Appendix B

Reclamation Plan

APPENDIX B

ATLANTIC RIM NATURAL GAS PROJECT RECLAMATION PLAN

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APPENDIX B

ATLANTIC RIM NATURAL GAS PROJECT RECLAMATION PLAN

This appendix presents a programmatic reclamation plan for the Atlantic Rim Natural Gas Project (ARPA). It gives general guidelines for completing reclamation in lieu of specific actions to take at each disturbance, as current Bureau of Land Management (BLM) policy recognizes that there may be more than one correct way to achieve successful reclamation, and a variety of methods may be appropriate to varying circumstances. BLM will continue to encourage the operators to use their expertise in recommending and implementing reclamation projects. However, the operators are responsible for attaining final reclamation standards of performance as outlined in USDI-BLM (1990a) reclamation policy. All reclamation must conform to BLM reclamation policy (USDI-BLM 1990a). Further guidance for reclamation can be found in the BLM/Forest Service "Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development" (Gold Book) found at:

http://www.blm.gov/bmp/gold%20book/FinalGoldBook%20-%202006%20Edition.pdf

1 Reclamation

BLM reclamation goals emphasize eventual ecosystem reconstruction, which means returning the land to a condition approximate to or better than that which existed before it was disturbed. Final reclamation measures are used to achieve this goal. BLM reclamation goals also include the short-term goal of quickly stabilizing disturbed areas to protect both disturbed and adjacent undisturbed areas from unnecessary degradation. Interim reclamation measures are used to achieve this short-term goal. As such, two types of reclamation are envisioned at the ARPA:

1. **Interim Reclamation.** Stabilization of soil by revegetation on sites that will likely be further disturbed in the future. This includes sites where re-contouring is needed at the end of the project and sites where periodic disturbance may occur due to operation and maintenance activities.

2. **Final Reclamation.** Reclamation of an area that is not planned for further disturbance including re-contouring, stabilization of soil by revegetation, and restoring the ecosystem function originally found at the site.

Among items to be emphasized in achieving these goals are:

- Stabilization of disturbed soils until the first growing season;

- Soil stabilization through establishment of a vegetative ground cover on disturbed sites during the first growing season following disturbance;

- Restoration of the native plant community disturbed or removed or restoration of an alternate vegetative regime in consultation with and approval by the BLM's Rawlins Field Office;

- Minimal disturbance of the existing environment and avoidance of riparian areas;

- Annual monitoring and control of invasive and noxious weeds beginning the first season of disturbance;

- Monitoring and management of reclamation sites to evaluate weed populations, reclamation success, and to plan and report on the program annually; and

- Affirmative efforts to resist the spread of weeds including power washing of machinery and equipment between work sites consistent with the Rawlins Weed Prevention Plan (USDI-BLM 1999).

1.1 Management of Soil for Restoration

Topsoil should be handled separately from subsoil materials. At all construction sites, topsoil should be stripped to provide for sufficient quantities to be re-spread to a depth of at least 4 to 6 inches over the disturbed areas during reclamation. In areas where deep soils exist (such as floodplains and drainage channel terraces), at least 12 inches of topsoil should be salvaged. Where soils are shallow or where subsoil is stony, as much topsoil should be salvaged as possible.

Topsoil should be stockpiled separately from subsoil materials. Topsoil salvaged from drill sites and stored for more than 1 year should be bladed to a specified location at these areas, seeded with a prescribed seed mixture, and covered with mulch for protection from wind and water erosion and to discourage the invasion of weeds. Topsoil stockpiles anticipated to be stored for more than 1 year will be re-spread so as not to exceed a depth of 2 feet. Topsoil should be stockpiled separately from other earth materials to preclude contamination or mixing and should be marked with signs and identified on construction and design plans. Runoff should be diverted around topsoil stockpiles to minimize erosion of topsoil materials.

In most cases, disturbances will be reclaimed within 1 year. Therefore, it is unlikely that topsoil stockpiling for more than 1 year will be required. Salvaged topsoil from roads and drill sites will be respread over cut-and-fill surfaces not actively used during the production phase. Upon final reclamation, topsoil spread on these surfaces will be used for the overall reclamation effort.

