State Land Office Surface Restoration Guideline

1. All improvements and trash will be removed. This includes but is not limited all mechanical, electrical (poles/lines), pumping equipment, storage tanks or berms, plastics, piping, caliche , signs, temporary fencing if not used to protect reseeded areas, metering equipment and vessels.
2. Any and all discolored soil shall be tested and removed from site and disposed of at a permitted site.
3. Complete removal of the caliche and /or compacted pad (if it exist) will be required.
4. Adequate topsoil consistent with the texture of the existing rangesite may be needed to provide a suitable seedbed for planting and seedling establishment.
5. Topsoil brought in shall be spread to a minimum depth of four (4) inches .
6. In areas where topsoil is to be added, fertilizer with the formulation of 0-20-0 shall be broadcast over the seedbed at a rate 100 pounds per acre. The fertilizer is to be incorporated into the topsoil.
7. All rock in excess of two (2) inches in diameter shall be removed and discarded off of State Trust Lands.
8. Reseeding will initiated between July 15 and September 15 preferably with a grass drill. The drill rows will be eight to ten inches apart. The seed will be planted not less than one-half inch deep or more than one inch deep. The seeder should be followed with a drag, packer, or roller to insure uniform coverage of the seed and compaction. Drilling will be done on the contour where possible, not up and down the slope. If seed is broadcast, double the seeding rate.

SPECIES TO BE PLANTED IN POUNDS OF PURE-LIVE-SEED PER ACRE:

Kg Kimbrough gravely loam-------Shallow Rangesite

Blue grama (Hachita or Lovington)	.6 lbs.
Sideoats grama (Vaughn)	1.8 lbs.
Sand Dropseed (Common)	.2 lbs.

9. All planted sites will be protected by livestock or 4 strand barbed wire fencing until vegetation is established.
10. Adequate establishment or need of reseeding of the site will be determined after the second growing season following initial planting.

11. Upon compliance determination and approval, boundary fence will be replaced along highway frontage.

Eddy County Coordinated Weed Management Group
3219 S Canal, Carlsbad NM
575-628-1532
Noxious Weed Location Form

Please fill out the following:

1. **Name:** _____

2. **Agency:** _____

3. **Phone Number:** _____

4. **Weed Identification:** _____

5. **Location of Weed (Quarter Corner, Section, Township, Range, Well/Location Name):**

_____

_____

_____

_____

_____

Questions or Comments: _____

_____

_____

_____

_____

_____

_____

_____

_____

Combining seed with all the hydromulch woodfiber and applying everything in a one step operation is highly discouraged and success will be unlikely.

For best results, measure the area(s) to be seeded, divide the disturbed area into small components, depending on the capacity of the hydroseeder, and prepare a chart or plan for determining the number of seed loads and the location(s) for each load. The hydraulic mulch and tackifier should be mixed with water and uniformly applied after seeding, preferably during the same day or within 36 hours. See section 4.5 Mulching for more details on Hydromulching.

Application Rates

Seed mixtures should be applied at double the drill seed application rates in the Revegetation Plans.

Equipment

The hydroseeder shall be equipped with a mechanical power-driven agitator capable of keeping all solids in suspension in a homogeneous slurry until distributed. The pump pressure must maintain a continuous non-fluctuating spray capable of reaching the extremities of the seeding area.

Broadcast Seeding

Broadcast seeding is recommended only for areas inaccessible to a rangeland drill, or too small to warrant the use of a rangeland drill (less than ¼ acres), the SLO recommends drill seeding in all accessible locations. Because the seed is not carefully placed in the soil profile to a controlled depth when broadcast seeding, seed is lost to environmental impacts including wind, rain, wildlife (birds and rodents), sunlight (UV light, heat) and other factors.

Application Rates:

When broadcasting, seed mixtures shall be applied at double the drill seed application rates in the Revegetation Plan.

Procedures:

Areas to be broadcast seeded should receive the same topsoil placement and seedbed preparation as drill seeded areas. If equipment access limitations exist, then some type of soil surface loosening is still necessary such that the topsoil is in a mellow, loosened condition. If slopes are too steep to apply on the contour by drill seeding, broadcast up and down the slope or at a diagonal. Broadcast seeding should not be done during windy conditions.

Do not broadcast an area larger than can be quickly raked, dragged, or chained to cover the seed (within approximately 30 minutes after broadcasting). The seed should be covered approximately ¼ to ½ inches by raking, dragging, chaining, or chain harrowing, unless prevented by equipment access limitations. Care should be taken by the operators and laborers to minimize dragging seed down slope or dragging seed off high spots and concentrating that seed in the low spots. Failure to cover the seed soon after broadcasting, or at all, may result in revegetation failure.

