From: Priscilla Burton
To: Kirk Nicholes; OGMCOAL
CC: Helfrich, Joe; Steab, Suzanne
Date: 8/10/2012 3:25 PM
Subject: 0250005 Coal Hollow, Task 4148 supplemental information
Attachments: Seed Mix Revised Pages.pdf

Okay. Thank you Kirk.

>>> Kirk Nicholes <knicholes@altoncoal.com> Friday, August 10, 2012 6:02 AM >>>

Hello Priscilla,
The attached is what was intended to be submitted, 3-58 through 3-66 (as indicated on the C2 form). With the newly approved Sage-grouse plan these pages would fall in line with the new Sage-grouse pages by replacing the old 3-56 through 3-66. When I printed out the seed mix changes I forgot to include 3-65 and 3-66 which would bring all the page numbering back into alignment without omitting any information.
Hopefully this supplemental information for Task 4148 will help correct my mistake. If you have any additional questions, please do not hesitate to call, I can be reached at 435-691-1551.
Thanks
Kirk

From: Priscilla Burton [mailto:priscillaburton@utah.gov]
Sent: Wednesday, August 08, 2012 10:12 AM
To: Kirk Nicholes
Cc: Joe Helfrich; Suzanne Steab
Subject: Revision to seed mix Task 4148

Hi Kirk,

We usually request that an application is provided in redline strike-out format, that way we can see what is intentionally being deleted and what will remain even if page numbering changes. As we discussed by phone, your intention is not to remove the information in Section 341.220, but the C1C2 instructions and revised page numbering would do so.

To preserve the wording that you currently have in your approved plan under Section 341.220, you could either replace all pages in the chapter with new page numbers or use numbers such as page 3-63a, b, c to allow for pages before and after the page that needs to be retained. Information to be retained is currently on pages numbered 3-64 and 3-65 in Section 341.220.

Would you please send me an electronic copy of one of the above solutions? And indicate that it is supplemental information for Task 4148?

Thanks,

Priscilla

Priscilla Burton, CPSSc
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340. RECLAMATION PLAN

341. REVEGETATION

This document contains the revegetation plan for final reclamation of all lands disturbed by coal mining and reclamation operations, except water areas and the surface of roads approved as part of the postmining land use, as required in R645-301-353 *through* R645-301-357. It also shows how the Coal Hollow Project will comply with the biological protection performance standards of the State Program.

341.100. Reclamation Timetable

A detailed schedule and timetable for the completion of each major step in the mine plan has been included in Chapter 5 of the MRP. Briefly, the mine will conduct operations in one area (segment) at a time. No more than 40 acres will be disturbed at one time for mining. Once mined, the plan includes redistributing subsoil and topsoil followed by seeding this segment with the final seed mix contemporaneously, or at the same time the mining of the next segment begins. However, seeding will be accomplished only in appropriate periods (usually late-fall, but early-spring could also be an option). The mine plan has been engineered to disturb the smallest practicable area at any one time. With prompt establishment and maintenance of vegetation, immediate stabilization of disturbed areas will minimize surface erosion. Details of the plan has been included in Chapter 5 of this document.

341.200. Reclamation Description

The Coal Hollow Project will be reclaimed and revegetated to meet the appropriate postmining land use. Most areas will be reclaimed to the native plant communities that existed prior to mining conditions. Other areas will be reclaimed to enhance habitat for sage-grouse or other wildlife species. Finally, in those areas where the landowner requests a change in the plant community to increase productivity for domestic livestock, they will be reclaimed accordingly.

341.210. Seed Mixtures

Revegetation seed mixtures for each plant community disturbed by mining activities in the Coal Hollow Project area are given in this section. Table 3-36 shows the plant communities that may eventually be disturbed by mining operations at the Coal Hollow Project area.

Table 3-36: Vegetation Communities of the Coal Hollow Permit Area Proposed for Disturbance

MAP SYMBOL (see *Vegetation Map*, Drawing 3-1)	PLANT COMMUNITY
S/G	Sagebrush/Grass
P	Pasture Land
P-J	Pinyon-Juniper
M	Meadow
OB	Oak Brush
RB/SB	Rabbitbrush/Sagebrush (Disturbed: previously Sagebrush/Grass)

Seed mixtures for each disturbance type are shown on Tables 3-37 *through* 3-42. These rates have been based on drill seeding methods described in this document. When broadcast seeding is employed these rates will be doubled.

