

A07/007/006
#2

July 23, 1987

TO: Tom Munson, Reclamation Hydrologist
Kathy Mutz, Reclamation Biologist
Rick Smith, Geologist
Pamela Grubaugh-Littig, Reclamation Engineer
Dan Duce, Reclamation Soils Specialist

FROM: John Whitehead, Permit Supervisor *gh*

RE: Supplemental Report, Plateau New Lands, Plateau Mining
Company, Star Point Mines, ACT/007/006, Folder #2, Carbon
County, Utah

This memo is to provide guidance on the supplemental report we will generate for the Plateau New Lands approval. The supplemental report is now a required part of our permitting process on federal mines due to our recently enacted Cooperative Agreement. In essence, it is an environmental assessment.

Attached is a proposed outline for the report we will generate. Please note the sections you are responsible for writing. Some of the information necessary for the report can be lifted directly out of the CHIA. Please utilize materials from the CHIA as much as possible. Remember, the report will focus on the new lands parcels as the existing five year renewal permit area has already undergone this process via OSMRE. As a help in compiling this first supplemental report, I have attached a copy of a supplemental report from a North Dakota surface mine.

Please have your sections completed in draft to me by July 31, 1987. If you have suggestions on how to complete this report please see me.

djh
Attachments
cc: L. Braxton
J. Fricke
0800R/42

PLATEAU STAR POINT
NEW LANDS
SUPPLEMENTAL REPORT

- I. Description of Mining and Reclamation Operations
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Supplemental Report
Falkirk Mining Company
Falkirk Mine

Surface Coal Mining and Reclamation Operations
Permit Application No. NAFK-8005

Prepared by
North Dakota Public Service Commission
Reclamation Division
_____ . 1986

I. DESCRIPTION OF MINING AND RECLAMATION OPERATIONS

A. Location and History

The Falkirk Mining Company (Falkirk) submitted Permit Application No. NAFK-8005 to the North Dakota Public Service Commission (Commission) and the Office of Surface Mining on April 24, 1980. The initial five year permit term was approved by the Commission on October 5, 1981 for 2086.4 acres located in Sections 19, 20, 29, 30, and 32, T146N, R82W, McLean County. Fifteen revisions to this permit were approved in the initial five year term and the acreage was adjusted to 2019.282 acres. The First Renewal to this permit was approved by the Commission on August 19, 1986 extending the permit term for these 2019.282 acres an additional five years until August 31, 1991.

The Falkirk Mine is located in all or portions of Sections 3, 4, 5, 6, 8, 9, 10, T145N, R82W, Sections 19, 20, 22, 23, 24, 26, 27, 28, 29, 30, 32, 34, 35, T145N, R82W, Section 1, T145N, R83W, and Sections 25, 26, 35, and 36, T146N, R83W, all in McLean County. Approximately 11,150 acres are currently under permit at this mine. The mine is located near the city of Underwood and about 60 miles north of Bismarck.

Falkirk has owned and operated the mine since it began operations in 1976. The production was 5.9 million tons in 1985. Production at the mine has recently been cut in half due to an explosion at the power plant. However, it is expected that the 5.9 million tons per year level will be resumed in approximately one year.

Coal is removed from open pit areas, hauled by truck to the coal handling facility in the SW1/4 of Section 5, T145N, R82W, and delivered by conveyor to the UPA/CPA Coal Creek Station which is located south of the mine.

Surface ownership in this permit area is private. Coal ownership is private and federal. Falkirk has its legal right to mine federal coal pursuant to Lease No. M31053 (ND) which became effective August 1, 1980. The federal coal within the permit area is located in the NW1/4 of Section 20, T146N, R82W. Mining operations within the permit area are scheduled to continue until the late 1990's.

B. Summary Description of the Surface Mining and Reclamation Operations

Approximately 1150 acres were affected during the initial five year permit term. Mining activities have proceeded from east to west and by late 1986 coal removal was nearly finished in Section 20 and the NW1/4 of Section 29. Mining will continue westward through Sections 19 and 30 and in the future pits from this permit are scheduled to be connected to those in adjacent permits to the west and will form a large horseshoe pit. Section B3 of the Fifteenth Revision shows the proposed mining operations.

