

*Contains 12/16/83 revisions*  
*Contains 3/14/84 revisions*

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ALASKA DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF MINERALS AND ENERGY MANAGEMENT

RECEIVED

OCT 31 1983

COAL EXPLORATION

Notice of Intent to Explore  
and  
Exploration Application

Div. of Minerals & Energy Mgt.  
Anchorage, Ak.

The Alaska Surface Coal Mining Control and Reclamation Act requires that any person who intends to conduct coal exploration which will not substantially disturb the natural land surface complete and file with the Department of Natural Resources a notice of intent to explore. The completion of Parts A (including submission of the required permit fee), B, and D of this form will meet these requirements. This form must be received at least thirty (30) days prior to commencement of the exploration.

The Act requires that any person who intends to conduct coal exploration which will substantially disturb the natural land surface must file a complete application for exploration. The completion of Parts A (including submission of the required permit fee), C, and D of this form will meet the applicant's submission requirements. The application should be submitted approximately three months prior to the anticipated commencement of exploration.

Substantial disturbance means an impact on land, water, or air resources by activities such as blasting; mechanical excavation excluding the use of light, portable field equipment; drilling or enlarging coal or water exploratory holes or wells; and construction of roads, structures, trails, aircraft landing and marine docking areas.

Please submit six copies of all application materials.

Reference: Alaska Statute 41.45.200; 11 AAC 90.161 - 11 AAC 90.167.

**PART A: GENERAL INFORMATION**

Ref: 11 AAC 90.161; 11 AAC 90.163

1.1 Name of Applicant Diamond Shamrock Chuitna Coal Joint Venture

1.2 Address of Applicant 430 West Tudor Road  
Anchorage, Alaska 99503

1.3 Telephone Number ( 907 ) 563 - 3456

1.4 If applicable, provide the following information for the representative who will be present and responsible for the exploration activities.

1.5 Name of Representative Robert Stiles

1.6 Address of Representative 430 West Tudor Road  
Anchorage, Alaska 99503

1.7 Telephone Number ( 907 ) 563 - 3456

**2.0 Location of the Exploration**

|                       |             |             |           |               |
|-----------------------|-------------|-------------|-----------|---------------|
| 2.1 Legal Description | <u>13 N</u> | <u>12 W</u> | <u>24</u> | <u>Seward</u> |
|                       | Township    | Range       | Sections  | Meridian      |
|                       | _____       | _____       | _____     | _____         |
|                       | Township    | Range       | Sections  | Meridian      |
|                       | _____       | _____       | _____     | _____         |
|                       | Township    | Range       | Sections  | Meridian      |
|                       | _____       | _____       | _____     | _____         |

2.2 Number of Acres in Exploration Area 68

2.3 Number of Acres of Federal Land (if applicable) N/A

- 2.4 USGS 1:250,000 or 1:63,360 Quadrangle Names Tyonek
- 2.5 Distance and Direction to Nearest Community Tyonek - approximately 11 miles south
- 2.6 Attach map of exploration site and adjacent area.

**3.0 Period of Exploration**

|           | month           | date     | year        |
|-----------|-----------------|----------|-------------|
| 3.1 Begin | <u>November</u> | <u>1</u> | <u>1983</u> |
| 3.2 End   | <u>November</u> | <u>1</u> | <u>1985</u> |

**4.0 Ownership of Surface/Subsurface Mineral Estate**

If the surface or the mineral estate is owned or leased by someone other than the applicant, answer 4.1 - 4.5, as appropriate.

**4.1 Surface Owner**

Name State of Alaska

Address Department of Natural Resources, Pouch 7-034, Anchorage, Alaska 99510

Telephone number (907) 276-2653

**4.2 Mineral Estate Owner**

Name State of Alaska

Address Department of Natural Resources, Pouch 7-034, Anchorage, Alaska 99510

Telephone number (907) 276-2653

**4.3 Surface Land Leaseholder**

Name Diamond Shamrock Chuitna Coal Joint Venture

Address c/o Diamond Alaska Coal Company, 1200 First Security Plaza, Lexington, KY 40507

Telephone number (606) 231-5300

**4.4 Mineral Estate Leaseholder**

Name Diamond Shamrock Chuitna Coal Joint Venture

Address c/o Diamond Alaska Coal Company, 1200 First Security Plaza, Lexington, KY 40507

Telephone number (606) 231-5300

4.5 Provide a statement describing the basis by which the applicant claims the right to enter the land for the purposes of conducting exploration and reclamation. Reference relevant federal, state, and local government prospecting permits or lease documents. Attach copies of supporting documents, as appropriate. Reference following page 2-1.

**5.0 Fees Ref: 11 AAC 90.011**

|                                       |  |   |
|---------------------------------------|--|---|
| 5.1 Permit Fee                        | \$ 500.00 plus \$540. for public notice. |   |
| Exploration - notice of intent        |  | Attach receipt. (Refer to fee schedule below) |
| Exploration - substantial disturbance | \$100                                    |   |
|                                       | \$500 + cost of all public notices       |   |
|                                       | <u>The Peninsula Clarion</u> - \$300.00  |   |
|                                       | <u>Anchorage Times</u> - \$240.00        | <u>\$540.00</u>                               |

**PART B: NOTICE OF INTENT TO EXPLORE**

Ref: 11 AAC 90.161

**6.0 Intention to Explore** N/A

- 6.1 Describe intended exploration activities, including major pieces of equipment and their use.
- 6.2 Will exploration activities substantially disturb the natural surface of the land? 1 no 2 yes If yes, proceed to Part C; if no, answer 6.3 and proceed to Part D. (See definition on page 1 of this form.)
- 6.3 Describe practices to be used to protect the environment from adverse impacts resulting from exploration activities.

**PART C: EXPLORATION PERMIT APPLICATION**

Ref: 11 AAC 90.163; 11 AAC 90.167

**7.0 Exploration Area Description** Reference Narratives on following pages.

Note: all technical data in this application must be accompanied by:

- 1) names of persons and organizations who gathered and analyzed data;
- 2) dates of data collections and analysis;
- 3) description of procedures used; and
- 4) names, addresses and positions of officials of each agency consulted.

