CHAPTER IV

MITIGATING MEASURES

Air Quality

All activities having an adverse effect on air quality must comply with state and federal air quality standards (Part I, Chapter VI). Stipulations will be included in the approved mining plan requiring such compliance.

Watering of haul roads in the mining area, dust-control measures incorporated in the design of crushing, storage and loading facilities, and enclosed conveyors in the secondary crushing plant will be used to reduce coal dust emissions. Control devices will be used on vehicles and equipment to reduce gaseous and particulate emissions.

Coal fire occurrence will be reduced by keeping the area free of piles of loose coal. Use of fire prevention campaigns will minimize the frequency of fires. Firefighting equipment will be required on the site.

Immediate revegetation (topsoiling, seeding and fertilizing) of spoils will be used and this will reduce short-term air pollution from blowing dust. Storing of initial topsoil and initial boxcut overburden with rough and uneven surfaces will reduce the amount of windblown dust.

Topography

The mining and reclamation plan filed with the Federal Government, in conjunction with federal regulations, state laws, and the coal lease terms, requires actions to mitigate adverse topographic effects of surface mining. Spoils will be graded to a rolling topography with no slopes greater than 3:1. Highwalls will be reduced. The final pits will be filled with material from adjacent spoil banks and highwalls. The spoil banks, highwalls, and final cuts will then be covered with a layer of soil material to facilitate revegetation. All exposed coalbeds will also be covered by at least three feet of soil material.

The restored landform shall be determined by consultations among the lessee, the appropriate land management agency, the State Lands Commission, and the U.S. Geological Survey. Such consultations will be frequent enough so as not to impede the progress of the mining or reclamation. Prime consideration in grading and shaping shall be the catching and holding of any waters falling on the area to improve the water table and catch and hold sediment in such a manner as to protect downstream areas from excessive sedimentation. During the shaping of the spoil into the final landform, no closed interior ponds should be permitted to form.

Soils

Impacts to soils can be minimized by including and enforcing protective stipulations in the federal authorizations.

Application of certain land treatment practices will minimize loss of topsoil and productivity; disruption of physical, chemical and biological properties; soil loss by wind and water erosion; and compaction. Mitigating measures will include: stockpiling of topsoil for later replacement on disturbed areas, cuts and fills. Mechanized equipment such as scrapers will be used to minimize soil mixing.

Ripping and cultivating the soil surface prior to seeding will minimize soil compaction effects. Restriction of unnecessary off-road vehicle use by equipment operators and employees will minimize soil compaction.

Soil erosion will be minimized by mulching, revegetation and development of water erosion structures including water bars, terraces, contour furrows, grassed water ways and interceptor ditches to divert running water away from unprotected disturbed areas. Wind erosion will be minimized by roughing up smooth exposed soil surfaces with a disc, harrow or similar equipment immediately after clearing is completed. Seeding or revegetation will be accomplished within one year after clearing of vegetation.

Detailed soil inventories will be provided by Carter Oil Company. The inventories will be conducted in accordance with standards designated by the Bureau of Land Management to map and identify each soil series situated within the lease area. Soil samples will be collected to a depth of 60 inches or bedrock for physical and chemical analysis. Chemical tests will include organic matter, pH, exchangeable sodium percentage, boron, sodium, chloride,

calcium, selenium, nitrogen, phosphorous, potash, sulfur, base saturation, cation exchange capacity, and conductivity. Physical tests will include standard soil mechanical analysis and engineering properties. Soil mineralogy and moisture relationships will be determined. Additional soils information will be collected after topsoil has been replaced and before seeding to determine profile, chemical, mechanical and mineralogy changes in the upper 60 inches.

Samples from overburden formations down to the coalbed will be collected for chemical tests to determine presence or absence of toxic or undesirable elements or material. Results from current or past research studies on revegetation and reclamation of disturbed areas will be applied in treating the disturbed onsite and offsite areas.

