of "low shrubs" in favor of tall shrub components of the mix. The grasses currently included in the mix were also reduced to minimize competition, while still providing some soil stabilization function. The entire trial area will be seeded with the modified Sagebrush Steppe Mix as seen below. In the event individual components of the mix are unavailable, guidance from the Division will be sought prior to implementation of the trial. Weedguard fabric or it's equivalent will be placed in rows (at intervals of approximately 22 feet) and will be used to severely reduce competition between the containerized plantings and annual weeds and grasses. Please see the "Expected Field Implementation Plan for Aspen/Tall Shrub Field Trials" illustration below.

e) Containerized 2-3 foot serviceberry and chokecherry plants will utilized from the most similar source elevation available in the region. Based on the volume of containerized plants included in the trial (550), and the expectations of success, a combined number of (300) serviceberry and chokecherry plants within the trial during 2016 (from seed and live plantings) will be considered a successful demonstration of Coloywo's ability to proceed further with additional plantings. Supplemental planting of serviceberry and chokecherry will be initiated in year 2012 should survival of the 2011 plantings be less than 350 stems/acre. Alternative methods for demonstrating compliance with the establishment of Tall Shrub habitat in South Taylor will be initiated with the Colorado Division of Wildlife during 2013, should failure of this trial continue.

f) Containerized serviceberry and chokecherry plants will be placed through the weed barrier by hand (or by mechanical means if practical and economically feasible) as per best practices with regards to depth, etc. Proper planting holes are important in transplant survival. Holes should be two to three times wider than the root ball. If the soil is clay and the sides of the hole become glazed during digging, the sides of the hole should be roughened with a spade. Holes should be prewatered before planting in dry soils. This prevents initial postplant water from migrating away from the root ball. Every effort will be made to plant at the same depth that the tree or shrub was growing in its previous

location. Damaged roots will be clean-cut with a sharp blade prior to planting. If any circling or kinked roots are discovered during the transplanting procedure, they will be severed to prevent future girdling of the plant. Every effort will be made to orient the tree or shrub in the same direction, relative to the sun, as it was facing in the previous location. Plantings will be performed in the fall by properly trained personnel. Serviceberry and chokecherry planting densities will be one plant every four linear feet (1/2 serviceberry, 1/2 chokecherry) within a row.

g) Colowyo will place contour furrows immediately above approximately every third fabric row (approximately every 66 feet). The trial will exhibit alternating bands of modified Sagebrush Steppe mix (approximately 17 feet), fabric/containerized plantings (4-5 feet wide), modified Sagebrush Steppe mix (approximately 17 feet), fabric/containerized plantings (4-5 feet), modified Sagebrush Steppe mix (approximately 12 feet) contour furrow (approximately 5 feet). This pattern should allow for specific emphasis on containerized plantings establishment while minimizing the risk of excessive erosion during the period of early establishment of the trial area.

h) An "elk proof" exclusionary fence will be erected around the perimeter of entire trial area to protect it from ungulates.

i) In the event of stand failure the area will revert back to sagebrush steppe for purposes of Phase III bond release in the future, with the exception that the requirement for 50% of the required 375 shrubs in this area be big sagebrush (Section 4.15.8), this requirement will reasonably be dropped, due to the reduction in sagebrush seed included in the mix applied.

3) Colowyo agrees to establish one small (one acre) tall shrub establishment site with thin topsoil conditions. The location of this area will be in the immediate proximity of the South Taylor X coal pod as portrayed below and on Map 28. The location for this trial represents elevation and aspect characteristics that are very similar to the majority of the tall shrub areas disturbed in the South Taylor area. Slope characteristics are more moderate than the areas disturbed, but for purposes of implementing and monitoring this trial it was determined essential that access and stability of the test location be manageable. Actual results from the trial should yield information that can be used to apply additional stability and/or sediment control measures on larger areas if this attempt is successful.

