SA-5

Wyoming Department of Agriculture

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The Wyoming Department of Agriculture is dedicated to the promotion and enhancement of Wyoming's agriculture, natural resources and quality of life.

Dave Freudenthal, *Governor*
John Etchepare, *Director*

March 28, 2007

Bureau of Land Management
Pinedale Field Office
Pinedale Anticline Supplemental EIS
Matt Anderson, Project Lead
P.O. Box 768
Pinedale, WY 82941-0768

To the Pinedale Field Office:

Following are our comments for the **Supplemental Environmental Impact Statement** (SEIS) for the **Pinedale Anticline Project Area** (PAPA).

Our comments are specific to our mission within state government: dedication to the promotion and enhancement of Wyoming's agriculture, natural resources, and quality of life. As the continued exploration and development of natural gas resources has major impacts upon our agriculture industry, our natural resources, and the welfare of our citizens, it is important that the Wyoming Department of Agriculture (WDA) remain involved in all actions and decisions affecting the agriculture industry and that we have the opportunity to express pertinent issues and concerns.

This project will negatively impact all 50 livestock grazing permittees on the PAPA, as well as our natural resource base, both in and near the project area. With the ongoing and increasing energy needs of our nation, the federal government will continue allowing gas companies to develop energy, thus affecting the natural resource base of our public lands. Development of gas resources will occur and intensify. Our comments intend to ensure the natural resource base receives the least possible impact, the highest degree of reclamation, while allowing this area to continue to provide economic stability to an agricultural industry, while meeting the energy needs of our nation.

CU-1 SA-5-1

In addition to these individual impacts, the Pinedale Field Office (PFO) and the gas operators, which include Ultra Resources, Inc., Shell Exploration and Production Company, Questar Market Resources including Wexpro Company, BP America Production Company, Stone Energy Corporation, and Yates Petroleum Corporation, should evaluate the cumulative effects of this and other

BOARD MEMBERS
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CU-1 SA-5-1 natural gas projects in the area for their impacts on rangelands, noxious weeds, and livestock grazing.

With the Draft SEIS to further develop the natural gas resource of the PAPA, our comments on the draft proposal on three areas:

1. Threshold for Impacts to Agriculture and Livestock Grazing
2. Interagency Office Development
3. Specific Language within the SEIS

1. Threshold for Impacts to Agriculture and Livestock Grazing

RC4 RC3 RC2 RC1 SA-5-2 To date, there is no guarantee that any disturbed acreage within the PAPA has or will be reclaimed to a level which supports livestock grazing. Significant attention has not been paid to achieving satisfactory range condition on any PAPA reclamation. **All past reclamation efforts on pipelines, pads, and wellfield developments is grotesquely inadequate. Why should we assume that successful reclamation will occur following the disturbance associated with additional drilling in the PAPA?** This lack of reclamation effort will continue to reduce the available forage for livestock, thus continuing to negatively impact the livestock permittee.

RC-5 SA-5-3 The PAPA SEIS lists existing disturbance at 4,094 acres, with an additional disturbance of 336 acres in 2006. This level of disturbance has already caused a loss of available forage for livestock grazing. The analysis within the PAPA SEIS was generalized for the sake of minimizing the impact. If you look closely, certain grazing allotments, like the Blue Rim Individual and New Fork Individual, will receive tremendous reduction in available AUMs:

Blue Rim Individual

Public AUM	Public Acres	Acres to support 1 AUM	Public Acres / AUM	Est. Surface Disturbance	AUM removed due to disturbance	Percent loss of Public AUMs
3258.0	36585.0	4.6	11.2	1401.8	304.7	**9.4%**

New Fork Individual

Public AUM	Public Acres	Acres to support 1 AUM	Public Acres / AUM	Est. Surface Disturbance	AUM removed due to disturbance	Percent loss of Public AUMs
302.0	1850.0	9.7	6.1	320.8	33.1	**11.0%**

The grazing of domestic livestock in the PAPA and its associated allotments is critical to the economic viability of the affected grazing permittees. A reduction of AUMs, including the proposed 9.4% or 11% reduction, has a negative impact on the individual permittee grazing within the allotment. Can a gas company survive

financially with a 9.4% or 11% decrease in their production base? Why should a livestock permittee be assumed to survive under a similar model?

The inventory value of livestock in Sublette County alone exceeds $35,580,000 per year (NASS-USDA, 2003). Any negative impact or alteration to the livestock industry can lead to a significant decrease to the value of agriculture. In neighboring Fremont County, a 100 percent reduction in BLM grazing estimates to reduce the average annual net income for the model ranch to -$59,848. Any business activity that has an average net income of -$59,848 is not economically viable. Even a 24 or 52 percent reduction in profitability will financially stress many livestock operations (Taylor, Coupal, Foulke and Thompson, 2004).

GR-1 SA-5-4 Any AUM decrease per allotment on the PAPA will negatively impact the livestock permittee. Therefore, the loss of one AUM triggers an impact and crosses a threshold for negatively impacting the livestock permittee. Couple the gas development surface disturbance with erratic weather conditions like drought, and severe financial hardships are imminent for agriculture in Sublette County.

GR-2 SA-5-5 Additionally, existing habitat in the flanks surrounding the core drilling area on the PAPA will be enhanced initially within this project. The SEIS gives no indication as to the short-term impact that this loss of forage will have upon the livestock permittee.