Equipment:

Mechanical broadcast seeding is always recommended over hand broadcast seeding. Mechanical broadcast seeding can be accomplished with any equipment that will evenly spread the seed on the soil surface. A broad range of hand held, ATV mounted, 3-point, and pull type broadcast spreaders are available on the market.

Mechanical broadcasting units must be capable of distributing fluffy and thrashy seed. Most residential type units are not capable. One example of a mechanical broadcasting unit capable of handling fuffy/thrashy seed is distributed by Truax (http://www.truaxcomp.com/seed-slinger.html), other types are available.

equipment efficiency, operator error, wind, wildlife impact, seed survivability, seed planting depth, and related factors that negatively impact seed placement and survival.

Seeding Depth:

The SLO recommends seed be drilled to a depth of ¼ to ½ inch regardless of the size or type.

Drill Calibration:

Calibrating the drill at the beginning of drill seeding operations is required for each seed mixture. Continual checking and adjusting the drill settings is necessary. Frequency of checking and adjustments depends on the uniformity of the mixed seed, humidity, dust and trash accumulation in the drill metering system, and variability in the roughness of the soil surface.

Drills can be calibrated by a number of different techniques. Utilize drill manufacturers calibration procedures if available; otherwise, the NMSLO recommends the following drill seeding calibration methods described by the NRCS (USDA, 1985. www.mt.nrcs.usda.gov/technical /ecs/plants/technotes/pmtechnotesMT30.html).

Hydraulic Seeding

Hydraulic seeding, or hydroseeding, is the process of broadcast seed using water and a small amount of wood fiber mulch to carry the seed via a hydroseeder. Hydroseeding is typically best suited for steep slope areas where drill seeding is not practical. While the SLO recommends drill seeding as the method of choice for all sites, economics of smaller sites may make hydroseeding more practical. Hydraulic mulching (hydromulching) shall follow hydroseeding on all sites (see section 4.5 Mulching).

Procedures

Following are the three steps for hydroseeding and hydromulching:

1. Preparing the area for seeding;
2. Hydraulic seeding; and,
3. Hydraulic mulching.

1. Preparing the Area for Seeding:

The Operator should first prepare the seedbed (seed section 4.3 Seedbed Preparation).

2. Hydraulic Seeding:

Mix seed, water, and hydraulic mulch fiber into a homogenous slurry and uniformly apply to the areas to be seeded. The slurry must be constantly agitated during application to assure even application and distribution of seed and hydromulch.

Seed should be applied at double the drill seed application rate. At least 1,000 gallons of water should be used per acre for applying the seed and hydraulic mulch. 400 pounds of hydraulic mulch fiber per acre should be included in the mixture to assist the hydroseeder applicator in visually determining the evenness of the seed application and the accuracy of the application rate.

Seed should not be left in the tank with water for more than 2 hours. If this occurs due to equipment failure, or for any other reason, then the mixed material may need to be disposed of either off-site, or applied to the slopes at the Operator's expense. If applied to the slopes, it should not be counted as applied seed and new seed will need to be applied.

3. Hydraulic Mulching (Hydromulching):

Hydromulching is a technique to provide short term soil stabilization and erosion protection while seedlings germinate and begin to establish. Hydromulching differs from hydroseeding in that only hydraulic mulch fiber and tackifier are applied during hydromulching operations. It serves the same purpose as hay mulching and crimping.

4.4 SEEDING

Drill seeding is the SLO preferred method for applying and incorporating the seed into the soil surface. Other methods of seeding shall only be used when drill seeding is not possible or practical (see Table 3).

Table 3. Recommended seeding methods

Preference	Seeding Method	Situation Best Suited for Seeding Method
1st	Drill Seeding	All applications
2nd	Hydroseeding	Steep slopes – greater than 3 horizontal to 1 vertical*
3rd	Broadcast Seeding - *Mechanical*	Small areas – less than ¼ acres

*Hydroseeding may occur when more economical for smaller sites.

Seed Mixtures

The seed mixtures developed by the SLO are designed to address the soil types and post-reclamation land use, soil stabilization, erosion control issues, seed availability and seed costs. Expensive seed was only specified when absolutely required.

Seeding rates shall be doubled when hydroseeding or broadcast seeding.

The Operator should request the seed supplier to divide the specified seed mixtures into submixtures of: small seed (S), standard sized seed (D), and fluffy and thrashy seed (F).