a) The area will be regraded in accordance with PMT requirements. Additional ripping of the overburden material will be conducted by a dozer to a depth of approximately four feet to ensure the material is in a loose, rough condition to encourage infiltration of rain/snowmelt and root development. Overburden with a significant coarse fragment component is desireable.

b) The area will be tested for overburden suitability as per requirements.

c) An approximate average of four inches of topsoil will be placed to replicate common topsoil depth conditions in the surrounding area in stands of this nature. Once the topsoil has been placed, it will be roughened with a disc (pulled by a dozer or other appropriate machine) to ensure the material is in a loose, rough condition to encourage infiltration of rain/snowmelt and root development.

d) The Sagebrush Steppe mix has been modified to reduce the volume of "low shrubs" in favor of tall shrub components of the mix. The grasses currently included in the mix were reduced to minimize competition, while still providing some soil stabilization function. The entire trial area will be seeded with the modified Sagebrush Steppe Mix as seen below.

In the event individual components of the mix are unavailable, guidance from the Division will be sought prior to implementation of the trial. Weedguard fabric or it's equivalent will be placed in rows (at intervals of approximately 22 feet) and will be used to severely reduce competition between the containerized plantings and annual weeds and grasses. Please see the "Expected Field Implementation Plan for Aspen/Tall Shrub Field Trials" illustration below.

e) Containerized 2-3 foot serviceberry and mahogany plants will utilized from the most similar source elevation available in the region available. Based on the volume of containerized plants included in the trial (550), and the expectations of success, a combined number of (300) serviceberry and mahogony plants within the trial during 2016 (from seed and live plantings) will be considered a successful demonstration of Coloywo's ability to proceed further with additional plantings. Supplemental planting of serviceberry and mahogony will be initiated in year 2012 should survival of the 2011 plantings be less than 350 stems/acre. Alternative methods for demonstrating compliance with the establishment of Tall Shrub habitat in South Taylor will be initiated with the CPW during 2013, should failure of this trial continue.

f) Containerized serviceberry and mountain mahogony plants will be placed through the weed barrier by hand (or by mechanical means if practical and economically feasible) as per best practices with regards to depth, etc. Proper planting holes are important in transplant survival. Holes should be two to three times wider than the root ball. If the soil is clay and the sides of the hole become glazed during digging, the sides of the hole should be roughened with a spade. Holes should be prewatered before planting in dry soils. This prevents initial postplant water from migrating away from the root ball. Every effort will be made to plant at the same depth that the tree or shrub was growing in its previous location. Damaged roots will be clean-cut with a sharp blade prior to planting. If any circling or kinked roots are discovered during the transplanting procedure, they will be severed to prevent future girdling of the plant. Every effort will be made to orient the tree or shrub in the same direction, relative to the sun, as it was facing in the previous location. Plantings will be performed in the fall by properly trained personnel. Serviceberry and mountain mahogony planting densities will be one plant every four linear feet (1/2 serviceberry, 1/2 mahogony) within a row.

g) Colowyo will place contour furrows immediately above approximately every third fabric row (approximately every 66 feet). The trial will exhibit alternating bands of modified Sagebrush Steppe mix (approximately 17 feet), fabric/containerized plantings (4-5 feet wide), modified Sagebrush Steppe mix (approximately 17 feet), fabric/containerized plantings (4-5 feet), modified Sagebrush Steppe mix (approximately 12 feet) contour furrow (approximately 5 feet). This pattern should allow for specific emphasis on containerized plantings establishment while minimizing the risk of excessive erosion during the period of early establishment of the trial area.

h) An "elk proof" exclusionary fence will be erected around the perimeter of the entire trial area to protect it from ungulates.

i) In the event of stand failure the area will revert back to sagebrush steppe for purposes of Phase III bond release in the future, with the exception that the requirement for 50% of the required 375 shrubs in this area be big sagebrush (Section 4.15.8), this requirement will reasonably be dropped, due to the reduction in sagebrush seed included in the mix applied.