APPENDIX L

VISUAL RESOURCES TECHNICAL SUPPORT DOCUMENT

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VISUAL RESOURCES TECHICAL SUPPORT DOCUMENT
WEST TAVAPUTS FULL FIELD DEVELOPMENT
ENVIRONMENTAL IMPACT STATEMENT

Prepared for:

United States Department of the Interior
Bureau of Land Management
Price Field Office

Prepared by:
Buys & Associates, Inc.
300 East Mineral Ave. Suite 10
Littleton, Colorado 80122

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VISUAL RESOURCE TECHNICAL SUPPORT DOCUMENT

1.0 INTRODUCTION

Visual resources are the natural and cultural features of an environment that can be viewed by an observer in the area. Visual quality is an important factor in land use decision making. The objective of visual resource planning is to prevent environmental degradation and maintain sociologically important resource values. Under BLM guidelines, visual resource values must be considered in all land-use planning efforts and the impacts of surface disturbance must be documented in the decision-making process. If development is approved, a reasonable attempt must be made to meet the visual management objectives for the area in question and to minimize the visual impacts of the proposal.

1.1 Purpose

This Visual Resources Technical Support Document (TSD) was prepared to supplement a proposal by BBC and other oil and gas companies to drill new wells in the West Tavaputs Plateau (WTP) Project Area as described in the West Tavaputs Full Field Development Environmental Impact Statement (EIS). This document provides an assessment of the existing visual resources and management thereof within the WTP Project Area. This TSD is intended to provide a basis for the analysis of potential environmental impacts.

The purpose of this TSD is to assist the Bureau of Land Management (BLM), Price Field Office (PFO) in planning for visual resources management as it relates to the proposed oil and gas development in the WTP Project Area.

Development of natural gas resources in the WTP Project Area would alter the visual quality of the landscape as experienced from sensitive viewpoints, including travel routes and popular use areas. Development of up to 807 wells from 538 well pads within the WTP Project Area would result in a noticeable increase in density of gas-production facilities throughout the WTP Project Area that would constitute a significant change in the visual character of the existing landscape. In addition, the proposed development would affect the existing Visual Resource Management (VRM) designations as visual modifications would fail to meet existing VRM class objectives.

1.2 Limitations

This TSD is not an analysis of the potential impacts of oil and gas development within the WTP Project Area on visual resources. Rather, this document is intended to be used as a baseline for the analysis of potential environmental impacts. Additionally, as the proposed well locations and ancillary facilities within the EIS are conceptual, site-specific visual simulations and full contrast ratings (described in detail later in this document) are not feasible at this time. Visual simulations and descriptions of potential visual intrusions are of a characteristic nature.

2.0 VISUAL RESOURCE MANAGEMENT

The BLM is directed to manage public lands in a manner that will protect the quality of the visual (scenic) resources in accordance with section 102(a)(8) of the Federal Land Policy and Management Act of 1976 (FLPMA). The VRM system provides the BLM with a methodological approach to identify visual (scenic) resources; establish objectives through the Resource Management Planning (RMP) process or on a case-by-case basis for managing those resources; and provide timely input into proposed surface-disturbing projects to ensure that the assigned objectives are met or intrusions are sufficiently mitigated.

The VRM process consists of three stages:

1. Visual Resource Inventory
2. Establishment of Visual Resource Management Classes
3. Analysis of management actions to ensure compliance (Visual Resource Contrast Rating.

2.1 Visual Resource Inventory

The visual resource inventory process provides BLM managers with a means for determining visual resource values for the lands under their administration and is detailed in BLM's Handbook H-8410-1, *Visual Resource Inventory*. The inventory consists of a scenic quality evaluation, sensitivity level analysis, and a delineation of distance zones.

2.1.1 Scenic Quality Evaluation

Scenic quality is a measure of the visual appeal of a tract of land as determined by using seven key factors: landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications.

2.1.2 Sensitivity Level Analysis

Sensitivity levels are a measure of public concern for scenic quality and are determined by analyzing the various indicators of public concern including: type of users, amount of use, public interest, adjacent land uses, special areas, and other factors (including research or studies of the area of concern) as necessary.