Construction designs will include mechanical treatment practices such as contour furrows, terraces and mulching to retain moisture onsite to benefit revegetation and reduce soil loss. Design will include control measures such as diversion ditches, water ways and water spreaders to reduce sediment yield and runoff from compacted areas or concentration of runoff waters. Studies and investigations are necessary to identify productive downstream soil units that are presently sustaining desirable vegetative communities from being deprived of soil moisture.

Disposal areas for solid and liquid wastes will be located upon sites that will not have detrimental effects upon the environment and in accordance with state and federal regulations. Service haul roads; material sites for sand, gravel ballast; campsites; and equipment storage areas will be cleaned up, scarified, rehabilitated to near natural condition and revegetated. The edges or vertical sides of all excavated material sites

and borrow areas will be sloped to a minimum 3:1 slope to minimize sloughing and enable revegetation. Contingency plans must include measures to cleanup accidental spillage of detrimental or toxic materials such as gasoline, oils, and chemicals and to restore damaged soil to a near natural condition.

Service and haul roads that are susceptible to producing dust and sediment will be surfaced or treated with a binder of water. Chemical binders, surfacing materials and use of herbicides must meet state and federal approval.

Availability of water from deeper aquifers

Water-well supplies affected by lowered water levels in the radius influenced by dewatering for mining could be replaced by deeper wells. The chemical quality of water in the Fort Union Formation is similar or of better quality than water in the overlying Wasatch Formation.

Monitoring programs

Monitoring programs are being established by companies planning to mine coal. A number of the monitoring programs are being planned in consultation with the Water Resources Division of the U.S. Geological Survey. The programs consist of establishing observation wells to determine water-level fluctuations in the coal and the overlying overburden. Water samples will be collected to determine the chemical quality of the water for detecting changes in water quality after mining begins. As mining progresses, observation wells will be established in backfill areas to monitor for leaching and movement of toxic materials.

Vegetation

The loss of vegetation on land disturbed by coal mining and related activities will be mitigated by satisfactory revegetation. Initial measures will be started within one year following reshaping of the land and replacing of topsoil. Revegetation efforts will continue until a satisfactory stand of vegetation is established that will grow without irrigation.

Plans to revegetate disturbed land will be approved by the administering agency. Stipulations will be developed and included in the mining plan to meet the revegetation objectives. Additional stipulations that will be considered are listed below.

Damage to native vegetation will be minimized by maintaining the acreage of disturbed areas (powerline right-of-way, railroad spur right-of-way, roadways, coal processing and transporting facilities, buildings, etc.), to an absolute minimum.

Depositon of dust and harmful chemicals on vegetation will be reduced by watering haul roads and installation of dust suppression controls on mining, transporting, processing and loading equipment.

Completion of a detailed vegetation survey (currently being conducted for Carter by personnel from the University of Wyoming) will provide protection for important plant communities on or adjacent to the coal property area.

Archeological Preservation

Legislative authorities and obligations which guide issuance of federal license to develop the Powder River coal resources are the statute commonly referred to as Antiquities Act of 1906 (34 Stat. 225, 16 U.S.C. 431-433); Wyoming statutes relating to archeological and paleontological sites (sections 36-11 to 56-13 and 18-330.7 W.S. 1957); Wyoming Environmental Quality Act of 1973 (Section 35-502.12(a)(v)); an act for salvage at reservoir sites (74 Stat. 220; 16 U.S.C. 469-469c); an act for historic preservation (80 Stat. 915, 16 U.S.C. 470-470m); National Environmental Policy Act of 1969 (83 Stat. 852, 42 U.S.C. 4321 et seq); and Executive Order 11593, May 13, 1971 (36 F.R.-8921).