- 7.1 Indicate type(s) of surface disturbance: 1 blasting 2 mechanical excavation 3 drilling 4 altering coal or water exploration holes and wells 5 road or trail construction or modification 6 aircraft landing construction/modification 7 marine docking facility construction / modification 8 construction of structures 9 placement of excavated material or debris on surface 10 other, specify \_\_\_\_\_
- 7.2 Provide a map of at least a scale of 1:63,360 enlarged 2.5 times, showing the following existing surface features:
- a. existing roads and trails;
  - b. occupied dwellings and other structures;
  - c. pipelines, airfields and marine docking facilities;
  - d. bodies of water;
  - e. historic, archeological and cultural features;
  - f. topographic and drainage features; and
  - g. habitats of endangered or threatened species.
- 7.3 Using existing information, briefly describe, with cross references to the map in 7.2, the surface topography, geology, surface waters, predominant land use, and other physical features.
- 7.4 Using existing information, briefly describe, with cross references to the map in 7.2, vegetation cover and important habitats of fish, wildlife and plants.
- 7.5 Does the exploration area include critical habitat of threatened or endangered species; or species such as eagles, migratory birds or other animals protected by state or federal law; or habitats of unusually high value for fish and wildlife? 1 no 2 yes If yes, describe impact control measures, management techniques and monitoring methods to be utilized to protect these species and habitats.
- 7.6 Does the exploration area include known archeological resources; or districts, sites, structures or objects listed on the National Register of Historic Places? 1 no 2 yes If yes, identify and describe, and describe protection measures to be implemented.

**8.0 Exploration and Reclamation Methods** Reference Narratives on following pages.

- 8.1 Provide a map of at least a scale of 1:63,360 enlarged 2.5 times, showing the following exploration and reclamation features (if appropriate, this may be combined with the map required under 7.2):
- a. the area to be disturbed by exploration and reclamation;
  - b. access routes, including new roads, trails or other transportation facilities to be constructed, and existing facilities to be used or modified;
  - c. proposed excavations and trenches;

- d. water or coal exploratory holes to be drilled or altered;
- e. earth or debris disposal areas;
- f. sediment control measures, such as sediment ponds and structures for diverting overland flow, if required; and
- g. other exploration or reclamation features.

- 8.2 Provide a description of exploration and reclamation methods and a discussion of how the exploration will comply with the performance standards in 11 AAC 90.167. Cross-referencing the map in 8.1, describe, at a minimum, the following:
- a. types and uses of equipment;
  - b. design, construction, maintenance and removal of any proposed new roads, trails or other transportation facilities;
  - c. alteration and restoration of existing transportation facilities;
  - d. blasting procedures;
  - e. earth or debris disposal;
  - f. backfilling and regrading of all excavations, artificial flat areas, embankments or other disturbed areas to their approximate original contour;
  - g. topsoil removal, storage and redistribution;
  - h. seed mix, application rates, seeding method and other procedures to be implemented in the establishment of a vegetative cover on all disturbed areas;
  - i. procedures for plugging and abandoning exploration holes, boreholes, wells or other exposed underground openings;
  - j. procedures and control practices to be implemented to minimize disturbance to the prevailing hydrologic balance, including, if necessary, sedimentation control;
  - k. handling and disposal of known acid-forming or toxic-forming materials, if any; and
  - l. removal of all facilities and equipment.
- 8.3 Provide a time table for each phase of exploration and reclamation including starting and ending date, type of disturbance, area of disturbance, and reclamation measures.
- 8.4 Give an estimate of the quantity of coal to be removed during the exploration. Specify method used to measure quantity. 0.0 tons.
- 8.5 Give a detailed estimate of the cost of reclamation of all areas to be affected by exploration activities.

**PART D: EXPLORATION ON LANDS UNSUITABLE FOR MINING**

Ref: 11 AAC 90.165

- 9.1 Does the proposed exploration area include any area previously designated as unsuitable for all or certain types of mining by the Commissioner of Natural Resources? 1 no 2  
 yes If yes, respond to 9.2 and 9.3.
- 9.2 Indicate petition name and number N/A
- 9.3 Describe the basis for the designation of the area as unsuitable for mining and why exploration in the area is not incompatible with the values or features which led to the designation of the area.

The applicant states to the best of his or her knowledge and belief that all statements made in the notice of intent to explore or in the application to explore are true and correct.

Applicant's Name Robert Stiles Title Manager  
Robert Stiles Signature Phone Number (606) 231-5300  
 Date 10-28-83  
 Subscribed and sworn to before me by Robert Stiles  
 this 28th day of October, 1983  
 Notary Public Linda Matthews My Commission Expires \_\_\_\_\_

- 7.3 Using existing information, briefly describe, with cross references to the map in 7.2, the surface topography, geology, surface waters, predominant land use, and other physical features

#### Physiography and Surface Hydrology

The exploration area is located in the Beluga coal field approximately 60 miles west of Anchorage. The exploration pit area and the camp area are contained entirely within the headwaters of the Lone Creek (stream 2002) and stream 2003 watersheds. Lone Creek and stream 2003 each flow southeastward approximately 7 miles into the Chuitna River and drain about 35 square miles. The exploration area is confined to 68 acres of the combined watersheds. No disturbances of the stream channels at the permit site are anticipated during exploration activities.

Lone Creek and stream 2003 drain glacier-free areas with channel streams incised in a broad piedmont lowland covered with a thin mantle of poorly drained tundra vegetation. Data collected on these streams in 1982 in the vicinity of the exploration area indicate Lone Creek and stream 2003 are perennial. Streamflows on Lone Creek ranged from less than 2 cfs to more than 600 cfs with an average daily discharge of approximately 25 cfs. Streamflows on 2003 ranged from less than 2 cfs to more than 50 cfs with an average daily discharge of approximately 15 cfs. Peak flows typically occur in May or June from snowmelt runoff and in September in response to heavy rainfall. The lowest streamflows typically occur in August with a second low flow period in the winter. The water quality of these streams is high for recreational and esthetic use, with total dissolved solids concentrations less than 100 mg/l and pH's between 6 and 7. More detailed hydrologic data have been provided to ADNR and other interested agencies in an interim report titled "Surface Hydrology and Water Quality Interim Report." This report was produced by ERT in February 1983.

