Guidance For Using The Rawlins Reclamation Plan Template

The reclamation plan should specify **how** reclamation standards will be achieved. The template is a list of items the reclamation plan may cover, depending on the type of project. The type of project then helps determine the appropriate level of detail and complexity described in the reclamation plan, tailored to the specific surface-disturbing activity. Site-specific information will provide for the addition of data relevant to determine appropriate mitigation, Best Management Practices (BMPs) and assess the environmental impacts. All items in the template may not be applicable to every surface-disturbing activity. Text following hollow bullets is clarification of the items noted in the template. The term "proponent" is used to interchangeable to describe the energy applicant, operator and/or grant holder.

1.0 Pre-Disturbance Site Characterization

Pre-disturbance survey information provides data that allows for proper planning and timely implementation of activities, as well as the ecological site(s), vegetation composition, structure, and successional pathway to be recreated with reclamation practices. Pre-disturbance inventories define baseline conditions. These specific items may not be located together in a received reclamation plan, and may need to be looked for, like a treasure hunt. Specific details and interpretations of the data found will be discussed later in this document. This is just a first check to make sure that important data needed for an environmental analysis has been identified by the proponent.

- A description of the extent of project area covered by the reclamation plan
  - We need to know what area they are planning to include with their plan. There can be a reference made to attachments to the application, even a map referenced, but there needs to be something telling the specialist where the plan applies to.
- Conduct soil testing, including: pH, electrical conductivity (EC), texture, topsoil depth and overall soil depth, carbonates (reactivity) and possibly lab testing (e.g. organic matter, Sodium Absorption Ratio (SAR) and percent (%) lime)
  - Is all of the field soil testing results included? The first five are required for each ecological site. Are laboratory analysis results included? Lab results may signal poor quality soils or were required as part of the proponent's soil testing protocols. Ecological sites and the methods of collecting field soil testing and what the results mean are discussed later under Limited Reclamation Potential.
  - Unless otherwise noted, most soil characteristic identification and testing can be accomplished in the field (pH, EC, texture, depth, color, temperature, structure, consistence, and carbonates (reactivity)). There are small, portable testing probes and equipment which can be used as screening tools to give the general trend or indication of soil depth and quality. These tools can be purchased separately or in a kit. The University of Wyoming has compiled, and made available for purchase, a soil testing kit, which allows the user to test for the most common soil properties, and includes instructions for its use. In some cases, field indicators and test results may indicate the need for further laboratory testing to fully evaluate the soil properties (e.g. SAR or % lime).
  - For most of the Rawlins Field Office (RFO), soils have been mapped by the United States Department of Agriculture Natural Resource Conservation Service (NRCS). A soil survey can provide a great deal of general information regarding soils. NRCS soil

surveys are typically Order 3 surveys conducted for general land management planning. NRCS soil surveys should not be used in lieu of field verification of the soil, vegetation and ecological site determinations, but can be used as a resource to identify potential issues and in designing a sampling protocol for areas of proposed disturbances.

- There is a difference between testing requirements for different types of projects. Well pads require testing for total suitable soil material for salvage. Road projects require sampling to identify all characteristics, and suitable soil material for reclamation down to a maximum of six inches (being as only the side slopes of the road cuts are immediately reclaimed). Some proponents reserve small topsoil piles and re-seed them for later use in reclaiming the road. These piles should be shown on the construction plans, and described in the reclamation plan. They also should be signed in the field.
- Pipelines smaller than 10-inches are similar to roads. Rarely is salvage for reclamation taken beyond six-inches, even if suitable material is available. Depth and ecological site identification is still needed, and quality, so a seed mix or mixes (as appropriate) can be proposed. In these instances, sampling for suitable soil to total depth available is waived. For pipelines greater than 10-inches, total suitable material should be identified as it will all be stripped for the full right-of-way width under all circumstances. There is an additional requirement of sampling at least every one-quarter of a mile, even if in the same ecological site. The suitable material depth can vary across ecological sites and there may be areas identified where minimal soil material should be removed to prevent contamination with unsuitable subsoil material.
- Other projects (e.g. leach field, power line) may have different requirements or additional test parameters depending upon the project. Check with the RFO's soil scientist and/or reclamation specialist with what the proponent is proposing.
- In the future, for pipelines adjacent to well roads, the soil testing results can be shared, potentially reducing the sampling required and review time to process pipeline applications. Pipeline routes not adjacent to well roads can still have data collected and be analyzed along with the well pad, potentially reducing processing time.

- Ecological Site(s) Identified
  - Are they mapped in the document? Referred to? Mentioned at all? If more than one ecological site is associated with a project, ensure that each ecological site has its own soil testing and vegetation sampling results.
  - An ecological site is the product of soils, topography, climate, management and natural factors, which combine to generate a unique plant community. This community may occur in different locations across a landscape, with sometimes considerable variability within the plant community composition. For instance, the Saline Upland ecological site may vary from being dominated by Gardner's saltbush, to saltbush inter-mixed with various grasses, to a mixture of shrubs (saltbush, bud sage, and/or birdsfoot sage) with various grasses. Proponents are asked to identify the ecological site where projects are proposed, in order to better document each unique plant community, evaluate reclamation response, and adapt new projects for more successful results. Data collected by the proponent about plant communities associated with surface-disturbing activities will be combined with the BLM monitoring data, which will help define the variability of each ecological site. At some point in the future, additional plant species data may no longer be necessary to collect.
  - In addition, a number of reference areas need to be established for each ecological site for long-term comparison of natural plant communities to reclaimed areas and natural trends