Both federal and state antiquities acts regulate antiquities excavation and collections, and both protect historical values on public lands. They provide for fine and/or imprisonment for violators of their provisions. The Wyoming Environmental Quality Act protects areas of the state designated unique, irreplacable, historical, archeological, scenic or natural. The reservoir salvage act provides for recovery of historical and archeological data from areas to be inundated by certain water impoundment as a result of federal action. The Historic Preservation Act established a system of historic preservation in the nation and requires that certain federal undertakings be submitted for review by the National Advisory Council on Historic Preservation. NEPA states in Section 101(b)(4) that one objective of national environmental policy is to "preserve important historic, cultural and natural aspects of our national heritage and maintain, wherever possible, an environment which supports diversity and variety of individual choice." Finally, Executive Order 11593 affects federal agencies most intimately in that they are instructed to cooperate with the nonfederal agencies, groups, and individuals and to insure that federal plans and programs contribute to the preservation and enhancement of nonfederally owned historic and cultural

values. Agencies are directed to inventory, evaluate and nominate properties in their jurisdiction to the National Register of Historic Places.

Under the mandate of the Executive Order, federal agencies must insure that until inventories and evaluations are completed, the agencies will use caution to assure that federally owned properties which might qualify for nomination to the National Register of Historic Places are not inadvertently transferred, sold, demolished, or substantially altered and that federal plans and programs contribute to the preservation and enhancement of nonfederally owned sites.

The Antiquities Act of 1906 prohibits damage or excavation of plant and animal antiquities on federal lands without a permit (see 43 CFR Part 3). The Wyoming statutes require that permits be obtained before excavation of any archeological or paleontological deposits on either state or federal public lands (sec. 36-11 W.S. 1957).

Archeological and paleontological values on federal lands will be protected by surveys and salvage excavations. The Wyoming Antiquities Act similarly requires a permit for excavation of antiquities on public lands, permission to be granted by the State Board of Land Commissioners.

The Wyoming Environmental Quality Act requires approval of any application for a mining permit under the provisions of Section 35-502.24 (g)(iv) of this Act to assure that "...the proposed operation will not irreparably harm, destroy, or materially impair any area that has been designated by the Council to be of a unique or irreplaceable, historical, archaeological, scenic or natural value."

Surface surveys for evidence of archeological values in the alluvium are fundamental to establishing responsible stipulations for their protection. Therefore those stipulations in the mining plan and/or permit that require surveys will be followed to insure archeological and paleontological protection.

No mining plans, permits or rights-of-way will be approved until the company has coordinated its archeological surveys with the Wyoming State Historic Preservation Officer. Company survey reports will be submitted to the State Historic Preservation Officer with a copy to agencies approving plans and permits. The report will be certified by the Preservation Officer and forwarded to the approving agencies with a statement that surveys have been conducted by competent, professional archeologists and a recommendation for additional surveys to be required before plans and permits are approved. These additional surveys may be necessary if surface evidence indicates further evaluation is necessary. In addition, approvals will be conditioned to require notification to the Area Mining Supervisor of all archeological and paleontological sites discovered during mining prior to disturbance and notification to the appropriate officer of the surface administrating agency of sites discovered during right-of-way construction prior to disturbance. The Antiquities Act of 1906 and Wyoming statutes make it unlawful to excavate sites which are discovered without a permit.

Furthermore, it will be required that the alluvium to be displaced during the mining operation be surveyed and that all surveys be coordinated with the Wyoming State Historic Preservation Officer to insure competent, professional inventories, salvage, and preservation of archeological and paleontological data.

It is recommended that all present and future applicants share in the cost of establishing a full-time resident basin paleo-archeologist under the supervision of the Wyoming State Historic Preservation Officer. The basin archeologist will aid in reducing lead time and development delays by performing advance surveys for support facilities, educating construction employees, sampling soils, responding to company discoveries, and conducting salvage work.

Historical Values

According to the Wyoming State Historic Preservation Officer, the possibility always exists that new information may be discovered that could place a value on previously unimportant sites. If this occurs, the appropriate acts shall be used to determine the course of action to be taken by the agency having jurisdiction on the land.