Facilities in the permit area presently include three haul roads, 11 sedimentation ponds, one pit dewatering pond, one pumphouse, one pipeline outlet, twelve runoff control channels, numerous culverts, and numerous suitable plant growth material storage areas. Facilities to be constructed include five sedimentation ponds and one diversion. These structures are described in Section D of the Fifteenth Revision.

The Hagel Bed is the main lignite seam in the permit area. The bed is generally 7 1/2 - 10 feet thick with a 0.5 - 1 foot clay parting below the middle of the bed which divides it into an upper and lower split. The B Bed, the second economical bed in the area, is found 11.5 - 24.5 feet below the Hagel Bed and ranges in thickness from 1 1/2 to 3 1/2 feet. A thin lignite bed of limited areal extent is situated about 90 feet above the Hagel Bed but over most of the area it has been eroded by glacial activity. Numerous thin beds of lignite are also located beneath the B seam. The surface of the majority of the permit area is underlain by deposits of the Coleharbor Group (Quaternary) and range in thickness from 0 - 114 feet.

In general, six major operations occur during the mining of the coal seams in the proposed permit area. First, an area is readied for mining operations by constructing all necessary surface water control structures. Suitable plant growth material is then removed from the area in two separate lifts, topsoil and subsoil, and is either stockpiled for future respreading or direct respread on areas ready to receive these materials.

Once suitable plant growth material is removed, draglines will be utilized to remove overburden material. After the coal is removed, the next pit is stripped and this material is deposited into the empty pit. The resulting spoil piles are leveled to postmining topography elevations. Once grade approval is obtained for these leveled areas, suitable plant growth material is respread, and the area is scarified, seeded, and mulched.

II. DESCRIPTION OF THE AFFECTED AREA WITHIN ITS RESOURCE SETTING

A. Topography

The permit area is situated within a region of generally undulating to rolling plains characteristic of the Coteau Slope. The topography of the permit area is characterized by a low, glaciated upland.

The northern portion of the permit area exhibits a hummocky, mounded topography, with local relief of 10 to 25 feet. The southern portion of the area gives way to a rolling surface with longer, generally southwestwardly, facing slopes.

Maximum relief across the permit area is 100+ feet, with a maximum elevation of 2080± feet in the east central portion of the area and a minimum elevation of 1980± feet along the southern edge of the permit area.

There are no important fragile lands as defined by 30 CFR 762.5 containing natural, ecologic, scientific and esthetic resources or natural systems in the permit and adjacent areas.

B. Geology

Within the permit area, the only geologic units that outcrop are the Sentinel Butte Formation (Paleocene) and the Coleharbor Group (Quaternary).

The economically mineable coal in the permit area occurs in the Sentinel Butte Formation (Paleocene), which conformably overlies the Bullion Creek Formation (Paleocene) and is unconformably overlain by the Coleharbor Group.

Sentinel Butte deposition was initiated by an influx of coarse sediment dispersed eastward and southeastward, in deltaic fashion, across late Bullion Creek swamps. The paleoslope appears to have been variable, both in magnitude and direction, and reflects Paleocene tectonism to the west and northwest. The elevation of western North Dakota, relative to base-level, increased during Sentinel Butte time and probably reflects increased deposition relative to basin subsidence.

The Sentinel Butte Formation, in general, consists of light gray to brownish gray sandstones, siltstones, and claystones. The six types of strata found in the Sentinel Butte are sandstone, claystone, plastic claystone, siltstone, plastic siltstone, and lignite.

Only the lower part of the Sentinel Butte Formation is present in the permit area. It consists of a thick channel sandstone overlying the coal beds with interbedded siltstones and claystones below the coal.

The Sentinel Butte Formation contains 11 major lignite beds. The lower beds can be traced throughout the area, and the upper beds have been progressively eroded and truncated since their time of deposition. The Hagel Bed is the main lignite seam in the permit area. The bed is generally 7 1/2 - 10 feet thick with a 0.5-1 foot clay parting. The clay parting occurs below the middle of bed and it divides the Hagel Bed into an upper split and a lower split.