2.1.3 Distance Zones

Landscapes are subdivided into three distance zones based on relative visibility from common travel routes or observation points. The three zones are: foreground-middle-ground, background, and seldom seen.

Based on the three factors described above, BLM-administered lands are placed into one of four visual resource inventory classes. These inventory classes represent the relative value of the visual resources in the planning area and their assignment formalizes the findings of the inventory process.

2.2 VRM Classes and Objectives

Visual resource classes are categories assigned to public lands to represent the relative value of the visual resources in an area. BLM VRM classes are assigned to specific landscapes and direct acceptable levels of visual intrusions within each class. Designation and management of VRM classes allows BLM to control surface-disturbing uses in a manner consistent with natural features and existing uses of an area. The specific objectives of each VRM class provide the standards for planning, designing, and evaluating actions. The four VRM class guidelines and objectives are as follows:

Class I. The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention. Class I is assigned to those areas where decisions have been made to maintain a natural landscape. This includes areas such as national wilderness, the wild component of a Wild and Scenic River (WSR), Areas of Critical Environmental Concern (ACEC) designated for scenic values, and other congressionally and administratively designated areas where decisions have been made to preserve a natural landscape.

Class II. The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III. The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Class IV. The objective of this class is to provide for management activities, which require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

2.3 Visual Resource Contrast Rating

The analysis stage of the VRM process involves conducting a visual resource contrast rating, or determining whether the potential visual impacts from proposed surface disturbing activities or developments will meet the management objectives established for the area, or whether design adjustments will be required. This process is described in BLM Handbook H-8431-1, *Visual Resource Contrast Rating.*

3.0 METHODOLOGY

Visual resource analysis involves determining whether the potential visual impacts from proposed surface disturbing activities or developments would meet the management objectives established for the area.

Visual resources analysis has an inherently subjective aspect. BLM's Visual Contrast Rating System (BLM Manual Section 8431) provides a method to evaluate activities and determine whether they conform to the approved VRM objectives. The degree to which a management activity affects the visual quality of a landscape depends on the visual contrast created between a project and the existing landscape. The contrast can be measured by comparing the project features with the major features in the existing landscape. The basic design elements of form, line, color, and texture are used to make this comparison and to describe the visual contrast created by the project.

The basic steps in the contrast rating process are:

- Obtain a project description
- Identify VRM Objectives for the project area
- Define the viewshed
- Select key observation points (KOPs)
- Prepare visual simulations
- Complete the contrast rating

4.0 ANALYSIS

Analysis of the potential impacts to visual resources associated with the West Tavaputs Plateau included a field study, analysis of available data, and modeling (defining viewsheds and generating simulations) anticipated development within the WTP Project Area. Given the extensive level of development proposed, visual simulations prepared were of a "characteristic" nature. Additionally, given the extensive level of development proposed, final contrast ratings were not completed for the project. Where necessary, detailed contrast ratings will be completed on a site specific basis during onsite inspections. Full contrast ratings will be required for development within Class I, Class II and sensitive Class III areas.

Field work associated with the analysis included site orientation; familiarization with the proposed action and alternatives; understanding the characteristics of the landscape, selection and photography of KOPs, communication and coordination with operators and agency team members.

4.1 Project Description and Setting

The WTP Project Area consists of a network of plateaus, ridges, and rugged canyons that divide the landscape. Bands of red rock cliffs are ubiquitous throughout and extend along the majority of the ridges. Many ridges extend downward off of the plateaus creating a sequence and layering of ridges that add substantial scenic variety. Vegetation ranges from that of a riparian nature in drainages, to sagebrush flats and dense pinon juniper on the ridges.

Due to the variable terrain and existing road network, there are a number of viewing opportunities from all three distance zones (foreground/middle-ground, background, and seldom seen) in the WTP Project Area. Most foreground/middle-ground views of the proposed project components would be limited to adjacent and nearby roadways. From ridgetops and benches, expansive views of background would be available.