The climate of the area is transitional and ranges between maritime and continental. The climate is typified by heavy snowfall and below-freezing temperatures from November through March. The most significant rainfall occurs in September and October, with a dry period typically occurring in the spring and early summer months. Temperatures range from a mean minimum of 1.5°F in January to a mean maximum of 64°F in July. The average annual precipitation is estimated to be more than 40 in/yr.

## Geology

The stratigraphy of the test pit area consists of 10 to 120 feet of Quaternary sand and gravel disconformably overlying the coal bearing Tyonek formation. The pleistocene erosional surface dissects the Tyonek strata to a varying and unpredictable extent in the project area. In the test pit area the Tyonek formation is slightly undulating but shows a general 1-2° South dip.

The stratigraphic interval of interest in the Tyonek formation has four coal beds of interest, referred to in descending stratigraphic order: Green, Blue, Red 3, and Red 2.

The Green seam has been removed along the pleistocene disconformity over most of the test pit area, but outliers approaching 30 feet have been found near the site of the western test pit.

The Blue seam, 2 to 10 ft. stratigraphically below the Green bed, shows considerable paleotopography at the Quaternary disconformity and varies from 0 to 20 ft. thick.

The Red 3 seam, 15 to 30 ft. below the Blue seam, was found to be 10 to 20 ft. thick in the drill holes in the vicinity of the proposed test pits.

The Red 2 seam, 10-50 ft. below the Red seam, is 20-25 ft. thick in the test pit vicinity.

Projection of coal beds encountered in bore holes to topographic intercept indicates the hypothetical outcrops of the Red 2, Red 3, and Blue coal beds in the permit area (see cross section). Location of significant amounts of coal debris in gullies on this slope and confirmation of coal by drilling confirm that these beds subcrop at shallow depths beneath the Quaternary gravel, their colluvium and the soils of the Mutnala series.

The Mutnala soils are volcanic and glacial silt cryothid loesse developed in well-drained areas. In the test pit area they are 12 to 30 inches thick and contain distinct volcanic ash layers to 6" thick.

In the Red 2 pit, approximately 20 feet of silty clay will be encountered overlying the coal, and possibly a few feet of the Red 3 bed, but more likely boulder colluvium of Red 3 provenance. Less than 10 feet of the Quaternary sand and gravel and Mutnala soil should be encountered.

In the Blue pit it is impossible to predict whether any Tertiary strata will lie between the Blue coal and the Quaternary disconformity. The younger Tertiary beds are present and they consist of several feet of carbonaceous clay and coal of the Green bed.

A generalized cross section through the permit area is presented as Figure 1.

## Groundwater

In hole 24A there was some circulating loss reported in gravel at 35 and 65 ft. and in the Red 3 coal zone, and total loss at 275 ft. in a sand facies below the Red 1 coal. No water pressure tests were conducted.

In hole 24B there was circulation loss reported. Results of field permeability tests show low permeabilities:

| <u>Unit</u>              | <u>Permeability (Ft./Min.)</u>               |
|--------------------------|--|
| Gravel to 71.6 ft.       | $9.2 \times 10^{-4}$                         |
| Coal (Green) 113.9-123.9 | $6 \times 10^{-5}$                           |
| Coal (Red 3) 164-178.9   | $8.2 \times 10^{-2}$ to $8.2 \times 10^{-4}$ |
| Coal (Red 2) 183.6-203.6 | $3.02 \times 10^{-5}$                        |
| Sand below R2 206-233.8  | $5.4 \times 10^{-6}$                         |

This hole was completed as a piezometer in the fractured Red 3 coal at 162-180 ft.

In hole 24C there was significant water loss at 25 ft. and 50 ft. in surface gravel, and at 185 ft. in coal and at 191 ft. atop coal. The hole was abandoned at 203 ft. due to loss of circulation. This hole was completed as a piezometer in clastic sediments at 117-140 ft. Falling water tests showed losses of less than 2 feet in a 15 minute period and 15.4 ft. in 31 minutes in overlapping zones (2" i.d. in measurement zone feeding 4-3/4" hole with extensive cavings.)

Hole 24J was abandoned at 135 ft., apparently at the top of the Red 2 coal, due to loss of fluids. Hole 24J2 re-drilled this section 200 ft. to the south using thicker mud with no reported difficulty.

Five shallow holes drilled in the immediate vicinity of the two eastern test pits during September and October, 1982 were marked by continued slow loss of drilling fluids in the gravels overlying the coal and generally extreme loss of fluids at the tops of the coals.

## Land Use

As detailed in response to Question 7.4 below, the exploration area supports native vegetation consisting of woodland and shrub thickets. These communities are used by wildlife including moose, black bear, and possibly brown bear. Human use of the area is limited to the mineral exploration activity that has been ongoing under the previous exploration permit.

7.4 Using existing information, briefly describe, with cross references to the map in 7.2, vegetation cover and important habitats of fish, wildlife, and plants.

### Vegetation

Vegetation cover on the proposed exploration area includes the two following vegetation types: spruce-birch mixed woodland, and alder closed tall shrub scrub. Additional communities mapped in the vicinity of the permit area include the willow open tall shrub scrub, sweetgale-grass fen, and bluejoint-herb communities. These communities are described briefly below and shown on the vegetation map.

The spruce-birch mixed woodland (Map Unit 5) is estimated to occupy approximately 55 percent of the surface area of the exploration area, including the camp area above the exploration pits. Within the overall Diamond Chuitna lease area, paper birch and white spruce provide average canopy cover of approximately 25 percent. Tree density in this vegetation type for the whole lease area was estimated to be 104 trees/acre. Important understory shrub species include highbush cranberry (Viburnum edule), tall blueberry willow (Salix novae-angliae), and Sitka alder (Alnus sinuata). Shrub stratum cover was estimated to be 45 percent. The most abundant ground cover species include bluejoint grass (Calamagrostis canadensis) and ferns (Polypodium sp). Ground canopy cover was estimated to be 75 percent. This type predominates on well to moderately well drained soils on uplands and side slopes. Numerous standing dead white spruce occur throughout the area because of a wide-spread spruce beetle epidemic.