The structure of the Hagel Bed is generally flat-lying with a gradual dip to the northwest. The bed decreases in elevation from 1990 feet in the south central portion of the area to 1930 feet in the northwest corner. The strike is generally northeast-southwest with a dip of 30 feet per mile to the northwest. Small scale structures are superimposed on this regional pattern as a result of original topographic irregularities on the depositional surface and differential settlement as a result of consolidation (compaction). These small scale structures commonly produce elevation changes of as much as 40 feet in 1/2 mile on individual beds. As a result, dips are locally very much steeper or even reversed. Structural doming is evident on the Hagel Bed in the southern portion of the area.

The B Bed, the second economical bed in the area, is found 11.5 to 24.5 feet beneath the Hagel Bed. The interval between the 2 beds consists of interbedded silts and clays. The B Bed ranges from 1 1/2 to 3 1/2 feet in thickness and typically averages 2 to 2 1/2 feet.

A thin lignite bed of limited areal extent is situated approximately 90 feet above the Hagel Bed. It is illustrated by geophysical log FA79-34 as 1 foot of coal. Over most of the area, the bed has been eroded by glacial activity. Numerous, thin nonmineable lignite beds are located beneath the B Bed throughout the area. The Sentinel Butte Formation is exposed in the southeast corner of the permit area.

The surface of the majority of the permit area is underlain by deposits of the Coleharbor Group. The deposits range in thickness from 0 to 114 feet.

The deposits are early Wisconsinan in age and 3 main facies occur: (1) interlayered bouldery, cobbly, gravelly, sandy, silty clay, (2) sand and gravel, and (3) silt and clay. In the area, the Coleharbor Group consists mainly of a cobbly, gravelly, sandy, silty clay with localized beds of sand and gravel. The till averages 25 to 30 feet in thickness.

Drift of the Coleharbor Group is found as valley fill in incised streambeds in the underlying Sentinel Butte Formation. One of the streambeds trends southeastward along the southern edge of the area, and the second trends southwestward, beginning in the west central portion of the area.

Post-glacial erosion has been minor in most of the area. Surficial deposits of slopewash (clays and silts) occur over most of the permit area.

There are no areas of unstable geology in the permit and adjacent areas.

C. Climate

The climate of west-central North Dakota is typically a semi-arid continental type with temperatures having a wide range of values. Cold and dry air masses from the polar regions intensify winters in the area. Warm and moist air from the Gulf of Mexico dictate most precipitation characteristics. The temperature extremes for the area can range from -40°F to over 100°F . January daily minimums are about 1°F with daily maximum temperatures near 21°F . July daily low temperatures average 55°F with highs near 85°F . A change of 50°F within a 24-hour period can be noted with the passage of arctic cold fronts in winter or with the sudden development of warm, strong westerly winds generally occurring in late winter or spring. The length of the growing season also varies from year to year; however, the average length is near 120 days for the region. Average precipitation is about 17 inches/year, with most occurring in the form of showers and thunderstorms in the months of April through June. The prevailing winds are northwesterly and average 9-11 mph.

D. Hydrology

1. Surface Water

The permit and adjacent areas are characterized by ephemeral or intermittent streams with parallel drainage patterns draining primarily from north to south. Drainage generally empties into several sloughs along the southern edge of the extended mining area, ultimately draining to the Missouri

River. Many of the ephemeral stream channels have been obliterated by agricultural practices. The permit falls within two major watersheds, referred to No. 1 and No. 6. Watershed No. 1 drains the eastern edge of the permit area via an ephemeral stream outletting into Samuelson's Slough. The drainage area is approximately 12.1 square miles. Watershed No. 6 drains the remaining permit area via an ephemeral stream outletting into the Weller Slough complex. The drainage area is approximately 5.0 square miles. Several Class I and II wetlands were present within the permit area and have been reclaimed.

Wetlands play an important role in the hydrologic system of this area. The largest permanent wetlands include Coal Lake, Samuelson's Slough, and the Weller Slough complex. All are maintained by surface water flows; however, Coal Lake and Samuelson's Slough are also influenced by groundwater. These large wetlands act together with smaller "potholes" in providing storage for spring snowmelt and storm runoff. Although perched water tables may exist, most of these wetlands and "potholes" may act as potential groundwater recharge areas.

