

#### IV. FOREST SERVICE REQUIREMENTS

The following responsibilities, procedures, resource inventories, and study programs are those which the Manti-LaSal National Forest will require for leasing of Forest lands for coal mining, exploration, or for coal mine plan approval. These are, in part, requirements of laws and regulations of the Department of the Interior and, in part, requirements of the Forest Service. Those required by the Department of the Interior are not referenced and may not be included in their entirety or have the same specific requirements. It is not intended that this program plan supersede in whole or in part requirements of the Department of the Interior. The programs are intended to generate the data we have determined essential for responsible multiple resource management. The operator would be responsible for those parts where data are needed to determine the effects of mining upon surface resources.

All programs to monitor the effect of mining on surface and subsurface resources will be applicable to existing leases (in all stages of development) and future leases. Accumulation of data pertinent to coal mining studies will occur at all stages of lease development.

##### A. Tract Leasing

Prior to leasing of any land on the Manti-LaSal National Forest for coal mining, the preparation of a site specific Environmental Assessment (EA) will be required. This assessment is the process by which the Manti-LaSal National Forest will determine a tract's suitability for leasing and is the approval document for coal land leasing. The Forest Service will be responsible for its preparation. The Technical Examination required to obtain the essential data for the EA will be performed by the Forest Service in cooperation with the U.S. Geological Survey and Office of Surface Mining. Data would be obtained by the Forest Service, U.S. Geological Survey, Bureau of Land Management, State, and other agencies as needed.

The Technical Examination will include an inventory and description of surface resources and uses; and will include the requirements given in items 1 through 9 below. These requirements, however, are not intended to be of a detail as to establish baseline data for the requirements of resource monitoring as specified in item C. for mine plan approval. They will, however, include sufficient detailed data to make an assessment of the compatibility of a coal lease tract with other resource elements, uses, determining the tract's leasability, an evaluation of probable impacts of mining the tract upon the environment, and for developing of lease stipulations.

The requirements for the Environmental Assessment will include the following information:

1. A description and assessment of the existing environment, including wildlife, vegetation, hydrology, soils, topography, geology, mineral occurrence, recreation, visual quality, historical, archeological, surface structures, and other resources as may be appropriate, will be required. This report also would include an assessment with regard to areas which may not be available for leasing, i.e., wilderness, withdrawals, threatened and endangered species, special uses, oil and gas fields, pipelines, reservoirs, and other surface features as may affect human safety.
2. A preliminary geologic map of an acceptable scale that will include faults, folds, joint systems, geologic formations, and significant surface geologic features, such as landslides and unstable slopes, is required.
3. A topographic map. This would properly serve as the base map for 2 and 4. Currently, existing color resource photography would supplement the topographic map for making the inventory and assessments.

4. A preliminary inventory of known ponds, reservoirs, springs, seeps, and significant wet areas will be recorded on a map. Flows will be estimated.
5.
  - a. A preliminary assessment of the surface hydrology that will include climate, precipitation, flooding, and descriptions of the stream(s) and drainage systems.
  - b. A preliminary assessment of the ground water geohydrology. This would include item 4 above, with a description as necessary. In addition, it will include an appraisal of the importance of each item listed and described to Forest management and will furnish estimated flow quantities and, where appropriate, the water quality. This would also include a description of the water source (i.e., seeps, springs, wells, etc.) in relation to topography, geologic conditions, vegetation, and other resources as may be appropriate.
6. Existing transportation and utility corridors, and possible future corridors, should be located and recorded on maps. Each should be accompanied by a detailed description.
7. Existing roads, existing mine portals, possible mine sites, oil and gas wells, and the opportunity for relocation of these features should be discussed jointly with the Forest Service and Geological Survey so that any major restrictions to these activities will be brought to light early in the process.
8. An evaluation of the tract for feasibility of mining, in-place tonnage, and expected recoverability will be addressed in a report to the Forest Service by the Geological Survey. A conceptual mine plan, complete with a transportation plan, will accompany this data.
9. Any drilling (prior to leasing, done by the U.S. Geological Survey) should be required to follow exploration regulations (Part B, below).

B. Exploration

Exploration of a coal mining tract is normally performed by the lessee after the lease is obtained. Some exploration for evaluation prior to leasing may be done by the Geological Survey as required by 30 CFR 211. Exploration is performed to evaluate the value of the coal seam(s) and the geologic structure; and the lithology of the rock formations for mine planning.