The Secretary of the Interior has always had the authority under the Taylor Grazing Act and Federal Land Policy and Management Act to reclassify and withdraw range land from grazing use. Yet, the Supreme Court stated in their decision for 98-1991 on May 15, 2000, that suspended AUMs will continue to be recognized and have a priority for additional grazing use within the allotment. Also stated in the decision is, "the regulations specify that regular grazing permits will be issued for livestock grazing or suspended use." In a concurring statement, Justice O'Connor noted that should a permit holder find the Secretary "deprives the permit holder of grazing privileges to such an extent that the Secretary's conduct can be termed a failure to adequately safeguard such privileges, the permit holder may bring an as-applied challenge to the Secretary's action at that time. The affected permit holder remains free to challenge such an individual [denial of] grazing privileges, and the courts remain free to determine its lawfulness in context." In other words, permit holders may request grazing privileges on an active, renewable basis.

2. Interagency Office Development

RC-6 SA-5-6 The monitoring of reclaimed areas within the PAPA is listed as the "responsibility of the Operator(s)." **Based on past reclamation efforts for gas development within the Upper Green River Basin, the WDA strongly believes that without**

RC-6 SA-5-6 **the assistance of the State of Wyoming, the Operators will not effectively or accurately monitor the reclaimed areas to ensure successful reclamation within the PAPA.** Additionally, if the responsibility is assumed by the BLM to monitor, resources are already stretched too thin that the outcome is traditionally minimal. The rangeland resource is an important component to ensure the viability of an agricultural industry remains following gas development.

MO-1 SA-5-7 For this reason, the WDA supports the development of an Interagency Office devoted to monitoring on the PAPA. We support the efforts of BLM, Operators, and the State of Wyoming to successfully monitor and reclaim areas of disturbance by gas development. It is our intent that these efforts will allow for successful forage growth to return the grazing allotments into productive rangeland for livestock.

GR-3 SA-5-8 The WDA houses the expertise to monitor forage and rangeland resources, develop livestock grazing plans and habitat enhancement projects, identify and prescribe removal for noxious weeds, serve as a point-of-contact for all 50 livestock grazing permittees, and provide information and expertise on the functionality of existing habitat and restoration efforts. All these duties can be conducted to continue livestock grazing on the PAPA, while utilizing a smaller forage base due to energy development and habitat enhancement. How is the BLM and/or Operators prepared to address the concerns of all 50 livestock permittees?

MO-2 SA-5-9 Currently, the WDA is a partner in the Jonah Interagency Office (JIO), located in Pinedale. Our involvement in the JIO is to provide the services necessary to execute plans, monitoring, and other activities necessary to assure the effectiveness of land management recommendations, reclamation actions, and mitigation in the vicinity of the Jonah Natural Gas Field in accordance with the Record of Decision (ROD) for the Jonah Infill Drilling Project. We suggest the Operators develop an Interagency Office based on the JIO model as an addition to the monitoring responsibilities listed within the SEIS.

GR-4 SA-5-10 The WDA supports compensatory mitigation discussions, as outlined in *BLM IM No. 2005-069*, between the operators and livestock permittees to lessen the burden, livestock stress and economic impact to a grazing permittee from this development. Such mitigation strategies and costs could include, but are not limited to, the following information:

GR-5 SA-5-11 2.1 <u>Movement of livestock to an open allotment or pasture</u>
For producers who desire to maintain their current herd size, an open federal allotment or private pasture may be found and utilized for the actual livestock that are displaced. The producer may also elect to absorb the displaced livestock into a surrounding or adjacent allotment. Where available, a pasture may be rented for the livestock producer.

GR-6 SA-5-12

2.2 Purchase hay in lieu of allotment use

Livestock producers may chose to graze their livestock at home on their hay meadows, and have hay purchased for them for use in lieu of grazing the affected allotment. This activity could serve as a temporary fix until other alternatives are found, or it may serve as a long-term mitigation strategy.

GR-7 SA-5-13

2.3 Monitoring of development impacts

Livestock producers may chose mitigation based on direct impacts, which are documented from on-the-ground monitoring. Rangeland monitoring can be used to make both short- and long-term management decisions. Monitoring can include utilization, plant community composition, cover, function, structure and species presence. Compensation can be based on a predetermined value which is placed on the recorded impact. Based on monitoring analysis, range improvements will be constructed. The WDA recommends the use of the *Wyoming Rangeland Monitoring Guide* (August, 2001).

GR-8 SA-5-14

2.4 Develop water

Poor water distribution is the chief cause of poor livestock distribution on most ranges. In certain allotments in the west, water is the limiting resource for complete utilization of the allotment. By developing water, livestock are able to move throughout the allotment and utilize the forage, without concentrating in one particular area. Water developments in either the affected allotment or surrounding allotments will improve the carrying capacity for livestock. Water could also be developed on the producer's private land to increase AUMs or hay crop yield.

GR-9 SA-5-15

2.5 Purchase grazing land for Cattlemen's or Grazing Association control

Gas operators will purchase private land in the area, turn the control over to the local grazing or cattlemen's association, in which they will utilize the land for grazing as displacement occurs in the oil and gas area. This effort will act as a grass bank until AUMs are returned on federal land.