Water use in the general area is very limited. A small stockpond located southeast of the permit area is not expected to be affected. At present, the stockpond is overgrown and shows little evidence of use, probably due to the close proximity of a large slough within the same pasture. There are no other significant water uses (stockponds, irrigation diversions, domestic intakes, etc.) from any of the stream channels or large wetlands. With the exception of the mine itself, there are no North Dakota State Water Commission permitted users.

Streamflow within the general area is highly erratic because of the wetland storage capacity. Flows are generally of extremely short duration and are a result of wetland overflows and/or direct surface runoff into the channels. Streamflow data since 1980 indicate peak flows may reach as high as 250 cfs but flows of 50 cfs or less are more common. Because of the ephemeral nature of the stream channels in the general area and the available wetland storage capacity, only significant precipitation events account for stream flows.

Wetlands throughout the general area range from Class I (ephemeral) to Class V (permanent) with hydrologically related clusters (same watersheds) comprised of any combination of these classes. Many

of the Class I and II wetlands are presently being tilled and cropped; however, their hydrologic value related to their storage capacity during runoff events has not been diminished. Likewise, because of the lack of water persistence, they do not greatly affect the present land use. The regional groundwater table ranges from 45 to 100 feet below the land surface, indicating there is no recharge of the wetland systems from groundwater. Water losses from the wetland systems is primarily through evapotranspiration, which accounts for approximately three-quarters of the total seasonal water loss. The remaining losses occur through downward seepage, potentially adding to the groundwater system, and overflows following significant precipitation events.

Water quality of the general area also shows great variability, depending on the flow rate and the water level of the wetlands. Wetland water quality is generally good although seasonal variations reflect the evaporative concentration of dissolved constituents, effectively increasing salinity levels with a corresponding decrease in water level. Stream flow quality is also generally good although water quality can be a reflection of wetland water quality in those instances where wetland discharge occurs. Elevated TSS values are also observed during direct runoff events; however, because of the short-term of any streamflows, it is doubtful these TSS values have any negative downstream impact.

The wildlife value of these wetlands and associated vegetation, shrubs, and woodland areas is obvious. They provide excellent habitat for breeding waterfowl and shorebirds as well as nesting and escape cover for upland gamebirds and big game.

2. Groundwater

The two coal seams to be mined, the Hagel bed and the B bed, and the Underwood Sand of the Sentinel Butte Formation comprise the water bearing strata of the shallow groundwater system in the mine area. The silty and clayey horizons of the Sentinel Butte Formation as well as till of the Coleharbor Group are basically aquitards.

The water table in the Falkirk mine area occurs under a variety of conditions. Where the water table occurs in till of the Coleharbor Group, it is defined as the demarcation between oxidized sediment and the underlying unoxidized sediment. In areas where the water table occurs in the Underwood Sand, it is defined as the potentiometric level in the shallowest piezometer that is screened in this unit.

The water table map submitted by the applicant indicates that the water table generally reflects surface topography with water table highs forming under surface highs. Notable exceptions to this general rule are the area of the Underwood sewage lagoons (SW corner of Section 21), where the water table is very near the land surface in what is a local topographic low at the head of Underwood Coulee, and the areas delineated on the map as having a "perched" water table. The formation of these areas with a perched water table is likely controlled more by vertical textural variations than by surface topography. In some areas, the presence of fine-grained till overlying coarser-grained sandy material has apparently led to the development of a "wick effect" (Corey and Horton, 1969). The areas of perched water tables were identified when piezometer nest installations revealed stable water levels in the shallowest piezometer and no water in the next deepest piezometer. The water table varies from 10 to 50 feet below the land surface, with water table elevations in the permit area decreasing from 2040 feet in the northwest corner of Section 20 to about 1930 feet in the southeast corner of the permit area.

Groundwater in the mine area occurs under both confined and unconfined conditions. Unconfined water level conditions predominate in the Underwood Sand in the permit area, whereas groundwater in both the Hagel and B bed lignite seams occurs under confined conditions throughout the permit area. The "sheet sand" unit below the B bed is also under confined conditions in the permit area. The Underwood Sand and the Hagel lignite bed are major aquifers throughout the mine area.