Table 3-37: Revegetation Seed Mixture for the Sagebrush/Grass Community at the Coal Hollow Project

	Rate** (# PLS/Ac)	Seeds/ft2
SHRUBS		
*Artemisia nova**	0.20	4.16
*Artemisia tridentata**	0.10	5.74
Ceratoides lanata	1.00	1.26
Purshia tridentata	2.00	0.69
Symphoricarpos oreophilus	1.00	1.72
FORBS* **		
Achillea millefolium	0.03	1.91
Hedysarum boreale	1.00	0.77
Linum lewisii	0.70	4.47
Lupinus argenteus	1.00	0.29
Penstemon palmeri	0.30	4.20
Sphaeralcea grossulariifolia	0.40	4.59
Viguiera multiflora	0.20	4.84
GRASSES		
Elymus smithii	1.50	4.34
Elymus trachycaulus	1.50	5.51
Poa pratensis	0.10	5.00
Poa secunda	0.20	4.25
Stipa hymenoides	1.00	4.32
Sterile Triticale - Quick Guard	10.00	4.59
TOTALS	22.23	62.66

* This species could also to be planted by containerized seedlings at a rate of 200 plants per acre to enhance sage-grouse habitat.

** Based on drill seeding methods. The number reflects the pounds of pure live seed (PLS) per acre.

*** Seeds used may be based on commercial availability. Other forb species that would be beneficial for sage-grouse enhancement include: Achillea millefolium, Agoseris glauca, Crepis acuminata, Gayophytum spp., Lomatium spp., Tragopogon dubius, Trifolium spp.

Table 3-38: Revegetation Seed Mixture for the Pasture Lands at the Coal Hollow Project

(Final determination to be made by landowners)	Rate* (# PLS/Ac)	Seeds/ft2
SHRUBS		
FORBS **		
Achillea millefolium var. occidentalis	0.04	2.55
Astragalus cicer	1.5	4.22
Hedysarum boreale	1	0.77
Linum perenne	1	6.39
Medicago sativa	1	5.21
GRASSES		
Bromus inermis	1	2.45
Dactylis glomerata	0.2	0.00
Pascopyrum smithii	1.5	4.34
Elymus lanceolatus ssp. lanceolatus	1.5	5.27
Psathyrostachys juncea	1	0.00
Thinopyrum intermedium	2	0.00
Phleum pretense	0.2	0.00
Poa pratensis	0.1	5.00
Sterile Triticale - Quick Guard	10.00	4.59
TOTALS	22.04	40.78

* Based on drill seeding methods. The number reflects the pounds of pure live seed (PLS) per acre.

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*** Seeds used may be based on commercial availability. Other forb species that would be beneficial for sage-grouse enhancement include: Achillea millefolium, Agoseris glauca, Crepis acuminata, Gayophytum spp., Lomatium spp., Tragopogon dubius, Trifolium spp.

Table 3-39: Revegetation Seed Mixture for the Pinyon-Juniper Community at the Coal Hollow Project

	Rate** (# PLS/Ac)	Seeds/ft2
SHRUBS		
Amelanchier Utahensis	5.00	2.96
Artemisia nova	0.20	4.16
Artemisia tridentata vaseyana	0.07	4.02
Ceratoides lanata	3.00	3.79
Purshia tridentata	12.00	4.13
Symphoricarpos oreophilus	2.50	4.30
FORBS		
Artemisia ludoviciana	0.04	4.13
Eriogonum umbellatum	1.00	4.80
Hedysarum boreale	5.00	3.86
Lupinus argenteus	15.00	4.30
Sphaeralcea coccinea	0.50	5.74
Viguiera multiflora	0.20	4.84
GRASSES		
Elymus spicatus	1.00	3.21
Elymus smithii	1.50	4.34
Elymus trachycaulus	1.50	5.51
Poa pratensis	0.10	5.00
Poa secunda	0.20	4.25
Stipa hymenoides	1.00	4.32
Sterile Triticale - Quick Guard	10.00	4.59
TOTALS	59.81	82.25

* Based on drill seeding methods. The number reflects the pounds of pure live seed (PLS) per acre.

Table 3-40: Revegetation Seed Mixture for the Meadow Community at the Coal Hollow Project

	Rate* (# PLS/Ac)	Seeds/ft2
SHRUBS		
FORBS **		
Iris missouriensis	2	0.96
Achillea millefolium var. occidentalis	0.1	6.37
GRASSES		
Carex microptera	0.2	3.89
Carex nebrascensis	0.5	6.13
Elymus trachycaulus ssp. trachycaulus	2	7.35
Phleum pretense	0.2	5.97
Poa pratensis	0.1	5.00
Poa secunda ssp. sandbergii	0.3	6.38
Schoenoplectus americanus	1	4.13
Sporobolus airoides	0.2	8.03
Sterile Triticale - Quick Guard	10.00	4.59
TOTALS	16.60	58.79

* Based on drill seeding methods. The number reflects the pounds of pure live seed (PLS) per acre.