BBC and other operators propose to develop approximately 807 wells from 538 well pads in the WTP Project Area. In addition to well pads, and extensive road and pipeline network, multiple storage areas, compressor station sites, aggregate borrow areas, and other ancillary facilities would be constructed to support natural gas development in the area. Total initial surface disturbance during development would be approximately 3,656 acres or approximately two percent of the total WTP Project Area.

Development has been going on in the WTP Project Area since the 1950s. This Draft Environmental Impact Statement (EIS) is preceded by five oil- and gas-related operations/actions and NEPA documents in the Project Area: the Stone Cabin 3-D Seismic Survey Project Environmental Assessment (EA) (UT-070-2003-15); the West Tavaputs Plateau Drilling Program EA (UT-070-2004-28); the Burris 1-10 Well and Right-of-Way EA (UT-066-97-55); the Bill Barrett Corporation Prickly Pear Bench Seven Well/ Two Pad Drilling EA (UT-070-07-003); and the Bill Barrett Corporation 2007-2008 Prickly Pear Unit Winter Drilling EA (UT-070-07-053). Those EAs evaluated impacts from seismic exploration and exploratory drilling projects designed to identify oil and gas resources within the WTP Project Area. Since the time of the Notice of Intent (NOI) filed for this EIS (August 25, 2005), natural gas development within the WTP Project Area has been ongoing based on the Decision Records for the previously described drilling EAs and through the use of the Categorical Exclusion (CX) process (authorized by Section 390 of the 2005 Energy Policy Act). Therefore, some of the well pads, roads, pipelines,

and support facilities that are proposed under this EIS have already been approved and constructed. Nonetheless, the direct, indirect, and/or cumulative impacts analyzed in this EIS include all development which has been approved and developed since the West Tavaputs Plateau Drilling EA was completed.

At the time the NOI was filed for this project, there were 71 existing natural gas wells, with their attendant service roads and facilities, within the WTP Project Area. Of the 71 wells, 37 wells were capable of production and 34 were temporarily plugged and abandoned. **Figure 1** shows pictures of typical existing development in the WTP Project Area.

4.2 VRM Objectives for WTP Project Area

The existing Visual Resource Inventory (VRI) classifications for the WTP Project Area are based on an inventory conducted for the entire Price Field Office (PFO) subsequent to the publication of the Price River MFP (BLM 1984a). Changes in resource conditions since the inventory include new facilities and increased visitation. Regardless the amount of change, each VRM class must meet that class objective or an amendment to the existing land use plan (Price River MFP) would be necessary. **Table 4-1** summarizes the acres of each VRM Class present in the WTP Project Area.

Table 4-1. Existing VRM Class Designations within the WTP Project Area

VRM Class	Acreage
Class I	36,832
Class II	69,085
Class III	30,083
Class IV	423

As shown on **Figure 3.16-1**, Nine Mile Canyon, the lower portions of Harmon, Dry, and Cottonwood Canyons, and visible cliff faces from Nine Mile Canyon are managed as VRM Class II. Bench areas and upper portions of Harmon, Dry, and Cottonwood Canyons are managed as VRM Class III. The WSAs in the WTP Project Area are managed as VRM Class I. Desolation Canyon National Historic Landmark (NHL) is also managed as VRM Class I (one mile on each side of the Green River from Nine Mile Canyon to Florence Creek).

Some oil and gas-related and other human-produced features are in non-compliance with the VRM Class I and II standards that currently exist in the WTP Project Area.

4.3 Viewshed Analysis

The term “viewshed” typically refers to the landscape visible from a specific viewing location and is established based upon topographic mapping and sight-line projections. The viewshed is determined by the existing topography and the viewing angle. A GIS-based viewshed analysis was conducted to determine those areas that could potentially be seen by visitors along major travel corridors throughout the WTP Project Area. The analysis utilized U.S. Geologic Survey (USGS) 10-meter resolution Digital Elevation Model (DEM) data.