No substitution of species, variety, or collection for non-varietal species will be allowed unless evidence is submitted in writing by the Operator to the SLO showing that the specified materials are not reasonably available during the seeding period. The substitution of a species, variety, or collection shall be made only with the written approval of the SLO, prior to making a substitution.

"Pure Live Seed" (PLS) is a means of expressing seed quality. Drills need to be calibrated on the basis of PLS/acre. The amount of PLS required for a planting is based on the quality of a given seed lot. Therefore, prior to calibrating a drill, seed lot quality must be known. PLS and bulk seed required are determined by using the seed analysis information on the seed tag in the following formula.

$$\% \text{ PLS} = [(\% \text{ germination} + \% \text{ hard or dormant}) \times \% \text{ purity})] / 100$$

$$\text{Bulk Seed (lbs/ac)} = \text{PLS seeding rate recommendation (lbs/ac)} / (\% \text{ PLS} / 100)$$

Recommended seeding rates provide an adequate amount of PLS seed per acre even though seed lots differ in seed size, shape, weight, viability, etc. The variation in individual seed lots causes the amount of bulk seed planted per acre to vary considerably while the actual PLS seeding rates remain constant.

Best Times to Seed

Seeding just prior to the summer monsoon season is recommended. The arrival of the summer monsoon season typically occurs somewhere between the middle of June through the end of August. If seeding immediately prior to the summer monsoons is not practical, the SLO recommends seeding during the monsoons, or after the monsoons and before the first frost. Seeding following the summer monsoons may be successful if rain initiates sufficient growth to allow the plants to go through cool, dry, windy, and hot weather prior to the next summer precipitation events.

Seeding during other times of the year is allowed, however, the risk of failure increases due to spring winds and early germination followed by a dry period. Seeding should not be done when the ground is frozen. Seeding may

proceed when there is evidence of frost, providing the seedbed can be kept in a workable condition so that the seed is planted at the correct depth.

Table 4. Recommended Seeding Times

Preference	Seeding Times
1st	Prior to summer monsoon *June - August*
2nd	During summer monsoon
3rd	After summer monsoon *Before first frost*

Seed Certification

All seed utilized must be purchased through a licensed dealer and meet standards established by the New Mexico Department of Agriculture (NMDA). All seed shall be furnished in sealed, undamaged containers and shall be plainly labeled on tags in accordance with NMDA standards. Following seeding operations, the Operator shall furnish to the SLO the seed tags and one copy of a materials certification signed by the vendor. One or more random samples may be taken by the SLO or his representative prior to, or during drill seeding operations for testing and analysis by an independent seed laboratory.

Drill Seeding

Drill seeding is the most effective seeding method for revegetation of disturbed sites.

Equipment:

Only rangeland drills are recommended. Drills shall be capable of applying the seed in uniform rows spaced at a maximum of 12 inches; 6 to 8 inch spacing between drill rows is most common. Rangeland drills including Truax Flex II drills, Laird rangeland drills, Great Plains rangeland drills, and equivalent are recommended for use.

Light duty drills (drills incapable of withstanding site and soil conditions on sites to be revegetated), standard farm drills, and drills in poor working condition are not acceptable. Use of these drills will result in less than satisfactory revegetation success due to poor seed application and placement. Turf grass type seeders can be utilized, but may have difficulty seeding in rough and rocky terrain and may be subject to considerable damage.

Rangeland drills capable of seeding a variety of seed types are best. Rangeland drills generally have three seed boxes, which can be used for the 3 seed submixtures.

1. Small seed box for small seed.
2. Standard box for average, non fluffy, non trashy seed
3. Fluffy box for fluffy, trashy, or similar seed

All three boxes shall have their own flow metering system. The drill manufacturer will provide operator's instructions for setting flow rates for the drill boxes. Seed mixes should be provided in bags separating seed types into the three categories: small (S), standard (D) and fluffy (F).

Application Rates:

The seed mixture shall be applied at the drill seed application rate indicated in the seed mixture tables of the Revegetation Plan with adjustments for hydroseeding or broadcast seeding if needed. Variations from the specified seed mixtures must be approved in writing by the SLO.