The alder closed tall shrub scrub type (Map Unit 7) occupies approximately 45 percent of the proposed exploration area including most of the disturbed pit area. Sitka alder (Alnus sinuata) forms dense patches along moist side slopes and in drainages. Estimated average cover in alder thickets is approximately 80 percent with shrubs ranging in height from 10 to 15 feet. Understory herbaceous species consist principally of bluejoint grass and ferns. Estimated understory canopy cover is 60 percent.

The willow open tall shrub scrub type (Map Unit 6) occupies the streambanks of the principal drainages of the Diamond Chuitna lease area including Lone Creek above the exploration pits. Tall blueberry willow and plane-leaf willow (Salix planifolia) were the most abundant willow species sampled, and contributed the majority of the shrub canopy cover (estimated to be 50 percent) for this type. The most common ground cover species included bluejoint grass, scouring rush (Equisetum arvense), and nagoon berry (Rubus arcticus). Estimated average herb canopy cover is 70 percent. Willows predominate in areas that have not been extensively impounded by beavers.

The sweetgale-grass fen type (Map Unit 8) occupies very poorly drained soils on the upland above the exploration sites; standing water is frequently present within this type. Several dwarf (.5 to 1.5 ft tall) shrubs mixed with a variety of grasses and herbs are characteristic of this type. Sweetgale (Myrica gale) provides the majority of the

shrub cover; other shrub species include dwarf birch (Betula nana) and various willows (Salix spp.). Shrub cover was estimated to be 28 percent. Common herbs include aquatic sedge (Carex aquatilis), spike rush (Eleocharis palustris), and crowberry (Empetrum nigrum). Estimated herb cover is 53 percent.

The bluejoint-herb type (May Unit 11) is dominated by bluejoint grass and fireweed (Epilobium angustifolium). Other species provide only minor amounts of cover. Estimated average cover is 88 percent. Within the exploration area, it appears that this type has invaded old beaver pond areas that have silted in along the Lone Creek drainage below the exploration pits.

These and other vegetation communities present on the Diamond Shamrock lease are more fully described in the interim report for ERT's 1982 vegetation baseline studies titled "Preliminary Analysis of Terrestrial Biology Data Collected in the Diamond Chuitna Study Area." This report, prepared in March 1983, was submitted to ADNR and other interested agencies for review and comment.

### Fish

Aquatic baseline studies conducted by ERT in 1982 and 1983 have provided information on the distribution, seasonal abundance, and movements of juvenile salmonids; distribution and abundance of adult salmon; and fish habitat characterization for six streams in the Chuitna River drainage. The programs were designed after consultation with biologists at ADF&G in Anchorage. Results of the 1982 study have been summarized in an interim report titled "1982 Data Report, Aquatic Biology, Diamond Chuitna Project, Baseline Studies." This report was submitted to ADNR and other interested agencies in early 1983 for review and comment. Based on these studies, Lone Creek provides spawning and rearing habitat for chinook salmon (Oncorhynchus tshawytscha), coho salmon (O. kisutch), rainbow trout (Salmo gairdneri), and Dolly Varden (Salvelinus malma), and spawning habitat for pin salmon (O. gorbuscha). In addition, chum salmon (O. keta) may spawn in Lone Creek, since low numbers of adults have been observed in the Chuitna River.

### Stream #2003

The Exsco camp and Strip Creek airstrip will not be used for this permit. These areas will be covered under a separate Notice of Intent to Prospect until revegetation is completed. Stream #2003 will not be disturbed in any way.

## Wildlife

Important animal species potentially utilizing the exploration permit area include brown bear, black bear, and moose. All three species potentially use all vegetation types present on the area during spring, summer, and fall seasons. Moose winter use of the area appears to be limited in most years because of deep snow. Beaver are found throughout the Lone Creek drainage and its tributaries. There are extensive beaver dams on Lone Creek within 1 mile downstream of the permit area.

No species of wildlife listed as threatened or endangered by the U.S. Fish and Wildlife Service or the Alaska Department of Fish and Game are known to occur at or near the proposed exploration site. Peregrine falcons are the only endangered species potentially occurring in the area, but no nesting habitat occurs in, or near the permit area. Potential hunting habitat does occur in this area. Bald eagles and trumpeter swans are protected species in Alaska, and eagles are also protected under the Bald Eagle Protection Act. Both species could occur in the vicinity of the proposed exploration area, but no eagle or swan nests have been found in the permit area or immediate vicinity during 1982 and 1983 field surveys. The proposed exploration activities at this site should have little or no impact on these species.

- 7.5 Does the exploration area include critical habitat of threatened or endangered species; or species such as eagles, migratory birds or other animals protected by state or federal law; or habitats of unusually high value for fish and wildlife: 1 no 2 yes If yes, describe impact control measures, management techniques and monitoring methods to be utilized to protect these species and habitats.

No.

- 7.6 Does the exploration area include known archaeological resources; or districts, sites, structures or objects listed on the National Register of Historic Places? 1 no 2 yes If yes, identify and describe, and describe protection measures to be implemented.

No.

- 8.2 Provide a description of exploration and reclamation methods and a discussion of how the exploration will comply with the performance standards in 11 AAC 90.167.

Exploration and reclamation will be conducted under this permit as outlined in Article 7 of the Alaska Surface Coal Mining and Reclamation Act. Below are minimum steps to be followed to comply with the performance standards in 11 AAC 90.167 of Article 7.

All necessary steps will be taken to assure compliance with all applicable federal, state, and local rules and regulations.