1.2 Seed Mixtures

On all areas to be reclaimed, seed mixtures are required to be free of noxious weeds, composed of the same native species as were disturbed, and required to include species-promoting soil stability. A predisturbance species composition list must be developed for each site if the project encompasses an area where there are several different plant communities present. Livestock palatability and wildlife habitat needs must be given consideration in seed mix formulation. Variation of seed mixtures can be proposed and approved based on availability, climatic conditions, or variables. BLM guidance for native seed use is the BLM Manual 1745 (USDI-BLM 1992), and Executive Order 13112 (Invasive Species, 64 Federal Register 6183).

Alternate Seed Mixes. The seed mixtures identified in attachment B-1 may vary on a site-specific basis. Variations may be proposed and approved by the BLM before final reclamation. An example for the ARPA would be the addition of green needlegrass (*Stipa viridula* var. *Lodorm*) on clayey sites associated with the southern portion of the project area (e.g., Muddy Mountain area).

Temporary Seed Mixes. Depending on BLM authorization, the following seed mixtures may be considered for erosion and weed control on sites that will be disturbed again before final reclamation. The seed mixtures contain annual cereal grasses that are not suitable for establishing a reclaimed vegetative community, but offer a temporary option to prevent halogeton invasion and establishment.

Seed should be broadcast at the rate of 50 to 100 seeds per square foot, or 15 to 25 pure live seed (PLS) pounds per acre. Another viable option is the use of a sterile triticale hybrid such as 'Quickguard®' (Granite Seed) to stabilize the disturbed area. The use of a non-sterile plant species such as wheat as a cover crop is not recommended because of its ability to reseed itself.

During reclamation within areas of important wildlife habitat (crucial winter range, sage-grouse nesting habitat, etc.), consideration shall be given for the restoration of native browse and forb species. Follow-up seeding or corrective erosion control measures will be required on areas of surface disturbance that fail to meet reclamation success standards.

Any mulch used must be certified free from mold, fungi, or noxious or invasive weed seeds. Mulch may include hay, small-grain straw, wood fiber, live mulch, cotton, jute, or synthetic netting. Straw mulch should contain fibers long enough to facilitate crimping and provide the greatest cover.

1.3 Reclamation Standards and Principles

One of the most important principles for successful restoration is to limit initial disturbance. Restoration planning should start before disturbance and be an integral part of the operational plan. Consideration of the processes necessary for successfully reclamation is important. Pre-disturbance surveys, site stabilization, weed control, and maintenance and health of soils are important considerations. Re-vegetation considering vegetative succession to pre-disturbance vegetative conditions, with annual monitoring and reporting will allow tracking of success and adaptive management of problem areas.

1.3.1 At Any Time

For each discrete site where ground-disturbing activities are planned or occur under the operators, a site-specific reclamation plan shall be prepared, submitted, and approved by the BLM before the operators disturb the environment. Guidance and requirements for this plan can be found in program-specific direction (USDI-BLM 1983). A project-wide reclamation plan may be considered if it addresses discrete site disturbances individually. The collection of photo reference points is essential.

With the exception of active work areas, disturbed areas anticipated to be left bare and exposed will be stabilized to prevent soil erosion. In addition to mulch silt fencing, waddles, hay bales, and other erosion control devices will be used on areas at risk to soil movement away from disturbed areas including fill slopes. Variation of the cover percentage and the use of other stabilizing materials can be proposed and used with BLM approval consistent with the relevant site-specific reclamation plan. For areas anticipated for further disturbance in the future, use of the seed mixtures detailed in Temporary Seed Mixtures on page would be acceptable in the interim.

1.3.2 First Growing Season

Reclamation actions will be implemented before the first growing season following disturbance with the goal of returning the land to a condition approximate to or more productive than that which existed before disturbance or to a stable and productive condition compatible with that described in the land use plan (USDI-BLM 1990b). One strategy could include consideration of using all grasses for the first seeding so that it survives the weed-control method the first year. During subsequent seeding for final vegetation reclamation, the project shall consider using desired shrubs and forbs.

Consistent with the reclamation plan, the operator will ensure the following during the first growing season:

1. Prior to the beginning of the growing season,
    - Stabilize disturbed site soils until they are revegetated with no obstacles to germination and growth of seed, and
    - Properly prepare the site by
        - o Re-contouring for permanent reclamation;
        - o Completing soil preparation activities, such as ripping, straw crimping/seedbed preparation for planting including drilling and broadcast methods;
        - o Planting the approved seedling/seed mixtures using site-specific methods for successful revegetation using locally adapted species; and
        - o Ensuring that seed mixtures are compatible with treatment for weeds.
2. During the first growing season,
    - Monitor germination and growth of plants in the area being reclaimed;
    - Detect and control weeds in all areas—not just reclaimed areas;
    - Use adaptive management to correct establishment and growth problems;
    - Put up temporary fencing to avoid adverse effects to reclamation;
    - Build snow fencing, if requested, to increase effective precipitation and regenerate vegetation.
3. Following each growing season,
    - Review and complete a site-specific vegetation monitoring report for areas being reclaimed (table B-1) and

- Prepare a written, site-specific prescription for actions to be implemented which may include:
    - Reseeding of areas not attaining reclamation success,
    - Soil stabilization,
    - Weed control needs, and
    - Mulching/fertilization or other cultural practices prescribed for the following season.