GR-10 SA-5-16

2.6 Reimburse the producer for AUM loss

To temporarily offset the displacement of livestock due to oil and gas development, negotiate a settlement to reimburse the producer for lost AUMs until grazing resumes. This payment may be for a portion or for all AUMs located within the affected allotment. The reimbursement may continue for the life of the displacement of livestock, and cease following reclamation; upon which time livestock grazing will resume.

GR-11 SA-5-17

Additionally, future projects like range improvements and water developments that will enhance the natural resource base of the grazing allotments on the PAPA should be addressed in an attentive manner by the BLM. Livestock permittees are currently aware of areas within the allotments that are

underutilized by livestock. Addressing the potential for livestock to utilize these areas and implementing projects that would encourage this use should be supported. Projects could be placed not only with underutilization of forage in mind, but also with a concept of predicting the development location impact. If the operators are committed to continue to work together on the PAPA, this will easily be achieved.

GR-13 GR-12 SA-5-18 Eventually, successful reclamation and rangeland enhancements will provide better forage for livestock and wildlife and improve the carrying capacity of each allotment, as well as improve utilization and dispersal of both. Offsite mitigation of the environmental impacts occurring on the PAPA can help improve the natural resources in the Upper Green River Basin. However, costs to livestock permittees in the surrounding allotments will rise, due to displacement during surface disturbing activities. We ask the Operators to apply all mitigation opportunities to all affected permittees due to offsite mitigation resulting from impacts on the PAPA. We ask that the proponents work with the livestock permittees to lessen any burden because of disruption in their operations due to gas development activities.

3. Specific Language within the SEIS

3.1 SEIS Citation:

Under V.1, vii, Vegetation Resources:
"Surface disturbance in native vegetation dominated by shrubs and trees would be converted to herbaceous vegetation."

WDA Comment:

RC-7 SA-5-19 Successful reclamation of shrubs in the nearby Jonah Field, as well as many sites on the PAPA, refutes this statement. It is true that the herbaceous component of reclamation is higher than the woody component, but the woody component is expected and in an area with such an emphasis on wildlife habitat, there is a strong request that some sort of woody vegetation be a requirement in reclamation. This statement does not reflect accurate reclamation standards.

3.2 SEIS Citation:

Under Appendix E, E-3: Temporary Site Stabilization:
"On existing well pads that would not be fully developed within the upcoming annual cycle, all bare ground would have at least a 75 percent protective cover that may include but not be limited to organic mulch, herbaceous vegetation, jute matting, or other erosion-preventative fabric. Protective cover may be excluded on active work sites (up to the wellhead

with production equipment) if justified by the Operator and with concurrence of BLM. "

WDA Comment:

RC-8 SA-5-20

Is this 75% total ground cover or 75% cover compared to native? Most of the rangeland in this climate has under 75% ground cover in a historical climax plant community. According to the NRCS Ecological Site Descriptions for MLRA: 34A, a Clayey site with 7-9" ppt, ground cover by ocular estimate, varies from 40%-50% at a historical climax plant community. The same site in a 10-14" ppt. is about 55-60% ground cover by ocular estimate. Loamy sites are 10-15% less than clayey sites and shale sites are far less than that (5-15% in 7-9" and 10-20%in 10-14"ppt. ground cover). Therefore, we suggest that 75% cover should be to native vegetation and not to total cover.

RC-9 SA-5-21

There is also a big difference between basal cover and canopy cover. We recommend identifying which kind of cover this requirement refers too. In particular, basal cover would give a better indication of soil stability. If this statement is referring to erosion control protection, another option would be to require a Soil Surface Factor of 1. (See BLM Tech Note 346).

3.3 SEIS Citation:

Under Appendix E, E-3: Temporary Site Stabilization:
"During the period when an existing well pad is not being fully developed, the well pad would be vegetated prior to the first winter after the ROD to achieve at least 50 percent vegetative cover of desirable herbaceous species by the following spring."

WDA Comment:

RC-10 SA-5-22

This sentence needs rewording. The way we interpret it is that if you seed sometime after Jan. 1 and before freezing, you expect 50% cover by the next spring. If this is the case, it is not possible. Maybe if weeds are considered as aerial cover. Native perennial vegetation does not grow that quickly in the PAPA environment. Again, we suggest defining what kind of cover this statement refers to and if it is compared to native or % total cover. See Comment #2 above.

RC-11 SA-5-23

Having 50% total cover is high for the PAPA climate and not a reasonable expectation for the spring following seeding. One possible solution is a plant count, like frequency or density, which would require a certain number of plants per sq. meter and is compared to a native reference site. The percent cover estimate will differ, but these methods would indicate the number of plants that germinated in the spring and are on a successful

RC-11 SA-5-23

trajectory. Additionally, if you were to seed in year 2006, you need to wait at least until the summer of 2007 to monitor success. The spring will only show weeds and infant plants, many of which will not be recognizable.

3.4 SEIS Citation:

Under Appendix E, E-3: Temporary Site Stabilization:
"If an existing well pad would not be fully developed in 2 or more years after the ROD, desirable vegetation growth on the well pad would be at least 80 percent cover within three growing seasons."