that are occurring. These reference areas may be sites already in use by companies, but they need to be identified and approved by the BLM Interdisciplinary Team (ID) within reclamation plans, and protected from any future development or other man-caused disturbance. Proponents can share reference sites.
  - Reference sites will have to be established for all existing sites as part of the required annual monitoring (see Section 6.0 below). These sites will also have to be approved by the BLM ID Team as representative of the sites that were originally disturbed.
- Soil movement noted: rills, gullies, wind or water erosion
  - Is there a discussion of existing signs of erosion? They may use the words from the bullet, or they may refer to pedestalling of plants, plants pedestalled, wind deflation areas, wind scoured areas, or slope wash areas for example. These all refer to existing erosion signs.
- Erosion potential identified
  - Look for these words, or something like: soils have severe water erosion hazard potential, moderate wind erosion hazard potential, etc. There may not be existing signs of erosion, but the soils may be prone to erosional forces when the vegetation is removed. This needs to be identified because they are going to be removing some vegetation with their project.
- Soil mapping for topsoil salvage depth
  - This can be included on an existing map, like the ecological site map. Somewhere, they need to show or explain what they plan to remove and save for reclamation. Depth may vary by ecological site, or even within a site. Depth may vary from the road to the well pad, or along the route of a pipeline. Salvage depths should be identified, as well as topsoil pile locations. Amount of soil salvaged will affect pile size, and quality of soil may affect number of piles. For example, two different ecological sites may have different enough soil quality to require two different piles to avoid mixing, and potentially contaminating, the soil and reducing reclamation potential. Pile location(s) will most likely not be included within the reclamation plan and would be located with other site diagrams (within the well or pipeline application), so you might need to refer to the whole package.
- Unique topographic features present, steep slopes, aspect
  - Are there any unique features there? Were any noted during onsite inspections? This could be rock outcrops, unique boulders, natural "pile" of moss rock, etc. This also includes things like steep slopes. The Rawlins Resource Management Plan (RMP) prohibits disturbance on slopes in excess of 25-percent, but lesser slopes may also be unique or unstable and would require special attention if disturbed.
- Drainages affected by the project
  - Are there any noticeable drainages crossed, encroached upon, directly adjacent to, or otherwise potentially affected by the project's vicinity? This also includes ephemeral drainages, ones which only flow water in direct response to a rain event or snowmelt. Many of these will have riparian vegetation, but not necessarily. They may just be larger and/or deeper gullies which are common throughout the field office in lower precipitation zones. The hydrologist or soil scientist should be consulted to determine if a "drainage" is large enough or important enough to be addressed in the reclamation plan. These sites should be identified at the onsite.

- Cross sections and longitudinal profiles on channels and waterways that would be directly disturbed by the proposed action
  - Affected drainages, channels and/or waterways should be clearly identified in the reclamation plan, which includes cross sections and longitudinal profiles measurements. The cross sections and profiles will be used as baseline data to ensure channel stability is maintained and erosion is not accelerated as a result of the project. The proponent should also include **reference** cross sections and profiles, which should be located outside the planned disturbance area. These reference areas will be used by the proponent and the BLM when monitoring the reclamation success of these areas.
- Vegetation and weeds: species, composition, and density
  - Normally, this information would be in a table or two with column and rows with the following headers: slope, grass basal cover, desirable vegetation cover, weed basal cover, litter, rock cover, etc. The proponent should describe their data collection methods and take photos of the transects. This data should be tied to the ecological site identification.
  - If there is something noted under "weed basal cover" (or some similar wording) in the table or text you were just looking at, the species should be identified. The weed acronym (BRTE, HAGL, or ALDE) may only be listed, which can be defined by the Weed Coordinator, and/or other specialists within the RFO.
- Weed management plan, if weed species noted as present
  - A weed management plan is included as a stand-alone document (see Attachment 6, Q&A) with the reclamation plan.
  - There can, and probably should, still be some reference to a weed plan and what it would entail, even if there isn't a specific one yet. If the project is not the only disturbance in the area, chances are extremely high that there are weeds already in the vicinity and they will end up dealing with them post-construction.
  - The BLM has a national list of invasive weed species (which includes noxious weeds).
- Diagrams and schematics showing important features pertaining to operations, construction and reclamation of the site
  - These are usually included elsewhere within the application package, but may be included for some smaller projects. These could include diagrams showing any cut and fill required for the project, anticipated final topography, anticipated changes to pre-construction topography (like turning a hill into a flat or depressed area after using the material for fill somewhere else; leaving small cut slopes which would disturb more ground to replace the original slope than leaving short steeper, but stabilized slopes). Where are the topsoil and spoil piles located?
- Limited Reclamation Potential sites, defined in IM WY-2009-022
  - The best measure to take with these sites is avoidance. If this is not feasible, the site-specific reclamation plan needs to describe the use of BMPs and other strategies to mitigate impacts and/or to increase reclamation success. The BMPs should address the site-specific requirements of the project and local environment.
  - Does the proponent identify any of these areas up front? The proponent may not realize there are any of these sites affected by their proposed project; then it's our job to help screen for these sites. Go through the lists below and see if anything is present.
    1. ABIOTIC LANDSCAPE FEATURES: Topography (Slope and Aspect), Unique features, Parent materials (geological substrates), and Climate (including postulated microclimate)

a) Topography: Slope greater than 25-percent, on south or southwest facing aspects.
b) Cliffs or rock outcrops that would be destroyed during construction and difficult or impossible to re-establish.
c) Parent materials: marine shale, clay/siltstone, seleniferous (selenium bearing) geological substrates.
d) Climate: Annual precipitation below nine-inches. Probability, for any given year, of seeding germination failure is high.