*** Seeds used may be based on commercial availability. Other forb species that would be beneficial for sage-grouse enhancement include: Achillea millefolium, Agoseris glauca, Crepis acuminata, Gayophytum spp., Lomatium spp., Tragopogon dubius, Trifolium spp.

Table 3-41: Revegetation Seed Mixture for the Oak Brush Community at the Coal Hollow Project

	Rate* (# PLS/Ac)	Seeds/ft2
SHRUBS		
Amelanchier utahensis	1	0.59
Artemisia nova	0.2	4.16
Artemisia tridentate ssp. vaseyana	0.07	4.02
Cercocarpus montanus	1	1.35
Purshia tridentate	2	0.69
Symphoricarpos oreophilus	1	1.72
Ephedra viridis	2	1.15
FORBS		
Artemisia ludoviciana	0.04	4.13
Sphaeralcea coccine	0.2	2.30
Hedysarum boreale	1	0.77
Heliomeris multiflora	0.2	4.84
GRASSES		
Bromus marginatus	2	4.90
Pseudoroegneria spicata ssp. spicata	1.5	4.82
Elymus trachycaulus ssp. trachycaulus	1.5	3.96
Poa pratensis	0.1	5.00
Poa secunda ssp. sandbergii	0.2	4.25
Achnatherum hymenoides	1	4.32
Sterile Triticale - Quick Guard	10.00	4.59
TOTALS	25.01	57.56

* Based on drill seeding methods. The number reflects the pounds of pure live seed (PLS) per acre.

Table 3-42: Revegetation Seed Mixture for the Rabbitbrush/Sagebrush Community (disturbed Sagebrush/Grass Community) at the Coal Hollow Project

	Rate** (# PLS/Ac)	Seeds/ft2
SHRUBS		
*Artemisia nova**	0.2	4.16
*Artemisia tridentate ssp. Tridentate**	0.1	5.74
Krascheninnikovia lanata	1	1.26
Purshia tridentate	2	0.69
Symphoricarpos oreophilus	1	1.72
FORBS * **		
Achillea millefolium var. occidentalis	0.03	1.91
Hedysarum boreale	1	0.77
Linum perenne	0.7	4.47
Lupinus argenteus ssp. rubricaulis	1	0.29
Penstemon palmeri	0.3	4.20
Sphaeralcea grossulariifolia	0.4	4.59
Heliomeris multiflora	0.2	4.84
GRASSES		
Pascopyrum smithii	1.5	4.34
Elymus trachycaulus ssp. trachycaulus	1.5	5.51
Poa pratensis	0.1	5.00
Poa secunda ssp. sandbergii	0.2	4.25
Achnatherum hymenoides	1	4.32
Sterile Triticale - Quick Guard	10.00	4.59
TOTALS	22.23	62.66

* This species could also to be planted by containerized seedlings at a rate of 200 plants per acre to enhance sage-grouse habitat.

** Based on drill seeding methods. The number reflects the pounds of pure live seed
(PLS) per acre.

*** Seeds used may be based on commercial availability. Other forb species that would be beneficial for sage-grouse enhancement include: Achillea millefolium, Agoseris glauca, Crepis acuminata, Gayophytum spp., Lomatium spp., Tragopogon dubius, Trifolium spp.

341.220. Planting & Seeding Methods

Seedbed Preparation & Analyses

The final seedbed of the reclaimed areas will be prepared by first replacing the subsoil and topsoil in the same order it existed prior to removal by the mining activities. Next, a basic topsoil (top 8 inches of reclamation profile) sampling regime will be implemented prior to seeding that should identify fertility problems and will provide a basis for determining necessary soil amendments. The parameters analyzed will be:

- Available phosphorus (P)
- Soluble Potassium (K)
- Nitrate-Nitrogen

One composite sample will be collected from approximately every 2 to 5 acres based on soil types and variability. Each composite will be comprised of at least 4 samples.

Pre-testing of the soils has been conducted as part of the soils survey. Results from the pre-testing of topsoil and subsoil can be viewed in Table C-1 of Appendix 2-1 (native topsoil and subsoil) and Table C-2 (samples from core hole/overburden pits) of Appendix 2-1.