The major travel or recreation corridors through the WTP Project Area chosen for the analysis included:

- Nine Mile Canyon
- Cottonwood Canyon
- Dry Canyon
- Harmon Canyon
- Desolation Canyon
- Jack Canyon
- Cedar Ridge
- Jack Ridge
- Horse Bench

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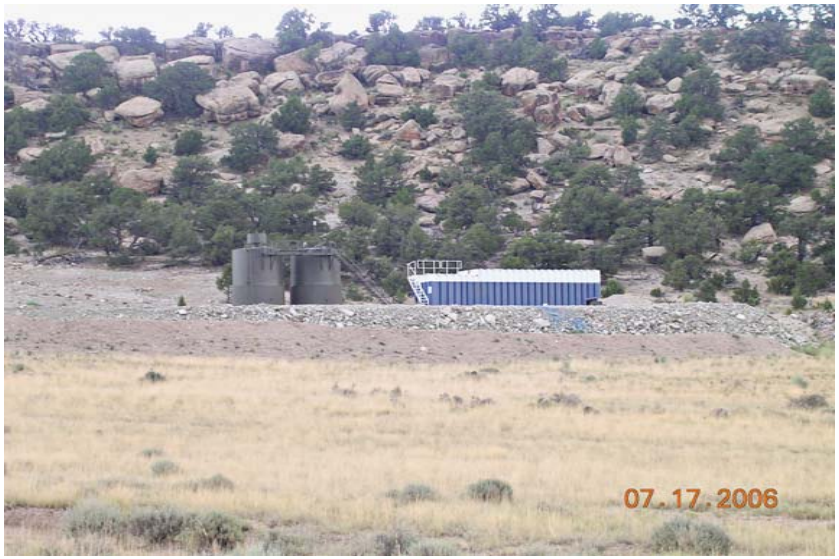
Figure 1. Existing Development within the WTP Project Area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The GIS analysis projects a "line of sight" from the corridors into the adjacent landscape. The results of the analysis show portions of the surrounding landscape that are visible from each of the travel corridors. Locations of proposed well pads, access roads, pipelines, and facilities were overlaid to identify areas of development potentially visible from each of the travel corridors. GIS-based viewshed modeling has inherent limitations, the most evident of which is the lack of vegetative cover information contained in digital elevation models. From any given vantage point, the view of the development may be obstructed by vegetative cover such as trees. In addition, the resolution of the DEM (10 meters) likely excludes additional topographic features, which would effectively screen the proposed site locations from view of the casual observer.

For each travel corridor, a map was generated showing the areas that would be potentially visible, including all development under the Proposed Action (**Figures 3.16-2** through **3.16-11**).

The principal viewing corridor and the area of greatest visitor density is along Nine Mile Canyon Road. The lower reaches of Harmon, Prickly Pear, Cottonwood, and Dry canyons also receive moderate visitor usage. The only project elements visible from Nine Mile Canyon would be the wells and associated facilities proposed within the canyon itself, which would be primarily located on private lands. No development would be visible from the lower reaches of Dry, Cottonwood, Harmon, or Prickly Pear Canyons. In addition, only three well pads would be visible from the Green River corridor (in the background viewing distance) in Desolation Canyon**,** which is another area of high viewer sensitivity**.**

Within the upper portion of Dry Canyon, only the development proposed within the canyon itself (21 well pads and associated facilities at maximum development) would be visible from the Road. Within Jack Canyon, only the development proposed within the canyon itself (9 new well pads at maximum development) would be visible from the road.

From Flat Iron Mesa Road, a limited amount of development (approximately 30 new well pads at maximum development) would potentially be visible to the casual visitor. However, this route receives very limited non-industrial use.

While the Horse Bench Road is not currently a widely used travel way, vast amounts of land can be seen from the bench. From Horse Bench, an estimated 213 new well pads would be visible, primarily in the foreground/middle-ground distances but in the background distance as well.

Prickly Pear Mesa also offers broad views of the WTP Project Area. However, this travel route receives very little non-industrial use as it provides very limited access to other parts of the WTP Project Area.

Finally, views into the Jack Canyon and Desolation Canyon WSAs are best provided by the routes along Jack Ridge and Cedar Ridge. Approximately 57 new well pads (at maximum development) would be visible from along the Jack Ridge Road and approximately 80 new well pads (at maximum development) would be visible from along Cedar Ridge Road. Not all well pads that would be visible would be located within the WSAs.