Exploration is most often performed by drilling of holes from the ground surface to the coal seam(s). However, not all lessees will explore by drilling, nor is it required. New exploration methods are being developed. Presently, drilling is the method used.

When exploration is done by drilling, the following should be required of the operator:

1. A comprehensive plan of operations as required by 30 CFR 211.  
This plan should include:
  - a. A map showing the locations of the proposed activity (drill hole locations) and the proposed access.
  - b. A detailed description of drilling plans and procedures.  
This should include:
    - (1) Drill hole locations, T., R., S.
    - (2) Expected depths of drill holes.
    - (3) Proposed access routes, including a description of the requirements for upgrading, reconstruction, or construction of the access roads.
    - (4) The time frame for the drilling program.
    - (5) Surface resource protection considerations.
  - c. A reclamation plan.

2. A log from each drill hole showing the ground waters encountered. Data will be compiled and submitted by the company, giving depths and lithologies where water is encountered. An attempt will be made to quantify amounts of water in the aquifers. Each actual drill hole location will be accurately plotted on the base map or appropriate overlay.

These data, combined with the surface geologic and hydrologic data, will aid to define the ground water system. This will be used to develop the hydrologic monitoring system required by regulation, as well as to aid in identifying possible impacts to surface water sources from undermining.

Selected holes may be required to be left open for periodic water level measurements and groundwater sampling. These drill holes and intervals of monitoring will be designated by Geological Survey upon the review of the operating plan. Coordination between the Forest Service, Geological Survey, and the operator is required to determine a need for, and establishment of, hole locations and reclamation.

C. Mine Plan Approval

All mining plans for underground coal mines should include, as part of the mining plan, a study and monitoring program to determine what, if any, effects mining will have upon other resource elements and land uses. This plan or study program will necessarily include two phases; (1) establishment of baseline data for existing resource and land use elements from which any change due to mining can be measured (see stipulation #1), and (2) establishment of study programs to monitor these resource and land use elements for measurement of any change that has occurred because of the mining (see stipulation #2).

1. Baseline Data Collection

The Forest Service will require of the operator the following specific data:

- a. Water - The location and identification, including a detailed description, of water sources. This should include the topography, geology, use, flow, quality, and other data as may be necessary to define each water source. Water sources which will be inventoried include seeps, springs, wet areas, natural ponds, lakes, reservoirs, stock ponds, streams, and water wells, on and within the area of influence of the leasehold. This would include a literature search, compilation of existing data, and a field search, investigation, and description of each.

To aid in the location and identification of these water sources, color infrared aerial photography (CIR) of the proposed mine area and area of influence may be required. The main purpose for the color infrared photography is to aid in: (1) the location identification and description of all water source points, and (2) the detection and monitoring of dead or dying (stressed) vegetation due to subsurface mining activities.

Water sources, surface cracks, property corners, and other points that are not used or tied to basic project control may be photo-identified in the field by direct or precise methods. A description of the procedures using these two methods can be found in the Appendix (VIIIA).

It is expected that the infrared photography will not be required for all mine plans. The need for this photography is to be determined by the Forest Service in consultation with and concurrence of the U.S. Geological Survey and the Office of Surface Mining (OSM) on a site-by-site basis.

Each water source shall be located and plotted on the base map or appropriate overlay, giving elevation, coordinates, flow (gpm), and date flow was measured. The method used to measure the flow must be described, i.e., weir, flow meter, estimated, etc. See a. above. Measurements ideally should be quarterly for a minimum of two years and preferably longer prior to any significant mining.

It is recognized that some water sources cannot be measured at these frequencies because of heavy snow cover, intermittent flows, or difficulty of access to the area.

It is not a requirement that the targets or ground panels required for the subsidence monitoring photography appear or be visible on the CIR photography. The same scale of photography, (or degree of resolution) may not be required for detecting or interpreting images as may be required for accurate terrain measurements. However, there are several advantages in maintaining the ground panels for visibility on the CIR photography and flying all photography at the same altitude or scale. Cross correlation for interpretive comparisons and the transfer of points and data from one set to the other are but a few of these advantages.