Potentiometric surfaces of the four uppermost aquifers in the mine area indicate the influence of differential recharge and surface geology on the near-surface groundwater regime. The Underwood Sand and both mineable lignite seams are recharged in the area of the Underwood sewage lagoon (southwest corner of Section 21), immediately east of the permit area. Recharge is concentrated in a localized depression on the upland area that has a very thin till cover compared to surrounding regions. Groundwater flow is radially outward from this recharge center toward the topographically low valleys of Weller Slough and Coal Lake Coulee. Infiltration in upland areas filters downward through surface sediments recharging the sand and lignite aquifers which transmit water laterally or lose water to underlying strata or both.

E. Soils

Soils in the general area were formed on till plains in friable, calcareous, alkaline loam or clay loam glacial till or in meltwater deposits. Over 90% of the soils fall within Hydrologic Soil Group B and generally have a low shrink-swell capacity and moderate infiltration rate. The remaining soils fall within Groups C and D. Since most of the soils indicate an agricultural capability subclass rating of "e", it can be assumed that the main limitation is the risk of erosion. Specific soils have a rating of "c" or "w", indicating climatic or water-related limitations. Organic matter concentrations are generally moderate to high. Despite the semi-arid, continental climate, agricultural land uses dominate the area. This is due to the fact that the maximum precipitation occurs in June with relatively high values throughout the growing season.

The premining soil survey identified nine soil series within the proposed permit area. They are:

- Arnegard - Pachic Haploborolls
- Bowbells - Pachic Agriborolls
- Bowdle - Pachic Haploborolls
- Falkirk - Pachic Haploborolls
- Max - Typic Haploborolls
- Parnell - Typic Agriaquolls
- Tonka - Argiaquic Argialbolls
- Williams - Typic Agriborolls
- Zahl - Entic Haploborolls

These soil series all have suitable topsoil materials and, except for the Bowdle series, all have subsoil materials that are suitable to the five foot investigation depth. The reason the Bowdle series is not suitable to the five foot depth is that loose sand or gravel is encountered at about 2 feet.

F. Land Use and Vegetation

The prevailing land use is agricultural, with land uses of cropland, native rangeland, fish and wildlife and woodland (shelterbelts). The permit area is zoned agricultural use by McLean County and the applicant has obtained a conditional use permit for the mining activities.

The largest portion of the premine permit area was occupied by cropland (86.3 percent). These croplands are used for the production of small grains with land used on a rotation basis. Crop rotations used vary, but a three year rotation system is predominant - two growing seasons with fallow or stubble the third year.

Crops commonly grown include hard red spring wheat and durum. Average yields for hard red spring wheat range from 20 bu/acre on stubble to 35 bu/acre on summer fallow; durum yields average from 25 bu/acre on stubble to 35-40 bu/acre on summer fallow.

The second largest portion of the premine permit area was native rangeland (10.4 percent) which contains four rangesites: silty, thin upland, overflow and wetland. The native rangeland in the S1/2, Section 20 was in good to excellent condition while that in the SW1/4 of Section 30 was in fair to good condition. The rangeland in Section 20 is not grazed, but is cut for hay approximately every other year. The rangeland in Section 30 was grazed in a rotation system with other areas not in this proposed permit area.

The fish and wildlife habitat, which was a wetland community, comprised less than 2% of the permit area. The fifteen wetlands identified in the permit area were small and found in both cropland and native rangeland. This community included some of the wetland range site communities found in the native rangeland. The community was dominated by different species throughout the year depending on water levels and management practices.

The last and smallest vegetative community found in the permit area was the shelterbelts (woodland) comprising less than 1% of the permit area. There were two shelterbelts found in the permit area; one is a farmstead windbreak in Section 29 and the other is near Underwood in Section 20.

The remaining acreage within the proposed permit area was occupied by roads, farmsteads, gravel pits, and other non-agricultural uses. There are no vegetative communities found on these areas.

G. Wildlife

Habitats located on the premine permit area included cultivated cropland, grassland, wetlands and farmsteads. Cultivated cropland and grassland make up 92% of the total habitat within the permit area.