2. TOP SOIL: A suitable soil usually has characteristics that do not inhibit plant growth, but rather will enhance plant growth. Suitable soil usually has a moderate pH (usually above 6.0 and below 8.4), has a salt content represented by an electrical conductivity (EC) less than 8 dS/m, sodium absorption ratio (SAR) less than 13, and a loamy (not sandy, silty or clayey) texture.
   a) Depth: No topsoil available or very shallow less than 75 mm (3 inches).
   b) pH: Greater than 8.4. Helps identify high carbonate and salt affected soils.
   c) Electrical Conductivity (EC): Greater than 8 dS/m. Helps identify strongly saline soils; moderately saline soils have EC >4 dS/m.
   d) Sodium Absorption Ratio (SAR): Greater than 13; this is a laboratory test. Helps identify sodic soils. The tougher calls, which require laboratory testing, are the sodic soils. These soils can be missed because they have an EC <4 dS/m (a field test). Other site indicators need to be looked at, like soil structure and plant community. Sodic soils can be missed with field tests alone. Why are we concerned about whether a soil is total salt or mostly sodium salt affected? Sodium salts can be reduced with soil amendments. Saline soils cannot (under most rangeland conditions)
   e) Texture: e.g. Sandy, any of the clay textural categories. Sandy soils are droughty, do not hold water, and are prone to wind erosion. Clayey soils tend to crust over when the original structure is broken up, as with topsoil salvage techniques, or from repeated driving over the surface which "powders up" the surface when dry, then crusts over when wet. Clayey soils also tend to be salty around here, which compounds the issue, see soil tests above.
   f) Surface Features: e.g., No visible biological activity, surface heavily stabilized by biological crusts, abiotic white crusts, abiotic black crusts, surface dominated by coarse material greater than two mm in diameter. These usually indicate salty conditions, old surfaces which are stable after years of protection by biological crusts, or soils which are potentially quite gravelly. Some gravel surfaced soils have had wind and water erosion over time such that there are only gravels and cobbles remaining over very thin, if any, topsoil. These sites usually also have very sparse vegetation.
3. SUB SOIL: Depth, pH, electrical conductivity, texture
   a) Depth: proximity to surface. Three inches or less to subsoil (unsuitable for topsoil).
   b) pH: Above 8.4
   c) Electrical Conductivity: Above 8 dS/m.
   d) Texture: e.g. Sand, any of the clay classes.
4. VEGETATION: Species diversity, density and vigor
   a) Halophytes (salt loving plants): e.g. saltbushes, greasewood

b) Selenium Accumulators: e.g. two-grooved milkvetch, prince's plume, woody aster.
c) Invasive Species: e.g. cheatgrass, halogeton, Russian thistle. The presence of invasive species alone normally would not kick an area into limited reclamation potential. However, some invasive species, like Kochia and halogeton, are halophytes and are indicative of soil issues as well. If one or two of the dominant plant species present is a weed, then there is something up, like large stands of cheatgrass, halogeton, or alyssum. They may relate to historic use, less than desirable soil conditions, and/or just make reclamation within a sea of weeds very difficult.
d) Very shallow, saline upland, saline lowland, sands, clayey, shallow clayey, impervious clay, shallow igneous, or badland ecological sites, to name a few. Many of the plants on these sites do not have seed available commercially, and also have poor soil characteristics for seedling establishment and growth.
e) Cushion plant, mountain shrub, silver sage, spiney hopsage, or alkali sage communities to name a few. Many of these plants do not have seed available commercially, and also have narrow site parameters for seedling establishment and growth.

- Photos of soil test pit(s) and vegetation transect(s)
  - These are important to visually compare sites to the data submitted. There will be times when the specialist cannot visit a site, and these may be the only photos available. Normally, the Natural Resource Specialist (NRS), Realty Specialist, or other team member(s) will have photos of each site to include in the file for pre-disturbance conditions.
- Photo reference points
  - These will be identified for monitoring long-term trend changes, should a project be in place for many years. These reference sites should be identified up front, and the BLM ID team needs to be involved in approving these sites. They will need to be protected, and reflective of the actual site to be disturbed (see Attachment 6, Frequently Asked Questions)

2.0 Surface-Disturbing Activities

- Manage all waste materials (Reclamation Requirement #1 From IM WY-2009-022)
  - Segregate, treat, and/or bio-remediate contaminated soil material.
    - This would be included in a site-specific plan which was addressing a specific issue of contaminated soil, submitted under a Sundry Notice of Intent (Sundry 3160-5) for an Oil and Gas related plan and may have been triggered by a Compliance Technician or NRS inspection. You probably will not see specific language to this in a reclamation plan for a proposed project. A general statement referring to a "what if" is also not acceptable here and there should be language stating that they would notify the BLM and proceed from there. Depending on the impacted site and required treatment, the proponent may need to submit a site-specific reclamation plan addressing how they will remediate the site.
  - Bury only authorized waste materials on site. Buried material must be covered with a minimum of three-feet of suitable material or meet other program standards.
    - All waste management plans must be submitted to and approved by the Authorized Officer (AO) only. The oil and gas companies are required, by Onshore Oil and Gas

Order #1, to let the BLM know this up front. There are **very few** materials which are allowed to be buried on a project site. Also, the RFO policy (per COAs) has been to cover any approved waste materials (like drilling muds) with five feet of suitable material, then topsoil and reclaim.

- Ensure all waste materials moved off-site are transported to an authorized disposal facility.
  - Again, all waste management plans must be submitted to and approved by the AO only. Any garbage from activities during drilling or construction operations, e.g., empty cartons or bags, wooden pallets, sandwich wrappings, left hand gloves, paper cups, etc., are included and required to be removed. The proponent cannot have a burn pile in the flare pit to dispose of this garbage.

