

Oil and Gas— Assessments, Planning, and Monitoring

KEY SERVICES

Reclamation Planning and Determination of:

- Ecological Site Description (ESD)
- Soil Series Identification
- Topsoil Salvage Depth
- Soil Texture
- Soil Limiting Factors
- Erosion Potential
- Vegetation Community
- Dominant Vegetation Species
- Noxious Weed Assessments
- Recommended Seed Mix
- Steep Slope
- Reclamation Recommendations for the Site
- Existing Disturbance Acreages
- Planned Disturbance Acreages

Reclamation Monitoring

- Weed Assessments
- Interim Reclamation Monitoring
- Qualitative Assessments
- Quantitative Assessments
- Reclamation Success Assessment
- Final Reclamation Assessment
- Stormwater Pollution Prevention Plan

APPROACH TO ASSESSMENTS AND PLANNING

BKS has conducted specific reclamation plan assessments for numerous oil and gas projects throughout Wyoming and the western United States. BKS has provided recommendations regarding reclamation potential, mitigation measures for soil limiting factors and erosion

control practices. BKS has conducted and/or compiled the following surveys or documents:

- Pre-Disturbance Site Characterization
- Ecological Site Description
- Topsoil-Suitable Subsoil Depth
- Plant Community and

- Dominant Species
- Surface Disturbance Activities
- Site Preparation and Seeding
- Invasive Species Management and Monitoring
- Integrated Pest Management Plan



SPECIFIC SITE RECLAMATION PLAN

Since 1981, BKS has performed and compiled numerous reclamation site designs for submittal to various federal and state agencies. BKS understands the varying requirements set forth by these federal and state regulators and has a long-term working relationship with many operators and regulators.

The purpose of specific reclamation plans is to provide pre-disturbance site characteristics, including qualitative and quantitative soils and vegetation data as needed and identification of reclamation suitability at a site specific level. Assessments ad-

dress potential concerns associated with the site based on its specific landscape variability and characteristics, based on technology and economic considerations.

Reclamation recommendations are provided for each proposed site whether that is a well pad, or a linear feature such as ROW's or pipelines. Example recommendations may include:

- Identifying varying topsoil strip depths for each location to maximize potential and reduce unnecessary impacts.
- Identifying various soil amendments to in-

crease soil moisture retention and stabilize the site surface.

- Identifying BMPs that reduce and mitigate stormwater runoff.
- Post initial seeding disturbance evaluations and follow up recommendations are also a service that BKS provides as part of initial seeding failures.



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Client List

- Anadarko Petroleum Corporation
- Chesapeake Energy Corporation
- Denbury Resources, Inc.
- Devon Energy Corporation
- Encore Energy Partners Operating
- EOG Resources
- Foundation Energy
- GRMR Oil & Gas
- Linn Energy
- Newfield Exploration
- Petroleum Association of Wyoming
- QEP Energy Company
- Sabine Oil & Gas
- Samson Resources
- True Oil
- Vanguard Operating

BKS Environmental Associates, Inc. was established in 1981.

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BKS' mission is to provide the highest quality natural resource services to all of our clients.

RECLAMATION MONITORING

Monitoring Techniques:

- Point Line Intercept
- Daubenmire Frames
- Quadrat Frames
- Shrub Density
- Production Plots
- Frequency Plots
- Photo Documentation
- GIS Analysis

BKS will monitor producing wells or plugged and abandoned wells for interim or final reclamation. BKS will also inventory the adjacent undisturbed area or use an established technical standard to compare the reclamation monitoring results. After monitoring in the field is complete, BKS will present the results of the field work and provide recommendations to the client so their reclamation goals can be achieved.

RECLAMATION MONITORING PROJECT

BKS conducts reclamation monitoring on several oil and gas well sites. BKS has been monitoring wells for consecutive years and have seen wells progress towards rollover or final reclamation while other wells may be challenged due to vegetation establishment, weed infestations, or soil characteristics. Each year, after reclamation monitoring is completed, BKS provides a report to clients that discusses:

- Methods utilized
- Qualitative observations
- Quantitative measurements including % ground cover, % vegetation and % desired vegetation cover
- Stage of reclamation each well site

has achieved

- Specific recommendations to improve the well site if needed
- Species list including any noxious or invasive weed species
- Maps for each well site identifying the sample locations and any erosion issues or other ground cover issues
- Photographs of the well sites.



BKS CONTACT INFORMATION

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