Application rates identified in the Revegetation Plan seed mixtures are designed to address more factors than the soil type and the standard recommended seeds per acre. The application rates also address practical issues such as

LOAMY (L) SITES SEED MIXTURE:

COMMON NAME	VARIETY	APPLICATION RATE (PLS/Acre)	DRILL BOX
Grasses:			
Black grama	**VNS, Southern**	**1.0**	**D**
Blue grama	**Lovington**	**1.0**	**D**
Sideoats grama	**Vaughn, El Reno**	**4.0**	**F**
Sand dropseed	**VNS, Southern**	**2.0**	**S**
Alkali sacaton	**VNS, Southern**	**1.0**	
Little bluestem	**Cimarron, Pastura**	**1.5**	**F**
Forbs:			
Firewheel (*Gaillardia*)	**VNS, Southern**	**1.0**	**D**
Shrubs:			
Fourwing saltbush	**Marana, Santa Rita**	**1.0**	**D**
Common winterfat	**VNS, Southern**	**0.5**	**F**
	Total PLS/acre	**18.0**	

S = Small seed drill box, D = Standard seed drill box, F = Fluffy seed drill box
VNS = Variety Not Stated, PLS = Pure Live Seed

- Seed mixes should be provided in bags separating seed types into the three categories: small (S), standard (D) and fluffy (F).
- VNS, Southern – Seed should be from a southern latitude collection of this species.
- Double seed application rate for broadcast or hydroseeding.
- If one species is not available, contact the SLO for an approved substitute; alternatively the SLO may require other species proportionately increased.
- Additional information on these seed species can be found on the USDA Plants Database website at http://plants.usda.gov.

LIME – GYPSUM (LG) SITES SEED MIXTURE:

COMMON NAME	VARIETY	APPLICATION RATE (PLS/Acre)	DRILL BOX
Black grama	**VNS, Southern**	**1.0**	**D**
Blue grama	**Lovington**	**1.0**	**D**
Sideoats grama	**Vaughn, El Reno**	**4.0**	**F**
Plains bristlegrass	**VNS, Southern**	**2.0**	**D**
Sand dropseed	**VNS, Southern**	**2.0**	**S**
Forbs:			
Firewheel (*Gaillardia*)	**VNS, Southern**	**1.0**	**D**
Annual Sunflower	**VNS, Southern**	**1.0**	**D**
Shrubs:			
Fourwing saltbush	**VNS, Southern**	**1.0**	**F**
	Total PLS/acre	**13.0**	

S = Small seed drill box, D = Standard seed drill box, F = Fluffy seed drill box
VNS = Variety Not Stated, PLS = Pure Live Seed

- Seed mixes should be provided in bags separating seed types into the three categories: small (S), standard (D) and fluffy (F).
- VNS, Southern – Seed should be from a southern latitude collection of this species.
- Double seed application rate for broadcast or hydroseeding.
- If one species is not available, contact the SLO for an approved substitute; alternatively the SLO may require other species proportionately increased.
- Additional information on these seed species can be found on the USDA Plants Database website at http://plants.usda.gov.

SHALLOW (SH) SITES SEED MIXTURE:

COMMON NAME	VARIETY	APPLICATION RATE (PLS/Acre)	DRILL BOX
Grasses:			
Sideoats grama	**Vaughn, El Reno**	**4.0**	**F**
Blue grama	**Lovington, Hachita**	**3.0**	**D**
Little bluestem	**Pastura, Cimmaron**	**1.5**	**F**
Green sprangletop	**VNS, Southern**	**1.0**	**D**
Plains bristlegrass	**VNS, Southern**	**1.0**	**D**
Forbs:			
Firewheel (*Gaillardia*)	**VNS, Southern**	**1.0**	**D**
Shrubs:			
Fourwing saltbush	**Marana, Santa Rita**	**1.0**	**D**
Common winterfat	**VNS, Southern**	**0.5**	**F**
	Total PLS/acre	**13.0**	

S = Small seed drill box, D = Standard seed drill box, F = Fluffy seed drill box
VNS = Variety Not Stated, PLS = Pure Live Seed

- Seed mixes should be provided in bags separating seed types into the three categories: small (S), standard (D) and fluffy (F).
- VNS, Southern – Seed should be from a southern latitude collection of this species.
- Double seed application rate for broadcast or hydroseeding.
- If one species is not available, contact the SLO for an approved substitute; alternatively the SLO may require other species proportionately increased.
- Additional information on these seed species can be found on the USDA Plants Database website at http://plants.usda.gov.