- Ensure sub-surface integrity, and eliminate sources of ground and surface water contamination (Reclamation Requirement #2 From IM WY-2009-022)
  - Properly plug all drill holes and other sub-surface openings (mine shafts, adits etc.).
    - Including rat holes, mouse holes, unused fence post holes.
  - Stabilize, properly backfill, cap, and/or restrict from entry all open shafts, underground workings, and other openings.
    - Like pipeline trenches, cathodic protection sites.
  - Control sources of contamination and implement best management practices to protect surface and ground water quality.
    - This is normally what the proponent proposes to do and the RFO specialists should look for details.
- Maintain the biological, chemical, and physical integrity of the topsoil and subsoil (where appropriate) (Reclamation Requirement #5 From IM WY-2009-022)
  - Identify, delineate, and segregate all salvaged topsoil and subsoil based on a site-specific soil evaluation, including depth, chemical, and physical characteristics.
    - If the proponent does not have this information, they need to be notified to provide it. How did they collect data to identify suitable soils for salvage? What soil tests were conducted? Were the tests conducted in the field? By whom? Were the soil samples sent to a lab? When was the data collected? Where was it collected at? How many soil pits were dug? What depth were the samples collected from? Why those depths? Is there a map showing how much soil should be salvaged for reclamation?
    - Is the salvage depth consistent across the project area? If not, how does the proponent address passing this information down to the people responsible for salvaging suitable soil? Are the topsoil and spoil pile locations marked on an included diagram of the project? If different salvage depths are proposed, are the soils different enough to require separate storage piles, and are they clearly marked on an included diagram? Are the topsoil and spoil piles actually separated on the diagram, by at least three feet to avoid soil contamination and allow the ability to pick up one pile without getting equipment into the other pile?
    - What equipment will be used to salvage suitable soil? Redistribute it?
  - Timing of construction (e.g., winter construction)
    - Did the proponent indicate when the project would most likely be built? Remember that the RMP prohibits construction with frozen soil or during periods when the soil material is saturated or when watershed damage is likely to occur (see Appendix 6 Q&A). This includes topsoil salvage, backfilling pits, holes, or trenches, digging pipeline trenches, etc. When the soil is frozen or saturated, topsoil cannot be

segregated from the subsoil. Also, when the frozen clods or entrapped snow thaws, the soils will settle. Many frozen soils cannot be compacted to engineering standards (depending upon the amount of frozen water in the soil) and therefore culverts should not be installed with frozen material.

- Protect all stored soil material from erosion, degradation, and contamination.
- Incorporate stored soil material into the disturbed landscape.
  - This statement is correct most of the time, but keep in mind that some proponents will stockpile road salvaged topsoil adjacent to the road for use in future reclamation. These piles will be on native soil and seeded with the approved seed mix. Bullets below also apply here.
  - Usually, however, topsoil and spoil piles are stored within the disturbed area for the project. These should be shown on diagrams included within the application package.
- Placement of stockpiles to minimize disturbance during interim and final reclamation
  - This goes back to the diagram of the project site and requires a little forethought. If some topsoil will be reserved for final reclamation of a well pad (the middle part), is the pile somewhat accessible since it is now outside the area already reclaimed. Will the proponent have to drive over reclamation or all around the pad to get to the topsoil? This may mean adjusting the location of the topsoil pile, or having two piles to accommodate this.
- Seed topsoil piles to be stored beyond one growing season, with desired vegetation.
  - This is one of the places to see if the proposed seed mix is appropriate given the soil testing results, vegetation data, and ecological site(s) the proponent provided.
- Identify stockpiles with appropriate signage.
- Piles left for more than two years should be no deeper than two feet, including the native topsoil underneath.

- Use of brush-hogging, matting, or other suitable BMPs to protect and/or promote vegetation re-growth
  - Brush-hogging involves the use of a mower to cut vegetation down to near ground level. This does not mean using a grader or dozer to drive over, smash, pulverize, etc. the vegetation and soil to get a level surface. This is more often referred to as scalping (which is more of a forestry term), but is used to infer that the vegetation is taken off down to the mineral soil, while leaving roots relatively unaffected. The issue becomes, that sagebrush does not survive this type of treatment, nor do many other plants, especially if the plants are cut off/or otherwise ripped or removed down too far into the root crown.
  - Matting can include heavy mats of material or pallets or just thick boards laid down to keep equipment off the actual soil surface. For some projects, this may even include using the snow as a buffer (e.g. laying a temporary surface pipeline)
- Re-establish slope stability, surface stability, and desired topographic diversity (Reclamation Requirement #3 From IM WY-2009-022)
  - Re-construct the landscape to the approximate original contour or consistent with the land use plan.
  - Maximize geomorphic stability and topographic diversity of the reclaimed topography.
  - Eliminate highwalls, cut slopes, and/or topographic depressions on site, unless otherwise approved.
    - Is the company anticipating the need to leave a cut slope or depression due to reclamation limitations? Are there any safety concerns with how they are proposing

to leave a site? Do they address how they would stabilize any cut slope proposed to be left post-reclamation? Would leaving the surface different in some way benefit some wildlife species?

- Work surface compaction testing, moisture content, ripping, aeration
  - Are the soils compaction prone, will they need ripping and aerating to aid in reclamation? Is the company proposing compaction testing or are they planning to rip everything, no matter what the soil type?
- Schematic of interim and final reclamation topography
- Downsizing of disturbance/roads

- Re-establish complementary visual composition (Reclamation Requirement #8 From IM WY-2009-022)
  - Ensure the reclaimed landscape features blend into the adjacent area and conform to the land use plan decisions.
  - Ensure the reclaimed landscape does not result in a long term change to the scenic quality of the area.
    - These thoughts come back to re-establishing a vegetation community that can trend back to similar to what it was, with consideration of what community is desired at the site. There are many miles of pipelines of almost entirely grass stretching for miles through sagebrush or other shrub habitat. Visually, this is a stark contrast. Sometimes, as the soils are altered, the community that can be supported is altered to the extent that grasses can now survive where they were almost non-existent and this in itself is not necessarily a degradation of the site, but is still a visual contrast
- Minimize sheet and rill erosion on/or adjacent to the reclaimed area. There shall be no evidence of mass wasting, head-cutting, large rills, gullies, or overall slope instability on/or adjacent to the reclaimed area.
  - Develop criteria for how and when waterbars, slope breakers, erosion control blankets, fencing, mulch, straw bales and rolls, etc. will be used
    - These are soil movement indicators not related to drainages. The company needs to state how they will avoid any of these things happening on their project area. These are things that the Compliance Technician (and others) would look for both during and after construction. Basically, are there any pre-construction topographic features that will be altered such that there is a possibility of excessive soil movement as a result of the project? For example, is there cut and fill required to level the site for the project? Will hillsides be cut into to make a road, install a pipeline, build a new irrigation ditch, or create wing ditches along a road? Are there already signs of soil movement present at the site, which would indicate the potential for more of the same?
  - Culverts, wing ditches, channels and other water management features
- Re-construct and stabilize water courses and drainage features (Reclamation Requirement #4 From IM WY-2009-022)
  - Re-construct drainage basins and reclaim impoundments to maintain the drainage pattern, profile, and dimension to approximate the natural features found in nearby naturally functioning basins.
  - Engineered drawings including cross sections and longitudinal profiles to explaining how channels will be restored to original plan form and profile
  - Re-construct and stabilize stream channels, drainages, and impoundments to exhibit similar hydrologic characteristics found in stable naturally functioning systems.