Aesthetics

The Carter mining plan will contain stipulations guided by Departments of Interior and Agriculture visual resource standards. Plant silos and powerlines will be designed to blend with natural landscape to the extent possible.

Probably the most critical factor in reducing the impact of a lineal project is its location in relation to naturally occurring lines in the landscape. Lineal projects will be located where natural lines already occur, following contours, depressions and avoiding a crossing at the crest of a hill.

Topsoil will be stripped off and replaced over reshaped natural land forms. Native grasses and shrubs will be seeded to hasten the return to natural unbroken patterns in the vegetation. Plantings will be irregularly seeded to break the unnatural lines of construction. Disturbed areas will be kept to a minimum and highwalls back sloped to a maximum of 3:1. Non-reflective materials will be used on transmission lines, towers, buildings, silos, conveyors and crushers, e.g., unpainted concrete on the silos.

Wildlife and Fish

Measures which will result in mitigation of impacts on some wildlife species are primarily those which will come about as result of attempts to reestablish grasslands for livestock forage and watershed protection. Carter Oil Company has purchased over 90 percent of the surface lands in their development area. They have stated that they may go into the ranching business after mined lands have been reclaimed. The existence of legal authority to require private landowners to restore specific types of habitat or specific amounts of key or crucial habitat is doubtful. Should existing laws and regulations be interpreted as imparting some authority to require the above, their effectiveness and enforceability would be equally open to serious question. In short, existing legal authority cannot be expected to insure mitigation of most specific losses where the mitigation may conflict with the interests of private landowners. Existing state and federal air, water and land quality laws will insure some mitigation of impacts through broad requirements of revegetation, non-degredation of water quality and reduction of gross air pollution. These legal authorities, if enforced, may significantly reduce total and long-term impacts on animals such as fish, waterfowl, and some birds, rodents and invertebrates. They can be expected to have only slight mitigating effects on total impacts on other species.

Opportunities for mitigation of wildlife losses, as opposed to legal requirements for mitigating are more available. Serious attempts to provide a variety of topography, reestablish shrub and riparian land ecosystems and expand aquatic habitats could be expected to meet with sufficient success to mitigate at least part of total long-term impacts on a variety of species. Due to the nature of mining operations and the long time period required to reestablish

these vegetative types their mitigation would be little realized before the end of the study period (1990).

A variety of native species representing shrub, forb, and grass groups should be well represented. Palatable varieties of big sagebrush and rabbitbrush as well as skunkbush sumac, chokecherry, and juniper would help mitigate losses of deer, antelope, sage grouse, sharptails and non-game species. Varied topography would increase habitat diversity and result in greater variety and abundance of wildlife.

Right-of-way fencing and other fencing barriers and hazards to deer and antelope movement could be reduced by using less fencing, using fences passable to antelope and deer and using various crossing structures. These measures should be planned and located on the ground with the State Game and Fish Department as the development proceeds.

Ponds or lakes created as a "by-product" should have irregular shorelines and islands to create the maximum amount of shoreline. Some shorelines should slope gradually to provide shallow, marshy areas and encourage emergent vegetation while others should have steeper shorelines to discourage emergent vegetation, thus increasing diversity. Shallow ponds would have the greatest value for waterfowl and deeper ponds the greater value for fish.

Reestablished riparian vegetation along drainage courses and around aquatic habitats would eventually result in reestablishment of many animals associated with this habitat type (Table 11, Chapter V, Part I).

Potential also exists to enhance offsite habitat which would offset losses created by mine development.

Recreation

If any requests for water impoundments are made on the Carter lease covering federal lands or minerals in areas of important cultural and recreation values, impact assessment and protection can be given through the authority granted by the Reservoir Salvage Act of 1960 and the National Environmental Policy Act of 1969.