WDA Comment:

RC-12 SA-5-24

All above comments apply to this citation. We also suggest that "native perennial" be added between "desirable" and "vegetation."

3.5 SEIS Citation:

Under Appendix E, E-3: Temporary Site Stabilization:
"Pipeline corridor(s) leading to the temporarily stabilized well pad would be revegetated immediately after construction."

WDA Comment:

RC-13 SA-5-25

Suggest adding requirements that pipeline corridors meet the same reclamation standards as well pads.

3.6 SEIS Citation:

Under Full Site Reclamation E-4:
"Once a well pad has been fully developed, full site restoration and reclamation would begin as soon as the ground is not frozen and would be completed before the onset of winter."

WDA Comment:

RC-14 SA-5-26

There are appropriate times to seed and there are not appropriate times to seed, even between periods where there is frozen ground. For example, seeding in July and August without any precipitation is likely to be a failure. We recommend changing this statement to *"once a well pad has been fully developed, full site restoration and reclamation would begin the next appropriate seeding period. Fall seeding should occur September 15 to freeze-up and Spring seeding should occur post-thaw to May 15."*

3.7 SEIS Citation:

Under Full Site Reclamation E-4:
"Full site restoration would require re-grading the pad to conform to the original contours."

WDA Comment:

RC-15 SA-5-27

We suggest this statement be reconsidered. Take this example, a site is not fully recontoured to original, yet looks aesthetically pleasing and natural, and fully meets reclamation standards. Is the BLM willing to require the site be redisturbed and reclaimed again to meet the original contours? Coal mine regulations require that a site be within 10 feet of the original contour. We recommend changing the site to be *"within 10 feet of original and have a natural looking contour."*

3.8 SEIS Citation:

Under Full Site Reclamation E-4:
"Pipeline corridor(s) leading from the fully restored well pad would be revegetated to the same levels required on fully reclaimed well pads."

WDA Comment:

RC-16 SA-5-28

We do not see any "levels" for fully reclaimed well pads. We recommend referring to the EIS if that is what is indicated, otherwise, identify what the levels are. There are levels for interim and not full reclamation.

3.9 SEIS Comment

Referring to Reclamation Monitoring E-5

WDA Comment:

The JIO monitoring guidelines were written with the intent that sites would be compared to native sites when evaluating reclamation success. If the PAPA SEIS does not require this comparison, some of the Monitoring Methods listed in E-5 are overkill.

RC-17 SA-5-29

If the reclamation criterion only uses ground cover as the criteria, using photo point monitoring, as suggested by BLM State Range Specialist Jim Cagney, is the best method for this purpose. All the other methods are a waste of effort, money, and personnel if the standards for reclamation are not identified (although very useful in identifying reclamation success).

RC-18 SA-5-30

We recommend one of two changes:

RC-18 SA-5-30

3.9.1 Identify reclamation standards and have monitoring techniques specific to those standards. The Attached JIO Reclamation Standards are a excellent example; or,

3.9.2 Delete "Monitoring Methods" and "Data Collection Methods" and add:

A. Timing and frequency of data collection.

a. Well Pads

A minimum of one monitoring location will be identified on each well pad that is representative of the reclamation site as a whole.

b. Rights-of-Way

Pipeline rights-of-way require one monitoring location every ¼ mile or change of ecological site (as defined by NRCS soil survey), whichever comes first. Specific monitoring locations may be modified as approved by the BLM Authorized Officer.

Additionally, multiple pipeline rights-of-way will be monitored by each "linear layer" based on date of disturbance/reclamation.

Pipeline operators of multiple pipeline rights-of-way will establish a maintenance agreement to determine a single responsible party for reclamation monitoring. A copy of the maintenance agreement will be provided to the BLM Authorized Officer upon implementation.

c. Quantitative Monitoring.

This is data collected to measure reclamation success.

Pre roll-over release; monitoring will occur every other year beginning the first growing season post-seeding.

Post roll-over release; 5% of all locations that have met roll-over reclamation for a minimum of five years will be monitored annually. Previously monitored locations must be included in subsequent monitoring on a 5-year cycle, plus new sites necessary to meet the overall 5% requirement.

Example:
In 2007 thru 2020, 100 new locations meet rollover criteria each year. No monitoring is required prior to 2012, when 5% of the sites that met rollover criteria in 2007 will be monitored (5 sites total). In 2013, 200 sites have met rollover criteria (100 in 2007 and 2008), so 10 sites must be monitored, none of which may be those monitored in 2007. This will continue thru 2016, when 25 new sites (not previously monitored) would be monitored. In 2017, the five sites monitored in 2012 would be monitored again, as well as 25 new sites for a total of 30 monitored locations (600 total sites in rollover).

d. Qualitative Monitoring.

This is data collected to monitor long-term trend.

Will be conducted annually on all reclamation sites not already quantitatively monitored until final reclamation criteria have been met. (See JIO Reclamation Monitoring Trend Worksheet).

B. Data Collection

a. Quantitative Monitoring

Permanent photo points will be established on both the reclamation and reference sites and will be permanently marked by GPS. Photos will be taken as close to the same time of year as previous photos were taken to reduce differences in plant growth characteristics.

Close-up pictures show the soil surface characteristics and the amount of ground surface covered by vegetation and litter. Close-ups will be taken at GPS located photo plots. A ½ meter x ½ meter photo plot is recommended.