- There shall be no evidence of down cutting or aggradation in drainages adjacent to the reclaimed area as a result of the project.
    - The proposed project needs to take into consideration what is there to begin with. There may already be instability in a drainage that the proponent needs to identify so they are not held responsible for it afterward. The proponent will be held responsible for aggravating an existing situation. Runoff and sediment leaving the site need to be controlled so that the natural system is not altered. There may be instances where implementation of the project may allow for stabilizing an existing degrading drainage or water feature. Brownie points are always a good thing if the proponent wants to address such issues concurrently and help fix an existing issue while still implementing their own project.
    - One area that stands out which would definitely require additional information from the proponent, would be a project proposed in or through any of the spreader dike systems in the Dad/Robbers Gulch area. These were constructed in the 1950s and 1960s, along with other large scale rangeland improvement projects (like soil pitting and inter-seeding with crested wheatgrass). These spreader dike systems have complex water drainage patterns which require more thought than just putting a road through the middle. Some of them are not functioning properly and have erosion issues already, so just something to be aware of.
- Ensure no net loss of riparian habitat
- Ensure reclamation objectives are consistent with the RMP goals and objectives for Special Management Designations when projects occur within the boundary of one of these areas (e.g. Wild Horse Management Areas (HMAs), Special Recreation Management Areas (SRMAs), Wildlife Habitat Management Areas (WHMAs), Areas of Critical Environmental Concern (ACECs), Adobe Town Disperse Recreation Use Area (DRUA), etc.)
- Potential activities proposed during the life of the disturbance and how these activities will affect interim and final reclamation needs for the future, e.g. workover areas and/or the need for future re-disturbance.

3.0 Site Preparation and Seeding

- Prepare the site for re-vegetation (Reclamation Requirement #6 From IM WY-2009-022):
    - Re-distribute soil materials in a manner similar to the original vertical profile.
    - Reduce compaction to an appropriate depth (generally below the root zone, 18-24 inches per COAs) prior to re-distribution of topsoil, to accommodate desired plant species.
    - Provide suitable surface and sub-surface physical, chemical, and biological properties to support the long term establishment and viability of the desired plant community.
    - Protect seed and seedling establishment (e.g. erosion control matting, mulching, hydro-seeding, surface roughening, furrow placement, fencing, targeted fertilization, netting, geotextiles, and watering as appropriate).
        - Is anything proposed, based on site characteristics, to address potential additional needs? If the soils are sandy, snow fencing may be proposed to trap additional moisture. If the soils are clayey, mulch may be proposed to keep the surface from crusting over and restricting seedling emergence.
- Establish a desired self-perpetuating native plant community (Reclamation Requirement #7 From IM WY-2009-022):
    - Soil re-testing, amendments as necessary

    - Necessary to see if the soil quality and physical characteristics have been altered through the salvage and re-spreading process. These results are required to be submitted prior to seeding a site, no matter the stage of reclamation. The initially-proposed seed mix may no longer be applicable and the pre-disturbance vegetation community may no longer be attainable.
  - Establish species composition, diversity, structure, and total ground cover appropriate for the desired plant community, ecological site, and current soil characteristics.
  - Enhance critical resource values (e.g. wildlife, range, recreation, etc.), where appropriate, by augmenting plant community composition, diversity, and/or structure.
  - Select genetically-appropriate and locally adapted native plant materials based on the site characteristics and ecological setting.
  - Select non-native plants only as an approved short term and non-persistent alternative to native plant materials. Ensure the non-natives will not hybridize, displace, or offer long-term competition to the endemic plants and are designed to aid in the re-establishment of native plant communities.
    - Is there a proposed seed mix included, and is it commensurate with the soil testing results, desired plant community, ecological site(s), etc.? Is there more than one ecological site and more than one seed mix? If non-native species are proposed, do they match the criteria above? If not, is this a proposed new seed mix based upon documented failure to re-vegetate the site with native species? It should be, otherwise, it is not allowed on the BLM-administered surface. If you are unsure, ask a Range Management Specialist, NRS, Reclamation Specialist, or someone who can answer the questions for sure.
    - Seed tags can be requested from the proponent post-seeding to check against the approved seed mix. Also, cultivars listed in the proposed seed mix can be checked for their origin, including elevation, to see if they should be adapted to our environment.
    - How are they proposing to seed a site? When are they proposing to seed the site? What type of equipment will they use? Will they drill seed or broadcast? Are they inter-seeding into established vegetation to enhance reclamation on an older site? Are they proposing staggered seeding (seeding grasses first to stabilize the site and compete against weeds, then come back and seed forbs and shrubs)?