If a reservoir planned for construction covers federal surface or mineral and has for its use, water designated for another federally approved project, it will be assessed under the requirements of the National Environmental Policy Act and salvage requirements under the Reservoir Salvage Act. If cultural values are located the "criteria for effect" under Section 106, of the National Historic Preservation Act and Section 2b of E.O. 11593 will be initiated by any federal agency joined in the project.

Where scenic, historic, and recreation values are impacted, either on or adjacent to federal land, it will be required that agencies constructing new federal aid highways study locations and alignments that complement these resources as stated in the Federal Aid Highway Act of 1973.

The Carter mining plan, in conjunction with land reclamation, will insure enhancement of any planned lakes or ponds by providing stipulations for shorelines and slopes that improve fishing and waterfowl nesting. These will improve sightseeing and hunting opportunities for area residents.

Agriculture

Livestock grazing

Measures that may be taken to minimize the affects of mining on livestock grazing should be initiated at the appropriate stages of the mining procedure.

Coal to be produced will require between 70 and 150 acres be taken out of forage production annually. Temporary fences should be erected around the areas actively involved in mining so the remainder of the area will be available for livestock use and hazards from highwalls and mining equipment to livestock will be minimized.

Topsoil will be stockpiled in sufficient amount to provide for placement on spoil piles at a depth not less than six inches. This will enhance plant establishment and growth during reclamation.

Where operations could result in acid or saline drainage or sedimentation in streams, provisions will be made for impoundments. Impoundments will not affect adjacent landowners or contribute to water pollution. Water capable of supporting fish and other aquatic life should be the goal of any impoundment. When feasible, erosion control and flood control structures should be built prior to excavation.

Open burning of all materials will be in accordance with suitable practices for fire prevention and control, and state regulations.

Abandoned highwalls will be reduced to slopes no steeper than 30 percent. Spoil piles will be reduced to slopes no steeper than 30 percent, topsoil spread at a depth not less than six inches in depth, and revegetated as soon as practical. If it is considered to be a desirable practice, denuded areas will be mulched and disked on the contour to reduce runoff, erosion and

sedimentation. Desirable surface maniuplation practices will also be prescribed when considering site conditions.

Prepared spoil areas will be revegetated within one year following topsoiling and reshaping. Revegetation will be accomplished by a prescribed acceptable method. Revegetation shall be attempted until a satsfactory stand and cover of perennial vegetation is achieved and maintained.

Water wells to be breached will be plugged with concrete to a point not less than 20 feet below the final mine floor level. After spoil rehabilitation is complete, new wells will be drilled to replace those destroyed. Metal and all other nonmineral material waste will be buried or removed and disposed of. Noxious and toxic species of invader plants will be controlled by using approved herbicides. The owner will be reimbursed at the appraised price for the loss of all facilities destroyed by mining activity.

Farming

Measures that will minimize the affect of mining activity on farming must be adequately timed. The following measures will be considered minimal in an adequate mining plan.

Acreages to be prepared for mining should be posted one year prior to anticipated activity to prevent economic loss due to unnecessary summer fallow operations or destruction of growing crops. Written notification to operator of cropland will be sufficient.

No less than one access route will be maintained to each cropped field. Temporary fencing will be installed to protect crops from destruction by drifting livestock when permanent fencing is destroyed by mining activity.

Active highwall areas will be posted with hazard warning signs. Abandoned highwalls will be sloped to a grade not exceeding 30 percent. Abandoned spoil piles and denuded areas will be mulched to reduce accelerated erosion and sedimentation due to wind or water. The mulch shall be disked into the surface. Active areas, such as haul roads, will be treated to reduce wind-borne mineral particles.

Transportation Networks

To mitigate impacts on traffic flow due to highway relocation, it will be necessary to allow traffic to travel undisturbed over the existing road until the realignment is completed. It will be necessary to provide alternate routes of access to any ranching or other local operations that will be isolated due to obliteration of roads within the mining lease.