8.2a Types and uses of equipment

- 1 - John Deere 450 Tractor for maintenance and reclamation
- 1 - D-S Caterpillar Dozer for maintenance and reclamation
- 1 - Nodwell Mounted Drill
- 1 - Nodwell Mounted Water Tank
- 1 - Nodwell Flat Deck
- 1 - Nodwell Mounted Dragline
- 1 - 3864 International Backhoe
- 5 - 12 Track Mounted Trailers - housing and storage  
Support equipment

8.2b Design, construction, maintenance and removal of any proposed new roads, trails or other transportation facilities

There are no new roads or trails proposed under this application submission. Reference MLUP regarding "new" roads in the area.

8.2c Alteration and restoration of existing transportation facilities

Facilities

The base camp will be moved to the exploration area and the access trails, Exsco camp and Strip Creek Airstrip reclaimed.

The use of existing access trails and winter landing areas under winter conditions does not constitute a substantial disturbance of the environment. Therefore, these areas will be permitted under a separate Notice of Intent. Winter conditions for this permit application is defined below:

Ground contact vehicles will not be operated in wetlands unless there is at least one (1) foot of ground frost accompanied by one (1) foot of snow cover. After March 15, the use of ground contact vehicles in wetlands and other areas of weak soil conditions will be subject to termination within seventy-two (72) hours of written notification from the Division of Minerals and Energy Management.

8.2d Blasting procedures

No blasting is proposed under this exploration permit application.

8.2e Earth or debris disposal

Two (2) existing spoil storage areas are shown on the Exploration and Reclamation Map. These areas have existing drainage controls in place and operational. Close inspections will be made to assure that proper erosion controls are maintained. No additional spoil storage is planned under this permit submission. Reference 8.2j for detailed drainage control plan.

Noncoal wastes will be disposed of in an approved manner to assure that the areas remain stable and suitable for reclamation. Also, disposal will be compatible with the natural surroundings.

8.2f Backfilling and regrading of all excavations, artificial flat areas, embankments, or other disturbed areas to their approximate original contour

Backfilling and regrading of the "Blue" pit and "Red #2" pit to their approximate original contours will be accomplished using dozers and/or a conveyor system. Reference the attached Post-Exploration Contour map for approximate contours. Spoil material will be pushed and/or conveyed back into the excavated pits and then regraded to an approximate 20° slope. The spoil swell, approximately 20%, will balance the coal removed during exploration. No backfilling problems are anticipated as a result.

Final regrading of the pit areas and topsoil material placement along with revegetation will be carried out as outlined in Subparts 8.2g and 8.2h.

8.2g Topsoil removal, storage, and redistribution

Topsoil removal and storage was completed under MLUP 182-102 for the test pit operation. Therefore, topsoil stabilization during storage and redistribution after final backfilling and regrading will be one of the major emphasis under this exploration permit application. The "Blue" pit and "Red 2" pit topsoil storage areas are shown on the Exploration and Reclamation Map and Drainage Plan Map.

Segregating of spoil and topsoil in the lower portion of the "Blue" pit will be difficult because of previous contamination. All efforts will be made to minimize topsoil loss during final reclamation. It is felt that adequate material is available within the permit area to return the exploration pits to an equal or better pre-exploration condition.

Detailed drainage and sediment controls for the "Blue" pit and "Red 2" pit are outlined at 8.2h and shown on the Drainage Plan Map. The new drainage plans should provide better protection against wind and water erosion, leaching

of nutrients and organic material, contaminants, and unusual compaction. Any additional controls needed to assure stabilization of topsoil and spoil storage areas will be taken.

The reclamation test plot study for each pit area is planned to continue through four (4) growing years. Final reclamation plans will be based on the results of this study. After the test plot study is completed, the disturbed areas will be returned to their approximate original contour and final reclamation started. Topsoil or an approved topsoil substitute will be redistributed as outlined below.

- 1) After final grading and before replacement of the topsoil or substitute material, the regraded areas will be treated to eliminate slippage surfaces, and to promote root penetration.
- 2) Topsoil materials will be redistributed in an approximate uniform thickness that is consistent with the post-exploration land use, and conform to the contours and surface water drainage system.
- 3) Topsoil material will be redistributed in such a manner as to prevent unnecessary compaction.

8.2h Seed mix, application rates, seeding method and other procedures to be implemented in the establishment of a vegetative cover on all disturbed areas

Areas disturbed by exploration activities will be stabilized and revegetated on a temporary basis until all exploration activities are completed. These areas will be graded to a stable contour, fertilized, and planted with the mixture of introduced species shown below.

DISTURBED AREA SEED MIXTURE

| Species            | Variety | Lb. PLS/Acre<br>(Broadcast)<br>(Planned) | (1983) <sup>1</sup> |
|--------------------|---------|--|---------------------|
| Hard Fescue        | Durar   | 5  | 5                   |
| Kentucky Bluegrass | Nugget  | 7  | 17                  |
| Meadow foxtail     | --      | 5  | --                  |
| Smooth brome       | Manchar | 10                                       | --                  |
| Annual ryegrass    | --      | 5  | 8                   |
| Alsike clover      | Aurora  | 2  | 3                   |
| Total              |         | 34                                       | 33                  |

<sup>1</sup>The mixture used in 1983 differs from that reviewed by Diamond Shamrock, ERT, and DMEM in March 1983 due to difficulties encountered in obtaining meadow foxtail and smooth brome. These two species will be included in 1984 seedings if adequate seed can be obtained.

area will be graded to a maximum 3 to 1 slope. This will assure that sedimentation control will be maintained in the "Blue" pit.

Silt fences will be placed, at a minimum, around the perimeter of the spoil area below the test pit, around the level test plot area, and at other potential problem areas as shown on the Drainage Map. Note that additional silt fences will be installed as needed to assure compliance with all applicable standards.

The topsoil storage areas and other disturbed areas will be stabilized and revegetated on a temporary basis until all exploration activities are completed. This will minimize any topsoil loss and control erosion. Reference item 8.2h for detailed revegetation plan.

#### Red #2 Test Pit

Drainage controls for the Red #2 test pit will consist of diversion ditches, silt fences, slope reductions, temporary revegetation, and culverts. Reference Attachment D for diversion ditch and culvert design calculations.