If the treatment area is found to be successfully reclaimed, the site will be checked for reclamation success at least annually after the growing season for at least five seasons. The site will also be checked for additional management needs including weed infestations/control needs.

If the reclamation area is not successfully reclaimed or otherwise requires further management activities to establish vegetation, the actions prescribed will be implemented as planned and further monitoring will occur as detailed beginning with Item 1 above.

1.4 Reporting Reclamation Monitoring after Successful Revegetation

The operator will provide the BLM with an annual report before December 1st for all sites disturbed. The report will include:

- Copies of the completed individual site review forms or a BLM-approved electronic report
- A summary of monitoring data and results that include:
    - Individual site reclamation monitoring reporting data (table B-1);
    - Identification of sites successfully reclaimed by reclamation years (starting with the first growing season);
    - Identification of sites needing additional work/more reclamation activities by reclamation year; and
    - Sites proposed for the end of monitoring, i.e., sites that were successfully reclaimed.
- A BLM useable shapefile(s) or Geographic Information System (GIS) layer(s) that details location, name, type, and extent of:
    - New disturbances,
    - Unreclaimed disturbance,
    - New reclamation,
    - Failed or unsuccessful reclamation,

- Locations of noxious/invasive weed infestation, and
- Further vegetation treatments planned (e.g., mulching, matting, and weed control).

On these shapefiles or GIS layers, *location* shall be given as the legal location and geo-referenced location of the site; *name*, as the BLM Application for Permit to Drill (APD), lease, or other BLM file name for the site; and *extent*, as the amount of area and location of the item.

2 Criteria for Reclamation Success

Reclamation will be considered successful if the following criteria are met.

- 80 percent of predisturbance ground cover,
- 90 percent dominate species*,
- No noxious weeds present in the seeding, and
- Erosion features equal to or less than surrounding area.

*The vegetation will consist of species included in the seed mix and/or occurring in the surrounding natural vegetation or as deemed desirable by the BLM in review and approval of the reclamation plan. The goal is no single species will account for more than 30% total vegetative composition. Vegetation canopy cover production and species diversity shall approximate the surrounding undisturbed area.

Section 1.3.1 of this appendix indicates that reclamation success will be tracked by each discrete site for which an individual reclamation plan was prepared. A site can be nominated for successful reclamation status by the companies or the BLM any time it meets the criteria for reclamation success as outlined above. A site will be considered reclaimed and the Atlantic Rim disturbance acreage count reduced by the extent of the reclaimed acreage when the BLM authorized officer accepts the written nomination. Partially reclaimed discrete sites will not have any reclaimed acreage subtracted from the disturbance acreage count. The Atlantic Rim disturbance cap is 7,600 acres at any one time.

The BLM Rawlins Field Office (RFO) will maintain a running count of the extent of surface disturbance acres based on the “as build” geo-spatial monitoring data submitted annually for the preceding year in December by the companies following construction. An annual summary report of the disturbance acreage count will be available to the companies and the public upon written request. For a project-wide type reclamation plan (per section 1.3.1 of this appendix) each individual site disturbance included in the plan will be managed as a discrete site and disturbance acreage will be tracked as detailed above.

When determining the extent of successful reclamation, a site covered under an individual reclamation plan will be evaluated as follows. If, for example a site is determined to have 4.2 acres of total disturbance based on the “As-Built” survey, the disturbance acreage count for that discrete site will be 4.2 acres. However, if one-half acre remains disturbed in the long term (e.g. roadway) then the disturbance count for that site would be reduced by 3.7 acres when accepted as successfully reclaimed by the BLM. It should be noted that “partial credit” would not be given until all of the 3.7 acre portion is successfully reclaimed and accepted.

Table B-1. Reclamation Monitoring Reporting Data.