If required, the CIR photography will be obtained with an acceptable 9" x 9" format mapping camera with an 8½" or 6" focal length and single-lens-between-the-lens-shutter system. ~~See Appendix VIII for detailed camera specifications.~~ Film will be Kodak Aerochrome Infrared 2443 (or equivalent) and will be exposed with the proper filter and camera setting as to provide the best possible image resolution and print quality. The flight dates of the CIR photography will be scheduled by individual project to obtain the optimum results for water and vegetative detection and analysis. The nominal or mean scale of this photography will not exceed 1:6000.

- b. **Geology** - A geologic map on which will be shown the rock formations, faults, folds, joint systems, dip and strikes, landslides, and other significant geologic features is required of the operator.
- c. **Manmade Features** - The location of surface and subsurface features that might incur damage by subsidence is required. This would include power transmission lines, property or land corners, pipelines (water, oil and gas, etc.), oil and gas wells, roads, dams, reservoirs, buildings, and other features as may be present. Documented descriptions, along with appropriate photographs, are required. The location of existing major highways and proposed highways should be identified. Unless otherwise specified, this information will be shown on the original topographic and/or planimetric base.
- d. **Monumentation** - A network of monuments is to be established, both over the mine or proposed mine workings and in adjacent areas not expected to be disturbed (reference monuments) by the mining operations (subsidence). Each mine or proposed mine area will require an individual control survey and targeting plan to complement the topography, access, mine layout, aerial photography coverage, and other constraints. The monuments will be constructed as survey control points for the subsidence, hydrologic, vegetative, and other monitoring study programs. The monuments will be located on a coordinate system that is the same for the mine survey and surface survey, so that surface points and the subsurface mine works can be superimposed. It is recommended that the State plane coordinate system be used as primary control for all surveys. Reference the Appendix for target or ground panel configuration and dimensions.

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e. Surface Terrain - Initial, low altitude color or black and white aerial photography of the proposed mine area will be flown at a scale such that elevations to within one foot vertically and horizontally ( $\pm 0.5$ ) can be attained by photogrammetric methods. This photography will be used for constructing the initial baseline surface map upon which potential subsequent surface subsidence will be measured and recorded. It will also provide the master base to assist in documenting changes to vegetation, topography, geology, surface structures, recreational, and land uses on the surface over undermined areas. All other map data layers will be registered to this base which will be constructed at a scale of  $1'' = 10A'$ .

See attached map specifications for symbols, etc. This map will contain the following: *in the Appendix (F3)*

- (1) Plotted horizontal positions of all control survey monuments and elevations.
- (2) Plane coordinate grid 5000' intervals.
- (3) Contours. Interval to be specified on a project by project basis.
- (4) Aerial photo centers.
- (5) Paneled section and quarter corners.
- (6) Planimetry and cultural features.
- (7) Legend.
- (8) Water sources - streams, springs, marshes, wet areas, reservoirs and lakes.
- (9) Transportation system including all existing travelways, roads, trails, railroads, etc.
- (10) Grid ticks showing the horizontal position including coordinates and vertical elevation of all terrain surface points, read photogrammetrically.

- f. Vegetation - Vegetative and wildlife inventories are to be conducted in areas subject to potential impacts. The inventories will consist of on-the-ground transects. Data will be presented in the form of a map overlay which will register to the master base. In most cases, the photography will be used for delineation of vegetative types and from which this data will be photogrammetrically transferred to its respective overlay.

The following vegetative analysis studies will be established for areas which may be affected or disturbed and will be measured as:

- (1) Permanent photo points and photo studies.
  - (2) Changes in plant species composition and vegetative trends.
  - (3) Changes in ground cover density (changes in vegetative and litter cover).
  - (4) Changes in total forage production.
  - (5) Quantification by acre of all riparian vegetation.
- g. Visual Observation - Visual observation of surface effects. Every monitoring plan will include an on-the-ground observation to document the existing (premining) condition of the ground surface, at the proposed portal, access, and over the proposed mine area (plus angle of draw).
- h. Precipitation Gages - Installation of precipitation gages at the mine site. A qualified hydrologist will supervise the site selection and the installation of the gages.
- i. Seismic Events - Natural seismic events. All such events that may occur over mine areas shall be documented. It would include a documentation of each event, its magnitude, intensity, epicenter location, date of occurrence, any resulting underground or surface disturbance, and its probable intensity at the mine site.