4.0 Manage Invasive Species (Reclamation Requirement #9 From IM WY-2009-022)

- Assess (pre-disturbance inventory)
  - This should already have been addressed in 1.0 above
- Develop Weed Management Plan (stand-alone document) (See Attachment 6, Q&A).
  - Management goals
  - Coordination
  - Methods (Equipment, Prevention, Mechanical and Herbicide Treatment, and/or Biological Control, and Timing of Management- including pre, during and post construction)
  - Monitoring
    - All the above bullets should be addressed in the Plan. How will the company address their weed situation, existing or anticipated? If herbicide treatments are proposed, a Pesticide Use Proposal (PUP) will need to be submitted for approval [unless already approved (see the RFO Weed Coordinator)]. If there are no weeds present pre-

project, there should be reference that one will be written and submitted for approval prior to weed treatment, if weeds are identified during the proponents required annual monitoring.

- Post-Construction Report submittals (e.g. Annual Report, Pesticide Application Records and Pesticide Use Report)
  - The proponent's annual reporting requirements are outlined under Section 6.0 below.
  - The proponent must have an approved PUP and an approved Weed Management Plan on file prior to the application of any pesticide on the BLM lands, even if we ask them to treat their weeds via a compliance inspection.
  - Pesticide Application Records (PARs) are due monthly to the AO/Weed Coordinator, for each month that pesticides are applied on the BLM lands. A Pesticide Use Report is due at a minimum, at the end of the treatment season (why then, and not March 1, like the annual report? Because the annual Pesticide Use Report from the office (to WO) is due at the end of the year). It is highly recommended that each month's PARs are summarized into a use report and turned in at the same time. This way, all reporting is complete with the last months' submission.

5.0 Monitoring Plan (Reclamation Requirement #10 From IM WY-2009-022)

- Conduct compliance and effectiveness monitoring in accordance with the BLM-approved monitoring protocol and with the following in mind:
  - Soil erosion/movement
  - Vegetation: density, diversity (species composition) and age class
  - Weeds: density, species composition
  - Photo reference points
  - Compliance with reclamation plan
  - Documenting/monitoring protocols
  - Timing of monitoring during the year
  - Identification of sites needing additional work or more reclamation activities outlining a site-specific prescription for actions to be implemented, including:
    - Reseeding of areas not attaining reclamation success
    - Soil stabilization
    - Weed control
    - Mulching/fertilization or other cultural practices
  - Geospatial file(s) identifying surface-disturbance activities, ecological sites, reclamation, areas needing additional reclamation (e.g. workover areas, areas with unsuccessful reclamation) and weed infestations

Commercially Available Seed

Partial list, by combined ecological sites

(not all inclusive for RFO—only the more common sites MLRA 34)

DRY LOAMY/CLAY SITES Site - *characterized as a sagebrush/wheatgrass community with less than 10 inches precipitation.* Includes: Dense clay, Impervious clay, Shale, Shallow loamy and Loamy ESD's.

Vegetative components, when generally undisturbed, for this ecological site: grasses 50%-70%; forbs 10%; bare ground < 25%; no noxious weeds and < 5% non-native invasives. Shallow soils will tend to be composed of 10-20% woody and deeper soils will tend to be composed of 20-30% woody. Contact RFO for Saltbush or birdsfoot sage dominated site specifications.

Species	Variety	SYMBOL
Grasses		
Streambank wheatgrass (*Elymus lanceolatus)*	Sodar	ELLA
Thickspike wheatgrass (*Elymus lanceolatus)*	Critana	ELLA3
Western wheatgrass (*Pascopyrum smithii*)	Rosana	PASM
Indian ricegrass (*Achnatherum hymenoides*)	Rimrock (Nez Par)	ACHY
Bottlebrush squirreltail (*Elymus elymoides*)	Sand hollow	ELEL
Slender wheatgrass (*Elymus trachycaulus*)	Pryor (San Luis)	ELTR
Little bluegrass "Sandberg" (*Poa secunda*)	High plains	POSE
Bluebunch wheatgrass (*Pseudoroegneria spicata)*	Secor	PSSP6
Galleta grass (*Pleuraphis jamesii*)	Viva	PLJA
Shrubs		
Big sagebrush (*Artemisia tridentata wyomingensis*)		ARTRW8
Gardner's saltbush (*Atriplex gardneri*)		ATGA
Fourwing saltbush (*Atriplex canescens)*	Wytana	ATCA2
Shadscale (*Atriplex confertifolia)*		ATCO
Rabbitbrush (*Ericameria nauseosa*) "green or rubber" (*Chrysothamnus viscidiflorus*) "Gray, yellow, or Douglas"		ERNA10 CHVI8
Winterfat (*Krascheninnikovia lanata)*	Open Range	KRLA
Forbs		
Lewis' flax (*Linum lewisii*)		LILE
Rocky Mountain beeplant (*Cleome serrulata)*	Appar	CLSE
Western yarrow (*Achillea millefolium* L. var. *occidentalis)*		ACMI2
Firecracker penstemon (*Penstemon eatonii)*	Yakima	PEEA
Textile onion (*Allium textile*)		ALTE
Scarlet globemallow (*Sphaeralcea coccinea)*		SPCO
Western wallflower (*Erysimum capitatum)*		ERCA14
Scarlet gilia (*Ipomospis aggregata)*		IPAGA3
Spiny phlox (*Phlox hoodii)*		PHHO
Desert biscuitroot *(Lomatium foeniculaceum)*		LOFO
Dotted gayfeather (*Liatris punctata*)		LIPU

DRY SANDY SITES - *characterized as a sagebrush/bunchgrass community with less than 10 inches precipitation.* Includes Sandy, Sands, Shallow sandy ESDs
Vegetative components, when generally undisturbed, for this ecological site: grasses 45-55%; forbs10-20%; bare ground < 20%; no noxious weeds and < 5% non-native invasives. Shallow soils will tend to be composed of 10-20% woody, and deeper soils will tend to be composed of 20-30% woody.