4.4 KOP Selection

KOPs were selected throughout the WTP Project Area using a combination of field visits, viewshed analysis, and local knowledge of the area. Among the initial KOPs selected were the Daddy Canyon developed recreation facility, the Great Hunt Panel, and numerous cultural sites

along Nine Mile Canyon that receive frequent visitation. All of these KOPs were dropped from further consideration following the viewshed analysis which revealed that new development within the WTP Project Area would not be visible from any of the fore mentioned sites.

Key observation points brought forward for analysis were selected to best represent the various components and land types of the Proposed Action and alternatives. KOPs were chosen to provide a representative view of the WTP Project Area (e.g., canyon bottoms, ridge tops/benches, and views into side canyons). Visual simulations were prepared from each of the chosen KOPs to depict how the construction of natural gas facilities would change the visual landscape at representative KOPs. Construction equipment, drilling and completion supplies, and human activity that would also visible to the casual viewer are not depicted in the simulations.

4.5 Visual Simulations

Visual simulations were prepared from four KOPs representing the most common landscape types and views within the WTP Project Area. The simulations are included as **Figures 2** through **5** below.

4.6 Contrast Rating

Due to the extent of the level of development proposed and the representative nature of the visual simulations prepared, contrast ratings were not performed for the project at this time. However, as previously determined by the BLM, contrast rating forms would be completed for all proposed wells located in Class I, Class II, and sensitive Class III areas. Additional contrast ratings will be performed during onsite inspections and recommended mitigation measures will be determined at that time.

Figure 2. KOP 1, Canyon Bottom

Existing Condition

Simulated Development

Figure 3. KOP 2, Canyon Bottom

Existing Conditions

Stimulated Development

Figure 4. KOP 3, Ridge/Bench

Existing Condition

Simulated Development

Figure 5. KOP 4, Ridgeline looking to Background

Existing Condition

Simulated Development

5.0 CONCLUSIONS

Impacts would be considered significant if the landscape, as seen from sensitive viewpoints is substantially degraded, or if modifications to the landscape are inconsistent with the VRM classification requirements prescribed by the BLM. As previously discussed, this TSD does not discuss impacts associated with proposed development. Rather, the TSD provides a baseline for an impact analysis in the WTP Full-Field Development EIS.

6.0 DESIGN TECHNIQUES AND MITIGATION MEASURES

There are numerous design techniques that can be used to reduce the visual impacts from surface-disturbing projects. The BLM divides the techniques into two categories; design fundamentals and design strategies.

6.1 Design Fundamentals

Design fundamentals are general design principles that can be used for all forms of activity or development, regardless of the resource value being addressed. Applying these three design fundamentals would mitigate some visual impacts:

- Proper siting or location
- Reducing unnecessary disturbance
- Repeating the elements of form, line, and color

Choosing the proper location for a proposed project or project component is one of the easiest design techniques to understand and apply, and one that will normally yield the most dramatic results. In general, locating visual intrusions as far away from prominent viewing locations as possible is the best design strategy because visual contrasts or impacts decrease as the distance between the viewer and the proposed development increases. Using both topographic features and vegetation for screening is also a good design strategy as is designing the shape and placement of project features to blend with topographic features and vegetation patterns.

As a general rule, reducing the amount of land disturbed during the construction of a project reduces the extent of visual impact. When possible, facilities should be consolidated on the same site or within the same ROW. Utilities should be placed underground when possible or along existing roads.

Every landscape has the basic elements of form, line, color, and texture. Repeating these elements reduces contrast between the landscape and proposed development and results in less of a visual impact.

6.2 Design Strategies

Design strategies are more specific activities that can be applied to address visual intrusions. Common design strategies include:

- Color selection
- Earthwork
- Vegetative manipulation
- Structures
- Reclamation/restoration
- Linear alignment design considerations

Most of the time, color selection will have the greatest impact on the visual success or failure of a project. Strong contrasts in color create easily recognizable visual conflicts in the landscape. Natural surfaces are generally well-textured and have shading and shadow effects which add depth. Surfaces of natural gas facilities are generally smooth and tend to reflect light, even when matte-finish paints are used. Therefore, as a general rule, colors on smooth man-made structures should be painted two or three shades darker than the background colors to compensate for the shadow patterns created by naturally textured surfaces that make colors appear darker. With this in mind, the color selection for all structures should be made to achieve the best blending with the surrounding landscape, both in summer and in winter.