General view pictures present a broad view of a site. Pictures depicting north, south, east, and west will also be established and monitored.

To measure erosion control, a soil surface factor of 1-25% must be achieved. (Accuracy is not consistently closer than ± 5 SSF and therefore allows a SSF of 25% to be considered stable.) See BLM Tech Note 346 below.

The Operator may use any BLM approved monitoring method identified in *Sampling Vegetation Attributes*.

C. Reporting Format:

Documentation of monitoring will be submitted to the BLM in a standardized data format, to be determined.

Conclusion

In conclusion, we appreciate the opportunity to comment on the proposed actions within the PAPA. We encourage continued attention to our concerns, and we look forward to hearing about and being involved in proposed actions and decisions.

Sincerely,

John Etchepare
Director

JE/mh/lsr

CC: Governor's Planning Office
Wyoming Farm Bureau Federation
Wyoming Stock Growers Association
Wyoming Wool Growers Association
Wyoming Game and Fish Department
Wyoming Board of Agriculture
Art Reese Consulting
The Spearman Company

ATTH: JIO Reclamation Monitoring Plan
JIO Reclamation Monitoring Criteria
JIO Livestock Monitoring Plan

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MONITORING RECLAMATION SUCCESS

Monitoring Responsibilities per FEIS DP-B-5.1

It is the responsibility of the operator to monitor reclaimed areas, determine if reclamation criteria are being met, develop and implement remedial actions if success standards are not being met, provide resulting data to the BLM and JIO annually, and request concurrence from BLM that success standards have been met and monitoring is no longer required.

It is the responsibility of the JIO to evaluate the annual monitoring reports, provide concurrence (or not) with the reclamation assessments as to whether or not success standards are being met and the rationale for the determination, and provide recommendations to the BLM for Roll-Over and Final reclamation acceptance.

It is the responsibility of the BLM to determine acceptance of JIO recommendations and to provide operators with remedial actions when reclamation success criteria are not being met. The remedial actions may include such things as soil testing, soil amendments, irrigation, seeding etc.

1. Location of data collection:

    a. A sample representation of the vegetative population will be used to collect the vegetative data on the reclamation and reference site.

    b. The reference site location will represent the ecological characteristics described in the reclamation criteria.

    c. All transect start and end points will be marked by GPS.

2. Timing and frequency of data collection.

    a. Well Pads

        i. A minimum of one monitoring location will be identified on each well pad that is representative of the reclamation site as a whole.

    b. Rights-of-Way

        i. Pipeline rights-of-way require one monitoring location every ¼ mile or change of ecological site (as defined by NRCS soil survey), whichever comes first. Specific monitoring locations may be modified as approved by the BLM Authorized Officer.

        ii. Additionally, multiple pipeline rights-of-way will be monitored by each "linear layer" based on date of disturbance/reclamation.

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iii. Pipeline operators of multiple pipeline rights-of-way will establish a maintenance agreement to determine a single responsible party for reclamation monitoring. A copy of the maintenance agreement will be provided to the BLM Authorized Officer and JIO upon implementation.

c. Quantitative Monitoring. (Data collected to measure reclamation success.)

i. Pre roll-over release; monitoring will occur every other year beginning the first growing season post-seeding.

ii. Post roll-over release; 5% of all locations that have met roll-over reclamation for a minimum of five years will be monitored annually. Previously monitored locations must be included in subsequent monitoring on a 5-year cycle, plus new sites necessary to meet the overall 5% requirement.

Example:

In 2007 thru 2020, 100 new locations meet rollover criteria each year. No monitoring is required prior to 2012, when 5% of the sites that met rollover criteria in 2007 will be monitored (5 sites total). In 2013, 200 sites have met rollover criteria (100 in 2007 and 2008), so 10 sites must be monitored, none of which may be those monitored in 2007. This will continue thru 2016, when 25 new sites (not previously monitored) would be monitored. In 2017, the five sites monitored in 2012 would be monitored again, as well as 25 new sites for a total of 30 monitored locations (600 total sites in rollover).

1. Grass production measurements need only be taken when all other reclamation criteria have been met.

d. Qualitative Monitoring. (Data collected to monitor long-term trend.)

i. Will be conducted annually on all reclamation sites until final reclamation criteria have been met. (See Jonah Reclamation Monitoring Trend Worksheet).

3. <u>Data Collection</u>

a. Quantitative Monitoring.

i. Permanent photo points will be established on both the reclamation and reference sites and will be permanently marked by GPS. Photos will be taken as close to the same time of year as previous photos were taken to reduce differences in plant growth characteristics.

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1. Close-up pictures show the soil surface characteristics and the amount of ground surface covered by vegetation and litter. Close-ups will be taken at GPS located photo plots. A ½ meter x ½ meter photo plot is recommended.

2. General view pictures present a broad view of a site. Pictures depicting north, south, east, and west will also be established and monitored.

ii. To measure erosion control, a soil surface factor of 1-25% must be achieved. (Accuracy is not consistently closer than ± 5 SSF and therefore allows a SSF of 25% to be considered stable.) See BLM Tech Note 346 below.

iii. The Operator may use any BLM approved monitoring method.

iv. The JIO will use the following monitoring methods to validate roll-over and final release recommendations to the BLM.