Species	Variety	SYMBOL
Grasses		
Indian ricegrass (*Achnatherum hymenoides*)	Rimrock (Nez Par)	ACHY
Needleandthread (*Hesperostipa comata*)		HECO
Slender wheatgrass (*Elymus trachycaulus*)	Prior	ELTR
Sandhill muhly (*Muhlenbergia pungens*)		MUPU
Western wheatgrass (*Pascopyrum smithii*)	Rosana	PASM
Thickspike wheatgrass (*Elymus lanceolatus)*	Critana	ELLA3
Threadleaf sedge (*Carex filifolia)*		CAFI
Galleta grass (*Pleuraphis jamesii*)	Viva	PLJA
Shrubs		
Rubber rabbitbrush (*Ericameria nauseosa*) "green" (*Chrysothamnus viscidiflorus*) "Gray, yellow, or Douglas"		ERNA10 CHVI8
Gardner's saltbush (*Atriplex gardneri*)		ATGA
Big sagebrush (*Artemisia tridentata wyomingensis*)		ARTRW8
Spiny hopsage (*Grayia spinosa*)		GRSP
Fourwing saltbush (*Atriplex canescens*)	Wytana	ATCA2
Silver sage (*Artemisia cana)*		ARCA13
White sage (*Artemisia ludoviciana)*		ARLU
Forbs		
Scarlet globemallow (*Sphaeralcea coccinea*)		SPCO
Lewis' flax (*Linum lewsii*)	Appar	LILE
Rocky Mountain beeplant (*Cleome serrulata)*		CLSE
Western wallflower (*Erysimum capitatum)*		ERCA14
Scarlet gilia (*Ipomospis aggregata)*		IPAGA3
Textile onion (*Allium textile*)		ALTE
Dotted gayfeather (*Liatris punctata*)		LIPU

LOAMY/CLAY SITES - *characterized as a sagebrush/wheatgrass community with 10 or greater inches of precipitation.* Includes: Dense clay, Impervious clay, Shale, Overflow, Shallow loamy and Loamy ESD's. Vegetative components, when generally undisturbed, for this ecological site: grasses 60-70%; forbs 10-15%; bare ground <30%; no noxious weeds and < 5% non-native invasives. Shallow soils will tend to be composed of 10-20% woody, and deeper soils will tend to be composed of 20-30% woody.

Species	Variety	SYMBOL
Grasses		
Western wheatgrass (*Pascopyrum smithii*)	Rosana	PASM
Thickspike wheatgrass (*Elymus lanceolatus)*	Critana	ELLA3
Indian ricegrass (*Achnatherum hymenoides)*	Rimrock (Nez Par)	ACHY
Green needlegrass (*Stipa viridula*)	Lordon	NAVI4
Prairie Junegrass (*Koeleria macrantha*)		KOMA
Bottlebrush squirreltail (*Elymus elymoides*)	Sand Hollow	ELEL
Mutton bluegrass (*Poa fendleriana*)		POFE
Streambank wheatgrass (*Elymus lanceolatus)*	Sodar	ELLA
Bluebunch wheatgrass (*Pseudoroegneria spicata)*	Secor	PSSP6
Basin wildrye (*Leymus cinereus)*	Trailhead, Magnar	LECI
Galleta grass (*Pleuraphis jamesii*)	Viva	PLJA
Idaho fescue (*Festuca idahoensis*)	Nezperce/Joseph	FEID
Mountain brome (*Bromus marginatus*)	Garnet	BRMA4
Muttongrass (*Poa fendleriana*)		POFE
Shrubs		
Big sagebrush (*Artemisia tridentata wyomingensis*)		ARTRW8
Big sagebrush (*Artemisia tridentata vaseyana) sites > 7,000'*		ARTRV
Fourwing saltbush (*Atriplex canescens*)	Wytana	ATCA2
Antelope bitterbrush (*Purshia tridentata*)		PUTR2
Snowberry (*Symphoricarpos oreophilus*) and/or (*S. albus)*	Maybell	SYOR2
Winterfat (*Krascheninnikovia lanata)*		KRLA
Shadscale saltbush (*Atriplex confertifolia*)		ATCO
Mountain mahogany (*Cercocarpus montanus*)	Montane	CEMO2
Forbs	Open Range	
Lewis' flax (*Linum lewsii*)	Appar	LILE
Scarlet globemallow (*Sphaeralcea coccinea*)		SPCO
American vetch (*Vicia americana*)		VIAM
Lupine (*Lupinus sericeus)*		LUSE4
Blanketflower (*Gaillardia aristata)*		GAAR
Western yarrow (*Achillea millefolium* L. var. *occidentalis)*	Yakima	ACMI
Firecracker penstemon (*Penstemon eatonii)*	Richfield	PEER
White sage (*Artemisia ludoviciana*)		ARLU
Giant evening primrose *(Oenothera hookeri)*		OEELH
Textile onion (*Allium textile*)		ALTE
Arrowleaf balsamroot (*Balsamorhiza sagittata)*		BASA3
Balsam groundsel *(Packera paupercula)*		PAPA20
Dotted gayfeather (*Liatris punctata*)		LIPU

SANDY SITES - *characterized as a sagebrush/bunchgrass community with 10 or greater inches of precipitation.* Includes Sandy, Sands, Shallow sandy ESDs
Vegetative components, when generally undisturbed, for this ecological site: grasses 70%; forbs 10%; and woody 20%; bare ground < 40%; no noxious weeds and < 5% non-native invasives. Sand dunes will tend to have a higher woody component. Sand Dunes will have a higher shrub component