General	WYW# (O&G Lease or right-of-way)
	Project Name
	Project Type (Well, Access Road, Pipeline, Facility, etc.)
	Qtr/Qtr Sec, T, R, County , State
Disturbance	Disturbance Dates
	Start-End
Reclamation	Reclamation Type (Interim/Final)
	Earthwork Contractor Name
	Earthwork & Topsoil Completion Date
	Soil Preparation Ripping Depth
	Area (Acres or Sq Ft)
Seeding	Seeding Contractor Name
	Seeding Date
	Seedbed Preparation Methods (Disc, Harrow, Depths)
	Seeding Method (Drill, Broadcast, Depths)
	Copy of Seed Tag (Species%, Purity%, Germination%)
	Actual Seeding Rate Lbs/Acre
	Area Seeded (Acres or Sq Ft)
Other	Soil Amendments Used (Describe)
	Mulching/Erosion Netting/Tackifier
	Fenced Location
	Snow Fencing
Weeds	Type(s) of weed treated
	Weed Contractor Name
	Contractor License #
	Weed Treatment Date
	Weed Treatment Type (Chemical, Mechanical)
	Chemicals Used and Rates Applied
	Area Treated (Acres or Sq Ft) (GIS extent and location)
Inspection	Inspector's name, company, ID
	Inspection Date
	Time After Seeding
	Seedlings/Sq. Ft Growing
	% and extent of Bare Soil
	% Ground Cover (Describe)
	% Desirable Species (Describe)
	% Noxious/Invasive Weeds (Describe)
	Erosion Features Present? (Describe)
	Evidence of Livestock Grazing (Describe)
	Reclamation Successful (Yes/No)
Reporting	Completed spreadsheet or database
	GIS layer with attribute table with site data as detailed
	Detail disturbance extent and location
Monitoring	Permanent Reference Point
	Reference Photos
	Close Up Photos
Future Management Prescription	Reseeding
	Weed Control needed
	Erosion control needed
	Grazing / predation issues
	Other cultural or mechanical needs

3 References Cited

USDI-BLM 1983. *Onshore Oil and Gas Order No. 1: Approval of Operations on Onshore Federal and Indian Oil and Gas Leases, Section III(G)(10).* 43 CFR 3160. United States Department of Interior, Bureau of Land Management. October 1983.

USDI-BLM 1990a. *Wyoming Policy on Reclamation.* Cheyenne, Wyoming: United States Department of Interior, Bureau of Land Management, Wyoming State Office. Instruction Memorandum No. WY-90-231. February 1990.

USDI-BLM 1990b. *Great Divide Resource Area Record of Decision and Approved Resource Management Plan.* Rawlins, Wyoming: United States Department of the Interior, Bureau of Land Management, Rawlins District Office, Great Divide Resource Area. 74 pp.

USDI-BLM 1992. *Introduction, Transplant, Augmentation, and Reestablishment of Fish, Wildlife, and Plants, BLM Manual 1745.* United States Department of the Interior, Bureau of Land Management. March 1992.

USDI-BLM 1999. *Rawlins Field Office Noxious Week Prevention Plan, Rawlins, WY.* United States Department of the Interior, Bureau of Land Management. April 1999.

ATTACHMENT B-1

STANDARD SEED MIXTURES
RAWLINS FIELD OFFICE

The following list contains seed mixes recommended by resource specialists with years of local knowledge. Care and planning must be taken to choose mixes and amounts that will benefit under site specific conditions. Planning and thought must also go into selecting successful planting and site preparation techniques. All sites must be planted with a diverse mix of grasses, forbs, and shrubs to be considered successful. Industry is ultimately responsible for successful restoration of disturbed sites. Alternate seed mixes can be proposed by industry to the BLM for approval prior to use. The final goal is to restore disturbed sites so that they closely resemble pre-disturbance native plant communities.

DRY LOAMY/CLAY SITES - *characterized as a sagebrush/wheatgrass community with less than 10 inches precipitation*