The scars left by excessive cut and fill activities during construction, especially in western landscapes where underlying soils tend to be substantially lighter in color than surface soils and surrounding landscape elements, often result in long-term visual contrast. Fitting the proposed development to the existing landforms in a manner that minimizes the size of cuts and fills will greatly reduce the visual impacts from earthwork. Shaping cuts and fills to appear as natural forms and blending slopes to match existing landforms will also help reduce the visual contrast. Retaining existing rock formations, vegetation, drainages, etc whenever possible is another measure.

Another effective method of reducing the visual impact from a proposed activity or development is to retain as much of the existing vegetation as possible. Where practical, it is also good to use the existing vegetation to screen the development from public viewing areas. Straight line edges should be avoided. Feathering or thinning the edges of cleared vegetation will reduce strong lines of contrast.

Strategies for restoration and reclamation are very much akin to the design strategies for earthwork, as well as the design fundamentals of repeating form, line, color, and texture and reducing unnecessary disturbance. The objectives of restoration and reclamation include reducing long-term visual impacts by decreasing the amount of disturbed area and blending the disturbed area into the natural environment while still providing for project operations. All areas of disturbance that are not needed for operation and maintenance should be restored as closely as possible to previous conditions. Topsoil should be stripped, saved and replaced as possible on disturbed earth surfaces and vegetation should be enhanced.

Finally, projects and activities associated with linear alignments, including roads and pipeline developments, can be made to contrast less with the natural environment primarily with proper placement. Topography is a crucial element in alignment selection. Visually, it can be used to subordinate or hide manmade changes in the landscape. Locating projects at breaks in topography or behind existing topographic or vegetative features can reduce impacts.

6.3 Mitigation Measures

The following are recommended mitigation measures designed to reduce visual impacts during construction and to assist in successful long-term reclamation.

- Either the BLM or the proponent(s) should contract a licensed landscape architect for on-site construction monitoring, inspection, and supervision of visual mitigation and environmental protection measures such as recontouring of landform to approximate natural conditions and berming, revegetation and introduction of screening vegetation, pipeline texturing and coloring (where appropriate), and other measures mentioned below and elsewhere in this document.

- Trenching equipment should be used for pipe burial to reduce overall impact to existing vegetation and landform.
- Excavation for pipeline installation should be limited to a narrow trench to install the pipe, thus reducing the width of disturbance to as narrow a corridor as possible. This may be especially appropriate in riparian areas and areas where equipment can be brought in with minimal damage to the landscape.
- Where appropriate, brush-hogs or similar equipment should be used to minimize impact to vegetation and enhance re-growth and revegetation potential.
- Edges of disturbed areas should be feathered by creating a vertical transition from taller to shorter vegetation along disturbed edges.
- The width of disturbance should be varied, where possible, and some plant masses should be preserved to create a more naturally appearing edge, thereby avoiding straight, sweeping, and converging lines in the landscape.
- Overall width of surface disturbance should be reduced, where possible, by working with equipment on the road, and taking advantage of the access already provided by the roadway.
- A revegetation plan should be implemented that includes the installation of shrubs and tubelings, thus establishing larger caliper plants early in the process.
- Rocks and downed vegetation should be used to "break up" new textures created by disturbance and exposure of soils, and to provide "planting pockets" for the establishment of new plant materials.
- At stream crossings, all equipment should be kept away from the edge of escarpments and stream banks, thereby minimizing impacts to the escarpment edge. These edges should be pre-constructed using vegetative or mechanical methods.
- Easily established and fast-growing shrubs should be used in seed mix and as tubelings.
- All disturbed surfaces should be recontoured to more natural appearing landform, similar in topography to pre-disturbance and surrounding landscape.
- Soils should be prepared for proper revegetation and environmental protection measures should be implemented for revegetation and erosion control.