Big game was limited to pronghorn and white-tailed deer. Predators included raccoon, red fox, coyote, and badgers. Two active predator dens were located. Small mammals were abundant and were most diverse in grassland habitat. Deer mice were most abundant (80% of all captures). Other predominant species included red back voles, thirteen-lined ground squirrel, meadow vole and longtailed and least weasels. Other mammals noted on

the permit areas included white-tailed jackrabbits, eastern cottontails, gray squirrels, fox squirrels, porcupine, and mink. Muskrat was noted on permanent wetlands and beaver and a beaver lodge were found in Coal Lake.

Upland game bird sightings included pheasant, gray partridge, sharp-tailed grouse and turkey. Waterfowl observed were generally limited to migrants. Mallards, pintails and bluewinged teal were the most abundant breeding waterfowl. The highest density of ducks were seen on Class III, IV, and V wetlands. During the spring, waterfowl were observed in Class I, II and III wetlands. Class IV and V wetlands were extensively used in the fall.

Surveys of songbirds revealed a broad spectrum of abundance and species diversity between habitats. Generally, density and diversity paralleled habitat complexity. Six species of raptors were noted. Marsh hawks were most abundant. Burrowing owls were noted outside the permit area.

No fish populations existed in wetlands. Fathead minnows and brook sticklebacks were collected in nearby lakes.

No threatened or endangered species were observed within or contiguous to the permit area.

H. Cultural Resources

A number of cultural resource surveys have taken place which included the permit area. A survey conducted by Dill in 1975 identified two abandoned coal mines within or adjacent to the permit area. Three sites were identified during a survey conducted by Good and Dahlbert in 1979. The sites consist of three historic homesteads (Neary I- 32ML138, Neary II-32ML139, and Mautz Site - 32ML140). St James Cemetery (32ML141) is excluded from the permit area but is surrounded by it.

The sites located within the permit area were not found to be significant in terms of the National Register of Historic Places or the North Dakota State Historic Sites Registry. St. James Cemetery located adjacent to the permit will not be affected by mining operations.

I. Transportation

The public transportation facilities which occur within and around the permit area consist of U.S. Highway 83, which runs north-south approximately 1 mile east of the permit area, and public county roads on the north and east boundaries of the permit area and between Section 5 and 32.

J. Aesthetics

The permit and adjacent area had no unusual scenic qualities prior to mining and was similar to surrounding lands. Human influences include the city of Underwood located directly northwest of the permit area, farming and ranching activities and mining operations. Sounds are from activities occurring in and around Underwood, traffic from Highway 83 and other roads, air traffic, agricultural and mining activities, wildlife and wind.

K. Socioeconomics

Underwood (population 1329), located directly northeast of the permit area, and Washburn (population 1767), located approximately 10 miles south of the permit area, serve local and agricultural needs in and around the Falkirk Mine. Washburn is the McLean County Seat.

III. ENVIRONMENTAL IMPACTS OF OPERATION

A. Topography and Geomorphology

No significant long term impacts should occur on the topography and geomorphology of the permit area. Falkirk's Mine plan will generally create a postmining topography consistent with adjacent unmined lands and which will result in surface hydrologic characteristics which are not significantly different from those which existed prior to mining.

Erosion and sedimentation will occur on disturbed areas until they are adequately revegetated. However, water quality will not be seriously impaired because Falkirk's surface water control plan insures that all runoff from mined areas will be treated in sediment ponds prior to discharge from the mine area.

B. Air Quality

Falkirk employs fugitive dust control measures in the mine area. The primary sources of fugitive dust on the mine area result from wind blown sources and equipment traffic. The primary methods of dust suppression include:

1. Minimizing the area of disturbance by restricting operations to that acreage necessary to accommodate immediate mining operations.
2. Stabilizing disturbed areas as soon as possible, using approved mulching and revegetation techniques.

3. Controlling dust from roads and other heavy traffic areas by watering and/or the use of approved stabilization agents.

Falkirk has established an approved air quality program, as discussed on Page 1 of B-2 in the permit, and also has an Air Pollution Control Permit to operate as required by the North Dakota State Department of Health.