Species of Seed	Variety	Lbs. PLS*
Grasses		
Streambank wheatgrass (*Elymus lanceolatus)*	Sodar	1
Thickspike wheatgrass (*Elymus macrourus)*)	Critana (Bannock)	1
Western wheatgrass (*Agropyron smithii*)	Rosana	1
Indian ricegrass (*Oryzopsis hymenoides*)	Rimrock (Nez Par)	2
Bottlebrush squirreltail (*Elymus elymoides*)	Sand Hollow	2
Slender wheatgrass (*Elymus trachycaulus*)	Pyror (San Luis)	4
Little bluegrass “Sandbergh” (Poa secunda)	High plains	0.5
*Bluebunch wheatgrass (*Pseudoroegneria spicata*)	Secor	2
Shrubs		
*Big sagebrush (*Artemisia tridentata wyomingensis*)		0.5
*Gardner's saltbush (*Atriplex gardneri*)		1
*Fourwing saltbush (*Atriplex canescens*)	Wytana	1
* Shadescale (*Atriplex confertifolia)*		0.5
*Rubber rabbitbrush (*Ericamerica nauseosas*) ”green”	Chrysothamnus viscidiflorus “Gray”	1
*winterfat (*Krascheninnikovia lanata)*	Open Range	0.5
Forbs		
*Scarlet globemallow (*Sphaeralcea coccinea*)		0.5+
*Lewis' flax (*Linum lewsii*)	Appar	0.5+
*Rocky Mountain beeplant (*Cleome serrulata)*		0.5+
*Western yarrow (*Achillea millefolium* L. var. *occidentalis)*	Yakima	0.5
***Firecracker Penstemon** *Penstemon eatonii*	Richfield	1

DRY SANDY SITES - *characterized as a sagebrush/bunchgrass community with less than 10 inches precipitation*

Species of Seed	Variety	Lbs. PLS*
Grasses		
Indian ricegrass (*Achnatherum hymenoides*)	Rimrock (Nez Par)	3
Needleandthread Needlegrass (*Stipa comata*)		4
Slender wheatgrass (*Agropyron trachycaulum*)	Prior	4
*Sandhill muhly (*Muhlenbergia pungens*)		0.5
Western wheatgrass (*Agropyron smithii*)	Rosana	1
*Threadleaf sedge (*Carex filafolia)*		2

Species of Seed	Variety	Lbs. PLS*
Shrubs		
*Rubber rabbitbrush (*Ericamerica nauseosas*) "green"	Chrysothamnus viscidiflorus "Gray"	1
*Wyoming Big sagebrush (*Artemisia tridentata wyomingensis*)		0.5
*Spiny hopsage (*Atriplex spinosa*)		1
*Fourwing saltbush (*Atriplex canescens*)	Wytana	1
*winterfat (*Krascheninnikovia lanata)*	Open Range	0.5
Forbs		
*Scarlet globemallow (*Sphaeralcea coccinea*)		0.5+
*Lewis' flax (*Linum lewsii*)	Appar	0.5+
*Rocky Mountain beeplant (*Cleome serrulata*)		0.5+

LOAMY/CLAY-LOAM SITES - *characterized as a sagebrush/wheatgrass community with 10 or greater inches of precipitation*

Species of Seed	Variety	Lbs. PLS*
Grasses		
Western wheatgrass (*Agropyron smithii*)	Rosana	1
Thickspike wheatgrass (*Elymus macrourus*)	Critana	1
Indian ricegrass (*Oryzopsis hymenoides*)	Rimrock (Nez Par)	1
Green needlegrass (*Stipa viridula*)	Lordon	3
Prairie Junegrass (Koeleria cristata)		1
Bottlebrush squirreltail (*Sitanion hystrix*)	Sand Hollow	1
Mutton bluegrass (Poa fendleriana)		0.5
Streambank wheatgrass (*Elymus lanceolatus)*	Sodar	1
Bluebunch wheatgrass (*Pseudoroegneria spicata*)	Secor	2
Basin wild rye	Trailhead	2
Shrubs		
*Big sagebrush (*Artemisia tridentata wyomingensis*)		0.5
*Big sagebrush (*Artemisia tridentata vaseyana) at sites above 7,000'*		0.5
*Fourwing saltbush (*Atriplex canescens*)	Wytana	1
*Antelope bitterbrush (*Purshia tridentata*)	Maybell	1
*Snowberry (*Symphoricarpos oreophilus*) and/or (*Sym. Albus*)		1
*winterfat (*Krascheninnikovia lanata)*	Open Range	0.5
Forbs		
*Lewis' flax (*Linum lewsii*)	Appar	0.5+
*Scarlet globemallow (*Sphaeralcea coccinea*)		0.5+
*American vetch (*Vicia americana*)		0.5+
*Lupine (*Lupinus sericeus*)		0.5+
*Blanketflower (*Gaillardia aristata*)		0.5+
*Western yarrow *(Achillea millefolium* L. var. *occidentalis*).	Yakima	0.5+
***Firecracker Penstemon** *Penstemon eatonii*	Richfield	0.5+
*White sage atrtemesia ludiciciana		0.5