1. Ground cover and species composition will be evaluated using line point intercept by plant species method. At a minimum, 200 data points will be collected on each site.

2. Nested Frequency Quadrants will be used to measure frequency. At a minimum, 200 frame plots on each site will be used to calculate data.

3. The density method as described in Sampling Vegetation Attributes Interagency Technical Reference will be used to measure density. At a minimum, 200 frame plots on each site will be used to calculate data.

4. Production measurements will be made using the double sampling method. Data will be collected from a minimum of 20 plots on each site.

b. Qualitative Monitoring.

i. Qualitative monitoring consists of personal observations. The Jonah Reclamation Monitoring Trend Worksheet will be used to collect this data.

ii. Results from qualitative monitoring may require additional photographs.

4. Stages of reclamation. After evaluating the monitoring data, each site will be categorized into one of four stages to determine landscape trends and reclamation status of the Jonah Field.

    a. Stage I - Contouring, soil preparation, and seeding has been completed although perennial vegetation is not yet established. If a site remains in Stage 1 for more than 3 years the BLM may implement remedial actions to facilitate reclamation success.

    b. Stage II - Perennial plants are established and increasing in abundance and vigor.

    c. Stage III - Rollover criteria have been met.

    d. Stage IV - Final reclamation criteria have been met. Operators have been released from bond.

5. Reporting Format:

    a. Documentation of monitoring will be submitted to the JIO in a standardized data format, to be determined.

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QUALITATIVE MONITORING SHEET

Well Name/Number _____ Monitoring Date _____

Company _____ Inspector _____

Check 1: ☐ Well Pad ☐ Access Road ☐ Pipeline ☐ Other

	Monitoring Requirement	Yes	No	Description
1	Area free of undesirable materials			Trash, construction materials, etc.
2	Soil stable with no indications of subsidence, slumping and/or significant downward movement of surface soil materials			Rills greater than 2 inches, accelerated erosion is obvious and soils are not being held by plants on site, perceptible soil movement, sheet flow, or head cutting in drainages, slopes occurring on or adjacent to reclaimed areas
3	Weeds or other undesirable species adequately controlled			Russian thistle, halogeton, cheat grass, etc.
4	Noxious weeds are not present			Perennial pepperweed, Canada thistle, black henbane, leafy spurge, yellow or dalmation toadflax, spotted knapweed, Russian knapweed, etc.
5	Evidence of vegetative reproduction (either spreading rhizomatous species or seed production)			Plants grazed too closely to allow seed production, recent precipitation reduced likelihood of plant reproduction, etc.
6	Grazing utilization (circle one)	Low	Medium	High

For any "No" answers above, please identify the problem and what remedial actions are planned. Attach photographs and notify the JIO as soon as possible.

_____

_____

_____

_____

Tech Note #346
U.S. Department of the Interior- Bureau of Land Management
Erosion Condition Classification System by Ronnie Clark

Well name and number: _____ **Date:** _____

Operator: _____ **Collector:** _____

Erosional Feature	Potentially Present Yes/ No	Identified Factors (Form 7310-12)	Possible Factor
Soil Movement			14
Surface Litter			14
Surface Rock Fragments			14
Pedestalling			14
Flow Patterns			15
Rills			14
Gullies			15
Column Totals			
Soil Surface Factor Total			
Class			

SSF	Class
1-20%	Stable
21-40%	Slight
41-60%	Moderate
61-80%	Critical
81-100%	Severe

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Procedure:
1. *Observe the total sample area and determine an average condition for each of the seven items above.*
2. *Determine if each item is potentially present as only these items will be considered.*
3. *For the items potentially present, indicate appropriate numerical value. (Form 7310-12)*
4. *Total both the weighted values and the potential values for each item.*
5. *Calculate the total percent SSF: (identified factors/ possible factors) X 100.*
6. *Indicate corresponding condition class site is in.*

Comments:

Form 7310-12
Determination of Erosion Condition Class
Soil Surface Factor (SSF)