C. Hydrology

A Cumulative Hydrologic Impact Assessment (CHIA) for mining activities within the permit area is included as supporting documentation for Finding No. 5. The impacts to the surface and groundwater regimes from mining within the permit area are discussed there.

D. Soils and Overburden

Information on suitable plant growth material identification and handling are discussed in Sections J, K and L of the permit and in Revision Nos. 4 and 15. Falkirk has received approval to save all topsoil and sufficient subsoil to respread a total thickness of 40 inches of suitable plant growth material. Specific overburden handling and spoil sampling procedures are being employed to insure that the uppermost 20 inches of the regraded spoil surface is a suitable plant growth medium. If undesirable spoil material is discovered in the top 20 inches Falkirk is committed to replace it with good quality material. Replacement of 40 inches of suitable plant growth material will be sufficient to assure successful revegetation based on the overburden characteristics. To the extent possible the topsoil and subsoil will be respread at uniform thicknesses based on the amount available. The material will be stabilized by seeding or mulching shortly after respreading is completed.

E. Vegetation

Falkirk has committed to a seeding schedule, submitted seed mixtures for both temporary and permanent vegetation, including species and amounts in pure live seed, described agronomic management methods and techniques, and discussed methods of evaluating the success of revegetation. Mining related disturbance will temporarily disrupt agricultural production from lands within the permit area but Falkirk is committed to restore all disturbed lands to at least the average premining productivity level.

The mining and reclamation operations will not result in a substantial loss or reduction of long range productivity of the lands producing food and fiber

products since reclamation practices are designed to restore the level of productivity to that which existed prior to mining.

F. Wildlife

The fish and wildlife plan in Section F2 of the permit describes general practices Falkirk employs in management of wildlife in the mine area. Wildlife habitat within the permit area will be destroyed by mining operations but wetland reclamation and other revegetation techniques will replace important wildlife habitat. Wetland reclamation techniques are described in Section P of the permit and in Section H of the fifteenth revision.

G. Cultural Resources

No significant cultural resources were identified within the proposed permit area based on the cultural resources survey. Nonsignificant sites will be disturbed by mining activities. The permit applicant has committed to inform the State Historical Society and the Commission of any previously unrecorded cultural resources and allow time for evaluation of significance and mitigation of such, if necessary.

H. Land Use

Significant changes have been made to the postmining land use plans originally proposed in the permit. The most notable is contained in the thirteenth revision (approved August 15, 1985) which approved a change of postmining land use for 170 acres in Section 20 from agricultural to recreational land use and corresponding changes in topography to accommodate this alternate use. This tract will be the future site of the Underwood Golf Course and will replace the present golf course located in Section 22, T146N, R82W, which is proposed to be mined through in Permit NAFK-8405. Another major change is contained in the fifteenth revision which approved the construction of three additional wetlands which will result in an overall increase of 4.7 wetland acres from the original plan.

A comparison of postmining land use acreage between the original plan (NAFK-8005 permit) and the current plan (as of Revision 15) is presented in tabular form in Section I2 of the fifteenth revision.

I. Transportation

No long-term impacts should occur to the transportation system in the permit area. Short-term impacts will occur to the county road and several section line trails that cross the permit area but should not be

significant. Falkirk has provided an alternate route for traffic that would have traveled this county road as addressed in Section J-4 of the permit.

J. Noise, Aesthetics, and Safety

Noise associated with operations within this permit area is similar to that occurring in other permit areas, but since activities are close to Underwood it is more noticeable to people than in other areas. However, mining has now progressed far enough west so that all operations are at least one half mile from the city limits.

Visually, mining operations will temporarily affect the landscape normally viewed by people in and around Underwood. However, after mining operations are completed the landscape will be restored to conditions generally similar to that which existed prior to mining.

K. Socioeconomics

No socioeconomic impact is projected as result of continued operations in this permit area. Employment by the mine is expected to remain fairly constant.

RECEIVED

MAY 01 1987

DIVISION OF
OIL, GAS & MINING

NAFK-8005
BOUNDARY

FEDERAL LANDS

Undermod

MINING LIMIT