Species	Variety	SYMBOL
Grasses		
Western wheatgrass (*Pascopyrum smithii*)	Rosana	PASM
Thickspike wheatgrass (*Elymus lanceolatus)*	Critana	ELLA3
Blowout grass (*Redfieldia flexuosa)*		REFL
Praire sandreed *(Calamovilfa longifolia)*	Goshen	CALO
Indian ricegrass (*Achnatherum hymenoides)*	Rimrock (Nez Par)	ACHY
Green needlegrass (*Nassella viridula*)		NAVI4
Needleandthread (*Hesperostipa comata*)		HECO
Mutton bluegrass (*Poa fendleriana*)		POFE
Sand dropseed (*Sporobolus cryptandrus*)	**Borden County**	**SPCR**
Canby bluegrass (*Poa secunda)*	Canbar	POSE
Galleta grass (*Pleuraphis jamesii*)	Viva	PLJA
Idaho fescue (*Festuca idahoensis*)	Nezperce/Joseph	FEID
Mountain brome (*Bromus marginatus*)	Garnet	BRMA4
Prairie Junegrass (*Koeleria macrantha*)		KOMA
Spike muhly (Muhlenbergia wrightii)	El Vado	MUWR
Shrubs		
Silver sagebrush (*Artemisia cana)*		ARCA13
Fourwing saltbush (*Atriplex canescens*)		ATCA2
Antelope bitterbrush (*Purshia tridentata*)		PUTR2
Winterfat (*Krascheninnikovia lanata)*	Open Range	KRLA
White sage (*Artemisia ludoviciana*)		ARLU
Spiny hopsage (*Grayia spinosa)*		GRSP
Big Sage (*Artemisia tridentata wyomingensis*)		ARTRW8
Basin Sage (*Artemisia tridentata tridentata*)		ARTRT
Forbs		
Firecracker Penstemon (*Penstemon eatonii)*		PEEA
Lewis' flax (*Linum lewsii*)	Appar	LILE
Rocky Mountain beeplant (*Cleome serrulata*)		CLSE
Western yarrow (*Achillea millefolium* L. var. *occidentalis)*		ACMI
Slimflower scurfpea (*Psoralidium tenuiflorum)*		PSTE5
Dotted gayfeather (*Liatris punctata*)		LIPU

WET ALKALINE/SALINE SITES - *characterized as a Gardner's saltbush /bunchgrass or greasewood community.* Includes Saline lowland, Saline upland, and Saline upland drained ESDs

Vegetative components, when generally undisturbed, for this ecological site: grasses 40-50%; forbs 5-10%; woody 45-65%; bare ground < 40%; no noxious weeds and < 5% non-native invasives. Note: Ripping the top soil on wet alkaline or saline sites can cause significant damage to future reclamation from soil mixing. Saline upland and Saline upland drained ESD's include: Indian ricegrass

Species	Variety	SYMBOL
Grasses		
Western wheatgrass (*Pascopyrum smithii*)	Rosana	PASM
Little bluegrass "Sandberg" (*Poa secunda*)	High plains	POSE
Alkali sacaton (*Sporobolus airoides*)		SPAI
Inland saltgrass (*Distichlis spicata*)		DIST
Basin wildrye (*Leymus cinereus*)	Trailhead, Magnar	LECI
Prairie cordgrass *(Spartina pectinata)*		SPPE
Slender wheatgrass (*Elymus trachycaulus)*	Prior (Revenue)	ELTR
Indian ricegrass (*Achnatherum hymenoides*)	Rimrock (Nez Par)	ACHY
Shrubs		
Fourwing saltbush (*Atriplex canescens*)	Wytana	ATCA2
Greasewood (*Sarcobatus vermiculatus)*		SAVE
Gardner's saltbush (*Atriplex gardneri*)		ATGA
Shadscale saltbush (*Atriplex confertifolia*)		ATCO
Forbs		
Textile onion (*Allium textile*)		ALTE
Desert biscuitroot *(Lomatium foeniculaceum)*		LOFO
Hoods phlox *(Phlox hoodii)*		PHHO

MOUNTAIN SHRUB SITES - *characterized as shrub community with deep loamy soils and greater than 14 inches of precipitation.*
Vegetative components, when generally undisturbed, for this ecological site: grasses 40%; forbs 20%; woody 40%; bare ground < 20%; no noxious weeds and < 5% non-native invasives.

Species	Variety	SYMBOL
Grasses		
Idaho fescue (*Festuca idahoensis*)		FEID
Green needlegrass (*Nassella viridula*)		NAVI4
Mountain brome (*Bromus marginatus*)	Garnet	BRMA
Oniongrass (*Melica bulbosa*)		MEBU
Basin wildrye (*Leymus cinereus*)	Trailhead	LECI
Bluebunch wheatgrass (*Pseudoroegneria spicata*)	Goldar (Secor)	PSSP6
Elk sedge (*Carex garberi)*		CAGA3
Shrubs		
Mountain sagebrush (*Artemisia tridentata vaseyana)*		ARTRV
Silver sagebrush (*Artemisia cana)*		ARCA
Antelope bitterbrush (*Purshia tridentata*)	Maybell	PUTR2
Serviceberry (*Amelanchier alnifolia*)		AMAL2
Chokecherry (*Prunus virginiana)*		PRVI
Snowberry (*Symphoricarpos oreophilus*) and/or (*S. albus)*	Maybell	SYOR2
Winterfat (*Krascheninnikovia lanata)*	Open Range	KRLA
Mountain mahogany (*Cercocarpus montanus*)	Montane	CEMO2
Forbs		
Arrowleaf balsamroot (*Balsamorhiza sagittata)*		BASA
Lewis' flax (*Linum lewsii*)	Appar	LILE
American vetch (*Vicia americana*)		VIAM
Lupine (*Lupinus sericeus*)		LUSE4
Blanketflower (*Gaillardia aristata)*		GAAR
Western yarrow *(Achillea millefolium* L. var. *occidentalis)*	Yakama	ACMIO
Firecracker penstemon *(Penstemon eatonii)*	Richfield	PEEA
Balsam groundsel *(Packera paupercula)*		PAPA20
Sulfur-flower buckwheat *(Eriogonum umbellatum)*		ERUM
Rocky Mountain penstemon-Bandera (*Penstemon strictus)*		PEST2