Well Name/Number: _____ Date: _____

Operator: _____ Collector: _____

Soil Movement	Depth of recent deposits around obstacles, or in microterraces; and/or depth of truncated areas, is 0 – 0.1 in (0 – 2.5 mm). **0 or 3**	Depth of recent deposits around obstacles, or in microterraces; and/or depth of truncated areas, is 0.1 – 0.2 in (2 – 5 mm). **5**	Depth of recent deposits around obstacles, or in microterraces; and/or depth of truncated areas, is 0.2 – 0.4 in. (5 – 10 mm) **8**	Depth of recent deposits around obstacles, or in microterraces; and/or depth of truncated areas, is 0.4 – 0.8 in. (10 – 20 mm) **11**	Depth of recent deposits around obstacles, or in microterraces; and/or depth of truncated areas, is > 0.8 in. (20 mm) **14**
Surface Litter	No movement, or if present, < 2% of the litter has been translocated and redeposited against obstacles. **0 or 3**	2 – 10% of the litter has been translocated and redeposited against obstacles. **6**	10 – 25% of the litter has been translocated and redeposited against obstacles. **8**	25 – 50%% of the litter has been translocated and redeposited against obstacles. **11**	> 50% of the litter has been translocated and redeposited against obstacles. **14**
Surface Rock Fragments	Depth of soil removal around the fragments, and/or depth of recent deposits around the fragments is < 0.1 in (2.5 mm). **0 or 2**	Depth of soil removal around the fragments, and/or depth of recent deposits around the fragments is 0.1 – 0.2 in. (2.5 – 5 mm). **5**	Depth of soil removal around the fragments, and/or depth of recent deposits around the fragments is 0.2 – 0.4 in. (5 – 10 mm). **8**	Depth of soil removal around the fragments, and/or depth of recent deposits around the fragments is 0.4 – 0.8 in. (10 – 20 mm). **11**	Depth of soil removal around the fragments, and/or depth of recent deposits around the fragments is > 0.8 in. (20 mm). **14**
Pedestals	Pedestals are mostly < 0.1 in (2.5 mm) high and/or have a frequency < 2 pedestals/100 ft. **0 or 3**	Pedestals are mostly 0.1 – 0.3 in. (2.5 – 8 mm) high and/or have a frequency of < 2 – 5 pedestals/100 ft. **6**	Pedestals are mostly 0.3 – 0.6 in. (8 – 15 mm) high and/or have a frequency of < 5 – 7 pedestals/100 ft. **9**	Pedestals are mostly 0.6 – 1 in. (15 – 25 mm) high and/or have a frequency of < 7 – 10 pedestals/100 ft. **11**	Pedestals are mostly > 1 in. (25 mm) high and/or have a frequency of > 10 pedestals/100 ft. **14**
Flow Patterns	If present, < 2% surface area shows evidence of recent translocation and deposition of soil & litter. **0 or 3**	2 – 10% surface area shows evidence of recent translocation and deposition of soil & litter. **6**	10 – 25% surface area shows evidence of recent translocation and deposition of soil & litter. **9**	25 – 50% surface area shows evidence of recent translocation and deposition of soil & litter. **12**	> 50% surface area shows evidence of recent translocation and deposition of soil & litter. **15**
Rills	If present, are < 0.5 in (13 mm) deep and at intervals > 10 ft. **0 or 3**	Rills are mostly .5 – 1 in. (132 – 25 mm) deep, and at intervals >10 ft. **6**	Rills are mostly 1 – 1.5 in. (25 – 38 mm) deep, and at intervals > 10 ft. **9**	Rills are mostly 1.5 – 3 in. (38 – 76 mm) deep, and at intervals >10 ft. **12**	Rills are mostly 3 – 6 in. (76 – 152 mm) deep, and at intervals > 5 ft. **14**
Gullies	If present, < 2% of the channel bed and walls show active erosion (no vegetation), gullies make up <2% total area. **0 or 3**	2 – 5% of the channel bed and walls show active erosion (no vegetation), gullies make up 2 – 5% total area. **6**	5 – 10% of the channel bed and walls show active erosion (no vegetation), gullies make up 5 – 10% total area. **9**	10 – 50% of the channel bed and walls show active erosion (no vegetation), gullies make up 10 – 50% total area. **12**	Over 50% of the channel bed and walls show active erosion (no vegetation), gullies make up >50% total area. **15**

Reclamation Criteria

Jonah Interagency Office Recommendations

INTRODUCTION

These reclamation criteria will be used to determine when roll-over and final reclamation have been met on federal lands within the Jonah Infill Drilling Project Area (JIDPA). These criteria were developed as required by the Jonah Infill Drilling Project Record of Decision (ROD) to assure habitat restoration and function in the shortest time possible. Best Management Practices will be implemented into this document as identified and procedures and/or criteria may be modified as necessary.

OBJECTIVES

1. Rollover reclamation credit requires establishment of viable site-stabilizing plant growth (e.g., resistant to wind and water erosion) and a plant community that approximates surrounding or ecologically comparable vegetative composition to the maximum extent possible.

2. Final reclamation requires a range of species composition, diversity, cover and production equal to pre-disturbance levels.

RECLAMATION CRITERIA

Each reclamation site will utilize a representative reference site for comparison to measure success of reclamation. A reference site must be undisturbed, similar in vegetative composition, soil structure, slope, and aspect. If possible, the reference site should be adjacent to the reclamation site and similar in size.

In recognition that vegetative composition is naturally sporadic, criteria may be met if data falls within ± 5% of the requirement.

See the JIO website for references on recommended plant lists, and Federal, State and County Noxious Weed Lists. References are also available to support scientific validation of the following criteria.

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Roll-Over Criteria

1. ***Erosion Control*:**

   The site must be in stable condition as indicated by the Erosion Control Classification System (BLM Tech Note 346). The percentage of bare ground must be equal to or less than the reference site.