## 2. Study Programs for Resource Monitoring

The Forest Service will require of the operator the following specific monitoring plans:

- a. Subsidence Monitoring - Color aerial photography will be required initially for baseline data collection. Subsequent flights will be annual and will cover the area mined and the area to be mined in the next 18 months (plus the angle of draw) on the entire lease area, as may be appropriate. A 30-percent overlap of flight lines and a 65-percent overlap of photographs will be required. The photography will be flown at a scale that will produce elevations accurate to within one foot ( $\pm 0.5$ ). Unless otherwise approved, the nominal or mean scale will be 1:4800 for an 8½" focal length camera and 1:6600 for a 6" focal length camera. The criteria being that vertical photogrammetric measurements should be obtainable to 1/10,000 of the flying height. Both scales and respective focal lengths theoretically equal .33 feet. The vertical margin should allow for some residual reading errors.

Aerial photography will be evaluated each year for determining the location and magnitude of subsidence. It will be supplemented by surveys for subsidence evaluation.

The aerial photography will not only serve for subsidence monitoring, but will aid in interpreting and documenting changes to vegetation, topography, geology, hydrology, recreational uses, wildlife use, range use, and surface structures. Prints of the color aerial photography will be furnished to the Forest Service by the operator of the initial flight and of each annual flight as requested. "Pugged" diapositives of the baseline flights will also be furnished, along with control coordinates as requested.

Monuments established for the initial flight will be properly paneled each year prior to each annual flight. For required dimensions and suggested materials, see Figure 2.

Visual Observation of Surface Effects. An on-the-ground visual inspection will be made each year of the condition of the ground surface above all underground mine workings (plus angle of draw). This survey should attempt to locate, photo-identify and document the presence of tension cracks, fissures, structural offsets, and obvious subsidence damage to buildings, roads, powerlines, pipelines, railroads, dams, reservoirs, or other features. The hydrologic monitoring program will assess changes in spring flows, streams, groundwater levels, etc. Photographs, as well as written documentation, will be required.

An annual field inspection of all unstable areas will be made for evidence of renewed movement. Unstable areas would include landslides, escarpments, etc. These will be documented with photographs, written descriptions, and maps.

A continued documentation of seismic events will be maintained throughout the mine life. These data are available from State and Federal agencies.

- b. Hydrologic Monitoring - The monitoring for water quality and quantity will be of representative sources selected from the baseline inventory. Time intervals and methods of monitoring will be determined on a site specific basis. Representative sources and specifics of the requirements for monitoring will be determined by coordination of the operator, Forest Service, and Geological Survey. Requirements for sampling, measuring of flows, and testing are defined by the Geological Survey

guidelines. Those water sources not designated for detailed monitoring within the affected area where subsidence might reasonably be expected to occur will be visually evaluated annually.

Frequent recording and quantification (where possible) of water encountered in the mining operations will be required. Sufficient measurements of major seeps of flows within the mine should be made to determine any trends in flow and quality. Location of the flow should be documented and a description should be made of the geologic structure where such waters are produced. This would include such features as faults, joints, sandstone beds, wet coal, etc.

Mine water discharge must be sampled and analyzed as required by EPA and State regulations. In addition, mine water discharge will be measured for volume, and the moisture content of the coal will be measured.

Infrared aerial photography as required will be repeated once every five years, or more frequently if needed. This will be for the mine area, plus the area to be mined in the next five years. Prints of the initial flight will be furnished upon request.

The precipitation gages required by l.h. will be monitored daily. Data will be furnished the Geological Survey and Forest Service monthly.

- c. Vegetative and Wildlife Monitoring - The plots (on-ground transects) established for the baseline inventory will be permanently identified on the ground. They will be reevaluated at 3- to 5-year intervals throughout the mine's life. Shorter intervals may be required at some sites. The data

will be presented in the form of a map having a scale of 1:4800. It would be expected that the aerial photography would be used for this study and would serve as the base map.

- d. Visual and Recreation Monitoring - Monitoring of visual resources will include a visual inspection at least annually and more frequently if required. This inspection will include a photographic and map record, as well as written. It will document the visual changes in an area from installation of mine facilities, roads, and traffic of these facilities. It would address such items as portal areas, roads, conveyor lines, streams, slopes, escarpments (i.e., rockfalls), slope failures, excessively eroded areas, etc.

Monitoring of recreation resources will include defining of changes in an area's use by recreationists as is affected by the installation of a coal mine. This would include fishing, hunting, camping, hiking, etc. Of particular importance to this monitoring program would be the affect of the increased truck traffic on the roads.