Diversion ditch R-1 will control runoff from above the test pit and divert water to either side of the pit. Log water bars will be used to control runoff velocities.

Diversion ditch R-2 and R-2A will be used to control runoff from the side of the test pit and protect the topsoil storage area from erosion and contamination. Log water bars will be used to prevent erosion and control critical velocities in the ditch. The entrance into ditch R-4 will be protected by additional log water bars or by increasing the height of the diversion ditch.

Diversion ditch R-3 will be used to control runoff from the spoil storage area and protect the topsoil storage area from erosion and contamination. Log water bars will be used to control runoff velocities in this ditch.

Diversion ditch R-4 will control runoff from the test pit area and control runoff from part of the spoil storage area. Water bars will be used to control runoff velocities. Silt fences will be used at the exit of ditch R-4 for sediment control. A portion of the spoil storage area below the test pit will be gently sloped to drain toward ditch R-4.

Diversion ditch R-5 and R-6 will control drainage from the remaining portion of the spoil storage area. Runoff will exit through a 24 inch corrugated metal pipe. Silt fences will be installed as shown on the Drainage Map.

The lower topsoil storage area located on the pit side of the corrugated metal pipe will be protected by gently sloping the spoil toward diversion ditch R-5. Vegetation will be established as quickly as possible in order to prevent erosion. Other topsoil storage areas will be protected by quickly establishing vegetation.

The two test plot areas will be protected by diversion ditches or silt fences as shown on the Drainage Map. Additional silt fences will be installed as needed.

fences as shown on the Drainage Map. Additional silt fences will be installed as needed.

Type of Sediment Fence and Anchoring

The type of sediment fence in use is a fabric Myrafyi, manufactured by the Dominion Textile Company.

The anchoring method now being used is wood stakes driven into the ground. The Myrafyi is nailed to the wood stakes and the bottom covered with native material.

Maintenance Schedule for Drainage Control Structures

Visual inspections will be made of all drainage control structures under the following schedule:

Visual inspections will be made during the first week of each month listed below:

January  
April  
July  
October

*ask for additional  
summer checks?*

Additional inspections will be scheduled after large storm events that may cause damage to drainage and control structures.

Surface Water Monitoring Program

A surface water monitoring station, #001, is proposed below the "Red #2" pit where runoff discharges from the permit area. Reference the Exploration and Reclamation Map for the proposed location.

The monitoring schedule is outlined below:

Surface water monitoring of suspended and settleable solids will be conducted during the first week of each month listed below:

April  
May  
June  
July  
August  
September  
October  
November

8.2k Handling and disposal of known acid-forming or toxic-forming materials, if any

There are no known acid-forming or toxic-forming materials within the exploration permit area. However, all spoil and waste from the exploration operation that may be detrimental to vegetation or may adversely affect water quality will be buried within the exploration pits and protected from erosion

and contact with surface water. Also, reference Attachment A for Soil Test Results Summary.

Preliminary overburden and interburden samples were collected between September 1981 and March 1983, as part of the Preliminary Design Phase of the Diamond Chuitna Project. Sample analyses from drill holes (1312-24C and 1312-24C-1) are presented as Attachment B.

### 8.21 Removal of all facilities and equipment

All areas affected by exploration will be returned to their approximate original contours and reclaimed as outlined in 8.2f, g, and h above.

All facilities and equipment will be removed as exploration and reclamation activities allow, but certain drainage controls will remain in place until final revegetation is established.

8.3 Provide a timetable for each phase of exploration and reclamation including starting and ending date, type of disturbance, area of disturbance, and reclamation measures.

#### Exploration

All major disturbances related to coal removal were completed under MLUP 182-102.

#### Reclamation

The Reclamation Test Plot Study is scheduled to continue through four (4) years, and permitting is scheduled through the Spring growing season of 1988. At the request of the ADNR/Division of Mineral and Emergency Management, a process for annual reassessment of the status of the test pits by both the applicant and the Division is being incorporated into this permit. A request for continuation of the Revegetation Test Plot Study will be submitted by November 1 of each year. The request will include a summary of data collected during that growing season. If the request for continuation is not made, reclamation will be started under the timetable below:

|                                 |                                   |
|---------------------------------|-----------------------------------|
| Backgrading of Pit Areas        | January 1, 1985                   |
| Regrading of Disturbed Areas    | February 1, 1985                  |
| Redistribution of Topsoil       | May 1, 1985                       |
| Revegetation of Disturbed Areas | May 15, 1985                      |
| Removal of all Facilities       | November 1, 1985                  |
| Removal of Drainage Structures  | After establishment of vegetation |

If approval is granted for continuation of the Revegetation Test Plot Study, the years presented in the timetable above will be changed to reflect the following year. The months and days will remain the same as presented above. Reference the field trip notes below and the analysis section of the Reclamation Study Plans (Attachment A) for 1984 study plans. The Division of Minerals and Energy Management will be notified of any changes to the 1984 test plot study.

4.5 Basis by which the applicant claims the right to enter the land for the purpose of conducting exploration and reclamation.

Leases from Alaska Division of Lands:

Lease Nos. 36911, 36913, 36914 and 37002 dated May 10, 1972.

Lease No. 59502 dated July 1, 1978.

Subleased by Diamond Shamrock Chuitna Coal Joint Venture dated August 4, 1981.

Approved by the Commissioner of Natural Resources on August 3, 1981.

FIELD TRIP REPORT - DIAMOND CHUITNA PROJECT  
REVEGETATION TEST PLOT CONSTRUCTION  
AUGUST 31, 1983-SEPTEMBER 14, 1983

The objectives of the field trip were to: 1) select and establish herbaceous seed mixture plots on level and 3:1 slopes on the Red #2 and Blue test pits; 2) select and establish qualitative plots on topsoil material existing at that time as topsoil berms; 3) install moisture-temperature cells on selected plots; 4) plant four tree species on level and sloping plots on each pit and the topsoil material; 5) coordinate with the Alaska Plant Materials Center to plant four species of willow cuttings on level and sloping plots on each pit and topsoil material; and mulch all 3:1 plots. The following presents a record, by date, of how these objectives were accomplished.