2. ***Vegetative Criteria*:**

   a. **Native Forbs:** The average density or frequency of forbs must be a minimum of 75% of the reference site. Diversity of forbs on a reclaimed site must be equal to or greater than the reference site.

   b. **Native Shrubs:** The average density or frequency of the shrub component must be at least 50% of the reference site. This includes both shrubs and half shrubs (e.g. winterfat, fringed sage, etc.), but rabbitbrush cannot account for more than 10% density or frequency of total shrub composition used to meet criteria. At least 15% density or frequency of the shrub component must be the dominant species from reference site. The diversity of shrubs must be equal to or greater than the reference site. Individual shrub plants younger than 3 years old will not count towards roll-over.

   c. **Native Grasses:** Reclaimed sites must have a minimum of 3 native perennial grass species present, 2 of which must be bunch grass species.

   d. **Non-Native Weeds:** Sites must be free from all species listed on the Wyoming or Federal noxious weed list. All state and federal laws regarding noxious weeds must be followed. Other highly competitive invasive species such as cheatgrass and other weedy brome grasses are also prohibited.

   e. **Plant Vigor**: Plants must be resilient as evidenced by well-developed root systems, flowers, and seed heads. All sites must exhibit the sustainability of the above desired attributes after the removal of external influences. A minimum of 1 growing season without external influences (irrigation, mat pads, fences, etc.) may satisfy this requirement.

Final Criteria

1. ***Ground Cover & Ecological Function*:**

   The site must be in stable condition as indicated by the Erosion Control Classification System (BLM Tech Note 346). To ensure soil stability and nutrient cycling, ground cover must be equal to or greater than the reference site and vegetative litter must be decomposing into the soil.

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2. ***Vegetative Criteria*:**

   a. **Native Forbs:** The average density or frequency and total diversity of forbs must be equal to or greater than the reference site.

   b. **Native Shrubs:** The average density or frequency of the shrub component must be at least 50% of the reference site. This includes both shrubs and half shrubs (e.g. winterfat, fringed sage, etc.), but rabbitbrush cannot account for more than 10% density or frequency of total shrub composition used to meet criteria. At least 25% density or frequency of the shrub component must be the dominant species from the reference site. Individual shrub plants younger than 3 years old will not count towards final criteria. The diversity of shrubs must be equal to or greater than the reference site.

   c. **Native Grasses:** Reclaimed sites must produce equal to or greater pounds of production per acre compared to the reference site. A minimum of 3 native perennial species must be included with at least 2 bunch grass species.

   d. **Non-Native Weeds:** Sites must be free from all species listed on the Wyoming or Federal noxious weed list. All state and federal laws regarding noxious weeds must be followed. Other highly competitive invasive species such as cheatgrass and other weedy brome grasses are also prohibited.

   e. **Plant Vigor:** Plants must be resilient as evidenced by well-developed root systems and flowers. Shrubs will be well established and in a "young" age class at a minimum (e.g. not comprised of seedlings that may not survive until the following year).

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Glossary

Annual: Completing the life cycle in one growing season or single year.

Decomposition: The breakdown of dead plant material.

Density: The number of individual plants per unit area.

Diversity: Composed of different plant species.

Erosive Features: Pedestals, flow patterns, rills, gullies, and soil movement.

Erosion: The wearing away of the land surface by rain or irrigation water, wind, ice or other natural or anthropogenic agents that abrade, detach and remove soil from one point on the earth's surface and deposit it elsewhere.

Frequency: The abundance and distribution of plants.

Functioning Ecosystem: The complex of a community of organisms and its environment functioning as an ecological unit.

Ground Cover: The soil cover of plant, litter, rocks, and gravel on a site.

Invasive Species: A species introduced by human action to a location, area, or region where it did not previously occur naturally (i.e., invasive), that becomes capable of establishing a breeding population in the new location without further intervention by humans, and spreads widely throughout the new location.

Litter: Dead plant material that may consist of leaves, twigs, and bark that has fallen to the ground.

Nutrient Cycling: In general, a plant using nutrients in the soil to grow, the plant dies over time and decomposes adding nutrients back into the soil for other plants to use repeating the cycle.

Perennial: Plants persisting for several years usually with new herbaceous growth from a perennating part.

Production: Plant biomass above ground present during a given year.

Reference Area: Areas where natural biological and physical processes are functioning normally.

Resilience: Plasticity or able to withstand change. The capacity to absorb shocks from environmental factors while maintaining function.

Stable State: Resistant to erosion.

Sustainability: Capable of being sustained. Two key related concepts are resilience and resistance. Resistance is the likelihood that a system will respond to a disturbance such as drought or pest invasion. A stable system resists large fluctuations in productivity, nutrient losses and other responses to stress. Systems with greater resilience return rapidly and reliably to the original conditions.

Viability: Persistence of a population or species into the future.

Vigor: Active healthy well-balanced growth.

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MONITORING LIVESTOCK OPERATIONS

1. Forage Utilization

   a. *Reclamation locations within JIDPA* -- Operators will record ocular estimates of low, moderate, or intensive grazing utilization during annual qualitative reclamation monitoring.

   b. *Undisturbed areas within the JIDPA* -- The authorized officer for the BLM, in conjunction with joint cooperative monitoring programs where applicable, will measure and record livestock utilization. The JIO will assist the BLM as requested.

2. Effects of development on livestock operations

   a. In coordination with the BLM, the JIO will initiate regular contact with the livestock producers who have grazing permits in the Jonah Field and surrounding allotments.

   b. Livestock deaths will be investigated by the BLM and JIO, and may lead to possible mitigation requirements.

   c. BLM, in coordination with livestock permittees, will record and/or map livestock grazing concentration areas, especially regarding any impacts to livestock from roads or disturbance from construction and drilling activities. The JIO will assist the BLM as requested and will receive a copy of monitoring results.

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