If heavy equipment operation results in excessive soil compaction at the surface of the reclaimed areas, they will then be ripped, disked, and harrowed to loosen the seedbed prior to seeding. Excessive compaction that could impact seeding success will be determined by observation and judgment of an environmental professional. In other areas where less compaction has occurred, the areas will be disked and harrowed. The disking and harrowing of all areas will be done parallel with the contour wherever possible to decrease the potential for water erosion downslope. In other areas where compaction is not a problem, dozer tracking can be used to roughen the surface, and to trap seed, fertilizer, mulch, and other amendments as well as decrease erosion by wind and water. In such cases, seeding will be done immediately after this treatment, whereas soil amendments, where required, would be applied over the surface during seedbed preparations. Seeding will mainly occur in the early spring and late fall.

Seeding & Transplanting

Seeding will be accomplished using different methods depending on the area to be seeded. In the more flat areas such as the meadows and existing pasture lands, a typical farmland drill will be used for seeding. In other areas where the surface may be more rough, a modified rangeland drill or "rough terrain seeder" will be used. Finally, in the areas where access is more difficult to reach by heavy equipment due to slope steepness or other limiting factors, broadcast seeding or hydro-seeding will be employed. For a list of plant species to be seeded refer to Tables 3-37 *through* 3-42.

Containerized plants can be planted in those areas proposed for sage-grouse habitat enhancement. These plants will be planted from containers at least 10 cubic inches in size and inoculated with appropriate site-specific or commercial mycorrhizal inocula at specified infection rates. The containerized plants will be planted at a rate that totals at least 400 individuals per acre. For a list of the species to be planted, refer to Table 3-37.
Containerized plants should be dormant when they arrive at the site in the spring or fall and will be planted as soon after delivery as possible. Plants will be planted in a fashion to simulate a natural habitat. If competing vegetation is present at the time of planting, this vegetation will be removed by scalping the area or herbicide application beforehand that provide a time period ample as to not affect the containerized seedling. A small depression will be created in the seedbed around the seedling at the time of planting to increase survivability by harvesting and holding water. The plants will be "wateredin" when they are planted by adding water to the depression. If possible, the plants will be watered during dry periods for the first growing season.

341.230. Mulching Techniques

Mulch will be placed on the seedbed surface once soil amendments have been incorporated and seeding has been accomplished. Mulching will occur by one of the following methods:

- Certified noxious weed free straw applied at a rate of 1 ton/acre anchored by crimping or a chemical binder.

- Wood fiber hydromulch at a rate of ¾ ton per acre for slopes flatter than 3:1 and 1 ton per acre for slopes at 3:1 which is the steepest slope planned at the project. This hydromulch would be anchored with a chemical binder at the manufacturer's suggested rate.

The mulch should control erosion by wind and water, decrease evaporation and seed predation, and increase survivability of the seeded species. Since there is only one post mining land use, mulching will follow one of the above described methods for all reclaim areas.

341.240. Irrigation

Irrigation has not been planned for the reclaimed area with the exception of watering the containerized plants as mentioned above.

341.250. Revegetation Monitoring

Vegetation of the reclaimed areas will be monitored regularly to measure the success of plant establishment and to determine if problem areas exist. Qualitative and quantitative data will be recorded at regular intervals. The qualitative data will include: site location, sample date, observers, slope, exposure, acreage, animal disturbance, erosion damage, dominant plant species observed, and other pertinent notes. Quantitative data recorded will include: total cover (living cover, rock, litter, bare ground), cover by species, composition, frequency, and woody species density.

Methods for quantitative monitoring will be as follows. Transect lines will be placed randomly on each of the revegetation sites. Random sample locations will then be placed from these transect lines and the aforementioned data will be recorded. Ocular methods with square meter quadrat will be used to provide cover and frequency data, whereas, point quarter and/or belt transects will be used to estimate woody species densities.

Weed control through chemical means will follow the current Weed Control Handbook (published annually or biannually by the Utah State University Cooperative Extension Service) and herbicide labels.

Weed surveys will also be conducted on the reclaimed areas on a yearly basis or during the revegetation monitoring studies. If undesirable, exotic or "weedy" plant species are present at a density that they could impede revegetation or out-compete desirable plant species, a certified or trained specialist will spray herbacide, kill or remove the weeds mechanically (roguing, grubbing and mowing).

341.300. Mining, Reclamation & Revegetation Research

Mining, reclamation & revegetation research has been planned and is in the process of being submitted to DOGM. Additionally, DOGM may require greenhouse studies, field trials, or equivalent methods of testing proposed or potential revegetation materials and methods to demonstrate that revegetation is feasible pursuant to R645-300-133.710.