August 31-September 3

S. Long arrived in Anchorage to purchase equipment and materials for use in establishing test plots. Seed materials, rakes, shovels, broadcast seeders, and fertilizer materials were purchased from Alaska Mill and Feed Co. The four tree species, recommended by the Division of Forestry (ADNR), were obtained from the Alaska State Forest Nursery in Eagle River. These species were white spruce (Picea glauca), lodgepole pine (Pinus contorta latifolia), paper birch (Betula papyrifera), and balsam poplar (Populus balsamifera). The stock for each had been hardened for approximately four weeks prior to pickup.

September 5

S. Ellis arrived in Anchorage. Long and Ellis collected field equipment and materials and flew to Shirleyville via Alyeska Airways.

September 6

Long and Ellis flew to the pits from Shirleyville and discussed plot construction and grading needs with the EXSCO supervisor on site. It was evident that due to spoil physical conditions, equipment capabilities, and access conditions the choices for siting blocks of plot would be limited.

The waterlogged condition of the spoil plus the areal requirements for plots eliminated much of each pit site from consideration. After pit evaluation and subsequent discussions it was decided to locate the Blue 3:1 plot block below the access road leading into the pit. The block would be two plots wide and six plots long. Each plot was to be approximately 15 feet by 15 feet. The Blue level plots would be located on the graded area extending out from the covered pit floor. The plot block would be four plots long and six plots wide. The Blue 3:1 plots were located at the base of the access road leading into the pit. The plot block extended down to the bench directly above the lower topsoil stockpile. The Blue level plots were located on the bench immediately below the 3:1 plots. Dimensions for the 3:1 and level plot blocks were 4 plots x 3 plots and 12 plots x 1 plot, respectively.

The sites selected for plot blocks required additional grading work before plots could be fertilized and planted. The site for the Blue 3:1 plot block had to be extended downslope to allow room for plot installation. Similarly, the pit floor had to be extended and leveled slightly to provide space for all Blue level plots. At the Red Pit, the 3:1 site, which had been previously graded, required significant leveling to eliminate swales. The site selected for the Red level plots needed to be extended slightly and smooth-graded. Boundaries were measured for all plot blocks with the exception of the Red level block as work was currently being conducted by EXSCO to remove spoil from the lower topsoil pile. Stakes were set at the boundaries as a guide for the equipment operators. A dozer was sent to the Blue pit to begin grading the sites selected for plot establishment.

Ellis and Long flew to the Tyonek sawmill to determine the availability of wood chips and found approximately ten acres of wood chips available. Five coal bags obtained at the EXSCO operation were left at the sawmill site to be filled the following day.

#### September 7

The bulk of the day was spent bagging and transporting wood chips to the site. Five bags were filled to a weight of approximately 500 pounds. The helicopter slung three bags to the Blue Pit and two bags to the Red Pit. Due to the requirements of four other field crews, the slinging operation required more time than expected. Following the delivery of

The helicopter slung three bags to the Blue Pit and two bags to the Red Pit. Due to the requirements of four other field crews, the slinging operation required more time than expected. Following the delivery of

the last bag of chips to the site, Long and Ellis flew to the Blue Pit to discuss final grading with the dozer operator.

#### September 8

The majority of the day was spent leveling the plots by hand and preparing the seedbed for seeding. The surface of the plots was very sandy making leveling relatively easy. Ridges and depressions left by dozer grading were leveled with shovels and cultivators. After plots were leveled, they were raked to prepare the seedbed. The four plots at the top of the slope were noticeably compacted in comparison to lower plots. Moisture content of plots increased downslope such that free water was accumulating at the toe of the slope after grading was completed.

Plot boundaries were staked on both the Blue 3:1 and level plot blocks. Plot dimensions were 15 feet x 15 feet with a one-foot buffer between plots. Plots on the Blue 3:1 plot block were fertilized with a hand-operated spreader. Blended fertilizer was applied to the plot blocks at the equivalent rate of 80-90-80 lbs/acre in accordance with recommendations from Mr. Gary Michaelson of the Agriculture Experiment Station in Palmer. This rate was based on soil tests conducted on representative spoil samples from the pit area.

#### September 9

The Blue level plots were leveled by hand and the seedbed was prepared in the same manner described for the Blue 3:1 plots. No differences in compaction between plots were noted; however, a seep was developing at the pit end of the plots. This seep continued to develop during the week and resulted in a small, contained, surface flow affecting three plots. Plot surfaces were sandy in nature and similar to the 3:1 plot surfaces. The Blue level plot block was fertilized in the same manner and at the same rate as the Blue 3:1 plots.

The plots in both plot blocks were seeded according to a randomized schedule. Six plots in each block were seeded (fall seeding); three to a native mixture and three to a mixture of native and introduced species. Six plots in each block remain to be seeded in the spring. All seeding was completed from pre-measured seed mixture packages containing seed weighed to match the specific plot size. Equivalent per acre rates are

specified in the March 1983 study plan. Seed mixtures were recommended by Dr. William Mitchell of the Agricultural Experiment Station in Palmer and reviewed by Mr. Calvin Miller of the Soil Conservation Service, Anchorage. Following seeding, all plots, seeded and unseeded, were raked to cover the seed and incorporate fertilizer into the seedbed.

Four sets of moisture-temperature cells (model MB-310 from Soil Test, Inc.) were then buried utilizing a hand auger in the 3:1 and level plot blocks. Each plot block received two sets of cells. One set was buried in a plot seeded to the native mixture and one set was buried in a plot seeded to the native and introduced mixture. Each set consisted of four cells buried to 5, 15, 25, and 50 cm depths.

Wood chip mulch was then hand broadcast over the surface of all 3:1 plots on the Blue Pit. Application rate equalled 80-90% surface coverage over the plots.

Six EXSCO employees assisted in plot leveling, raking, and mulch application.