New Mexico State Land Office

Field Operations Division

(505) 827-5723	P.O. Box 1148	Santa Fe, NM 87504
(575) 392-8736	2702-D N. Grimes	Hobbs, NM 88240
(575) 885-1323	N. Canal, Suite B	Carlsbad, NM 88220
(575) 623-4979	1001 S. Atkinson	Roswell, NM 88210
(575) 763-0796	105 E. 6th St.	Clovis, NM 88101

REVEGETATION FORM

1. General Information

Site name: Sinclair State #10				Lease No.:		
U/L or Qtr/Qtr	Section: 23	Township: 23s	Range: 36e	County: Lea	Latitude	Longitude
Company Name: BP America				Contact Name: Lloyd May		
Phone no.: 1-575-394-1608			Email: May1@bp.com			
Address: ½ mile South of Eunice Hwy 207						
Spill / Release ☐ OCD Spill No.		P&A Well ☑ API No.		Pit Closure ☐	Facility Closure ☐ Type:	Other ☐
Site size: one		acres	27,300	square feet	Map detail of site attached ☐	
Additional information:						

3. Soils

**Do not rip caliche subsoils; caliche rocks brought to the surface by ripping shall be removed.*

Salvaged from site ☐	Bioremediated ☐	Imported ☐	Blended ☐	Depth (in):	
Texture: Silty - Sandy	Describe soil & subsoil: Caliche - Gypsum				
Soil prep methods:	Rip ☑ Flip Depth(in): 6	Disc ☑ Depth (in): 6	Rollerpack ☐		
Date completed: 4/23/09	Photos attached ☐	Number of photos:			

4. Seeding

**Attach seed bag tags to this form. Seed bag tags shall contain the site name and S-T-R.*

Custom seed mix ☐	Prescribed mix ☑	Seed mix name: State Deep Mix	Seeding date: 5/18/09
Is seed mix divided into submixes based on seed size?	Yes ☐ No ☑		
Drill Seeder ☐ Drill Type:		Broadcast ☑ Method: Mechanical	Hydroseeding ☐
Soil conditions during seeding:	Dry ☑	Damp ☐	Wet ☐
Photos attached ☐ Number of photos:	Observations:		

5. Additional Methods

Mulching ☐ Mulch type: Tons/acre:	Crimping ☐	Fertilizer ☐ Type: Lbs/acre:	Other ☐ Describe:
Photos attached ☐ Number of photos:	Observations:		

Additional Information:

Sample

5. Certification

I hereby certify that the information in this form and attachments is true and complete to the best of my knowledge and belief.

Name: Gary Smith	Title:	Date: 10-7-09
Signature: Gary Smith		

* Mail form and attachments to the Santa Fe office address listed above, attention: POD- Environmental.

Version 200901

New Mexico State Land Office

Field Operations Division

(505) 827-5723 P.O. Box 1148 Santa Fe, NM 87504
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(575) 623-4979 1001 S. Atkinson Roswell, NM 88210
(575) 763-0796 105 E. 6th St. Clovis, NM 88101

REVEGETATION FORM

1. General Information

Site name:				Lease No.:		
U/L or Qtr/Qtr	Section	Township	Range	County	Latitude	Longitude
Company Name:				Contact Name:		
Phone no.:			Email:			
Address:						
Spill / Release ☐ OCD Spill No.		P&A Well ☐ API No.		Pit Closure ☐	Facility Closure ☐ Type:	Other ☐
Site size:	acres		square feet		Map detail of site attached ☐	
Additional information:						

3. Soils **Do not rip caliche subsoils; caliche rocks brought to the surface by ripping shall be removed.*

Salvaged from site ☐	Bioremediated ☐	Imported ☐	Blended ☐	Depth (in):	
Texture:	Describe soil & subsoil:				
Soil prep methods:	Rip ☐ Depth(in):	Disc ☐ Depth (in):	Rollerpack ☐		
Date completed: / /	Photos attached ☐	Number of photos:			

4. Seeding **Attach seed bag tags to this form. Seed bag tags shall contain the site name and S-T-R.*

Custom seed mix ☐	Prescribed mix ☐	Seed mix name:	Seeding date: / /
Is seed mix divided into submixes based on seed size?	Yes ☐ No ☐		
Drill Seeder ☐ Drill Type:		Broadcast ☐ Method:	Hydroseeding ☐
Soil conditions during seeding:	Dry ☐ Damp ☐	Wet ☐	
Photos attached ☐ Number of photos:	Observations:		

5. Additional Methods

Mulching ☐ Mulch type: Tons/acre:	Crimping ☐	Fertilizer ☐ Type: Lbs/acre:	Other ☐ Describe:
Photos attached ☐ Number of photos:	Observations:		

Additional Information:

5. Certification I hereby certify that the information in this form and attachments is true and complete to the best of my knowledge and belief.

Name:	Title:	Date:
Signature:		

* Mail form and attachments to the Santa Fe office address listed above, attention: FOD- Environmental.

Version 200901