SANDY SITES - *characterized as a sagebrush/bunchgrass community with 10 or greater inches of precipitation*

Species of Seed	Variety	Lbs. PLS*
Grasses		
Western wheatgrass (*Agropyron smithii*)	Rosana	1
Indian ricegrass (*Oryzopsis hymenoides*)	Rimrock (Nez Par)	2
Green needlegrass (*Stipa viridula*)		3
Needleandthread (*Stipa comata*)		2
Slender wheatgrass (*Agropyron trachycaulum*)	Prior (Revenue)	2

Species of Seed	Variety	Lbs. PLS*
Grasses (cont. from previous page)		
Mutton bluegrass (Poa fendleriana)		0.5
Sand dropseed (Sporobolus cryptandrus)	Borden County	0.5
Canby Bluegrass (*Poa Secunda)*	Canbar	0.5
Shrubs		
*Silver sagebrush (*Artemisia cana)*		0.5
*Fourwing saltbush (*Atriplex canescens*)		1
*Antelope bitterbrush (*Purshia tridentata*)		1
*winterfat (*Krascheninnikovia lanata)*	Open Range	0.5
*White sage atrtemesia ludiciciana		0.5
Forbs		
***Firecracker Penstemon** *Penstemon eatonii*		
*Lewis' flax (*Linum lewsii*)	Appar	0.5+
*Rocky Mountain beeplant (*Cleome serrulata*)		0.5+
* Western yarrow *Achillea millefolium* L. var. *occidentalis* DC.		0.5+

WET ALKALINE/SALINE SITES - *characterized as a greasewood community in a lowland location*

Species of seed	Variety	Lbs. PLS**
Grasses		
Western wheatgrass (*Agropyron smithii*)	Rosana	3
Slender wheatgrass (*Agropyron trachycaulum*)	Pryor (Revenue)	4
Alkali sacaton (Sporobolus airoides)		0.5
Inland saltgrass (Distichlis spicata)		2
Basin wildrye (Le*ymus cinereus*)	Trailhead	2
Shrubs		
*Fourwing saltbush (*Atriplex canescens*)	Wytana	1
Greasewood *Sarcobatus vermiculatus*		*0.5*

MOUNTAIN SHRUB SITES - *characterized as shrub community with deep loamy soils and greater than 14 inches of precipitation*

Species of Seed	Variety	Lbs. PLS**
Grasses		
Idaho fescue (*Festuca idahoensis*)		2
Green needlegrass (*Stipa viridula*)		4
Mountain brome (*Bromus carinatus*)	Garnet	2
*Oniongrass (*Melica bulbosa*)		2
Basin wildrye (Le*ymus cinereus*)	Trailhead	2
Bluebunch wheatgrass (*Pseudoroegneria spicata*)	Goldar, Secor	2
Shrubs		
*Wyoming Big sagebrush (*Artemisia tridentata wyomingensis*)		0.5
* Mountain Big sagebrush (*Artemisia tridentata vaseyana) at sites above 7,000'*		0.5
*** Silver sage (Artemisia cana)***		0.5
*Antelope bitterbrush (*Purshia tridentata*)	Maybell	1
*Serviceberry (*Amelanchier alnifolia*)		1
*Chokecherry (*Prunus virginianna*)		1
*winterfat (*Krascheninnikovia lanata)*	Open Range	0.5
Forbs		
Arrowleaf Balsamroot (Balsamhoriza sagittata)*		
*Lewis' flax (*Linum lewsii*)	Appar	0.5+
*Scarlet globemallow (*Sphaeralcea coccinea*)		0.5+
*American vetch (*Vicia americana*)		0.5+

Species of Seed	Variety	Lbs. PLS**
Forbs (cont. from previous page)		
*Lupine (*Lupinus sericeus*)		0.5+
*Blanketflower (*Gaillardia aristata*)		0.5+
* Western yarrow *(Achillea millefolium* L. var. *occidentalis*).	Yakima	0.5+
***Firecracker Penstemon** *Penstemon eatonii*	Richfield	0.5+

Notes:

Total Lbs. PLS - Seed mixtures should total approximately 12-14 lbs. of pure live seed.

****** Pure Live Seed, drill seeded. For broadcast seeding, double the above rates.

***** These species can be used as alternatives, to fulfill shrub and forb requirements, site specific choices, or species required to fulfill a particular value (*e.g., critical wildlife habitat*).