#### September 10

Ellis, Long, and Duncan spent the majority of September 10 leveling the Red 3:1 plots. Previous grading had left numerous swales on this site. EXSCO provided a dozer which attempted to rectify this condition. Through repeated attempts, the dozer eliminated some swales but, because of the nature of the spoil, created other surface irregularities. It was clear that the surface would have to be leveled by hand. This was completed to the degree possible with the use of shovels, cultivators, and rakes. Given the clayey, cloddy nature of the spoil and the spoil moisture content, it was not possible to eliminate surface irregularities completely. Minor swales and ridges are present in the lower half of the plot block. The upper half of the plot block is relatively smooth but exhibited compaction which could not be completely relieved with hand tools.

Following grading, the individual plot borders were staked on the 3:1 plot block. Plot size was 15 feet x 15 feet with a one-foot border between plots. The plots were fertilized, seeded, and raked. Two sets of moisture-temperature cells were installed; one in a native mixture plot and one in a native and introduced mixture plot. Specifications,

materials, and methods for fertilization, seeding, raking, and moisture-temperature cells were the same as for the plots at the Blue Pit.

The compacted nature of the plots on the upper half of the block prevented seed from being completely covered during raking. The rough, cloddy surface of the lower plots prevented any raking after seeding but it appeared that the majority of seed settled in cracks and depressions among surface clods.

#### September 11

The morning and a portion of the afternoon were spent by Long, Ellis, and Duncan planting trees on all blocks with the exception of the Red level block. This site had not yet been prepared due to on-going construction. Ten seedlings of each species obtained from the Palmer nursery were planted near each block. Planting methodology consisted of digging a hole deep enough to accommodate the root system without bending, placing the seedling in the hole, and backfilling the hole while tamping the backfill to properly support the seedling. All seedlings were watered to eliminate air spaces in the backfill material. A small amount of wood chips was placed around the base of the seedling as a mulch. Tree planting sites were seeded to the native seed mixture. The site was raked lightly to cover the seed. All tree planting sites were fertilized at the time of plot fertilization.

Following seedling planting, the topsoil stockpile to the west of the Red Pit was prepared and planted. On the previous day, the stockpile had been graded by EXSCO. The form of the stockpile consisted of a relatively level, narrow bench at the peak with sides sloping down to the natural terrain. The stockpile was divided into four, 50-foot long plots. The pile was then raked to fill in depressions, eliminate ridges, and prepare the seedbed for fertilization and seeding.

The stockpile was fertilized using the same rate/acre and material as noted under the discussion for the Blue Pit blocks. This corresponded to recommendations based on laboratory analysis of soil samples taken previously. Two 50-foot sections were then seeded by hand broadcasting at the same rate/acre as for the Blue plots. The lowest (north) section was seeded to the native mixture. The section immediately above was seeded to the native and introduced mixture. (The two upper 50-foot sections remain to be seeded in the spring.) Ten seedlings of each tree

at the same rate/acre as for the blue plots. The lowest (north) section was seeded to the native mixture. The section immediately above was seeded to the native and introduced mixture. (The two upper 50-foot sections remain to be seeded in the spring.) Ten seedlings of each tree

species were planted in the lower section using the methodology previously described.

The upper half of the Red 3:1 plot block was mulched with wood chips.

#### September 12

Nancy Moore from the Plant Materials Center in Palmer joined Long and Ellis on site. Moore provided five species of willows and one dogwood species for testing on site. These species were feltleaf willow (Salix alaxensis), park willow (S. monticola), grayleaf willow (S. glauca), Bebb willow (Salix bebbiana), pacific willow (Salix lasiandra), and red-osier dogwood (Cornus stolonifera). All plants were in the form of cuttings.

Willows were planted on both the Blue blocks and the Red 3:1 block. Methodology was the same as for the tree plantings previously mentioned except that cuttings were not watered. Watering was not done at the request of Moore.

Mulching of the Red 3:1 plots was completed. The entire topsoil stockpile was lightly raked to cover seed and incorporate fertilizer into the soil.

Moore established small grass plots on the Red Pit spoil adjacent to the sediment pond to test the germination and establishment.

#### September 13

The majority of this day was spent preparing the Red level site for plot installation. Though twelve plots are required for a complete fall/spring study, only six plots could be constructed due to the physical nature of the spoil material on the site. Near continuous rain during the previous 36 hours had saturated the spoil and made it extremely difficult to work by hand. Previous dozer-grading work had leveled the site but had left deep ruts and high ridges on the surface which had to be eliminated. In addition, drainage from the adjacent spoil, despite the constructed drainage ditch, flooded the center portion of the site.

Given these constraints as well as the time factor, it was decided to prepare only the six plots required for fall seeding during this field trip. The six plots required for spring seeding would be constructed during the spring 1984 field trip. To this end, the area required for six plots on the bench was leveled to the degree possible. Plots measured 15 feet x 15 feet with a one-foot buffer between. Six plots were staked

and the plots broadcast fertilized using the same rate and materials described for the Blue plots. As before, this rate was based on soil test recommendations. Three plots were broadcast seeded to the native mixture and three plots were seeded to the native and introduced mixture. Seeding was accomplished by using premeasured seed mixture packages as previously described.

Tree seedlings along with willow and dogwood cuttings were planted at the far end of the bench. The method for planting was the same as previously described except that no seedlings were watered. Because the spoil material was saturated with water from rain the previous 36 hours, it was concluded that watering was not necessary.

Soil moisture-temperature cells will be installed during the spring 1984 field trip.

September 14

Long and Ellis returned to Fort Collins.

- 8.4 Give an estimate of the quantity of coal to be removed during the exploration. Specify method used to measure quantity.

Not applicable - no coal is to be removed under this exploration permit.

- 8.5 Give a detailed estimate of the cost of reclamation of all areas to be affected by exploration activities.

|                                     |               |
|-------------------------------------|---------------|
| Backgrading of Pit Areas            | \$ 50,000     |
| Regrading of Disturbed Areas        | 10,000        |
| Redistribution of Topsoil           | 20,000        |
| Revegetation of Disturbed Areas     | 10,000        |
| Removal of Facilities               | <u>10,000</u> |
| Total Estimated Cost of Reclamation | \$100,000     |