

K-ELK RIVER 78 (10) A.

Report on

The 1977/78 Development Work  
carried out on the  
Elk River Coal Project

**ELCO MINING LIMITED**

GEOLOGICAL BRANCH  
ASSESSMENT REPORT

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*K-ELK RIVER 78 (10) A*

Report on

The 1977/78 Development Work  
carried out on the  
Elk River Coal Project

Coal Licence Numbers 64, 65,  
421-434 incl., 481-489 incl.,  
515, 771-779 incl., 951-957 incl.

NTS Map: MOUNT HEAD 82J/7W

Submitted to the  
B.C. Ministry of Mines and Petroleum Resources  
Calgary, Alberta, February 26, 1979

*G. F. Lawrence*  
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Chief Geologist.

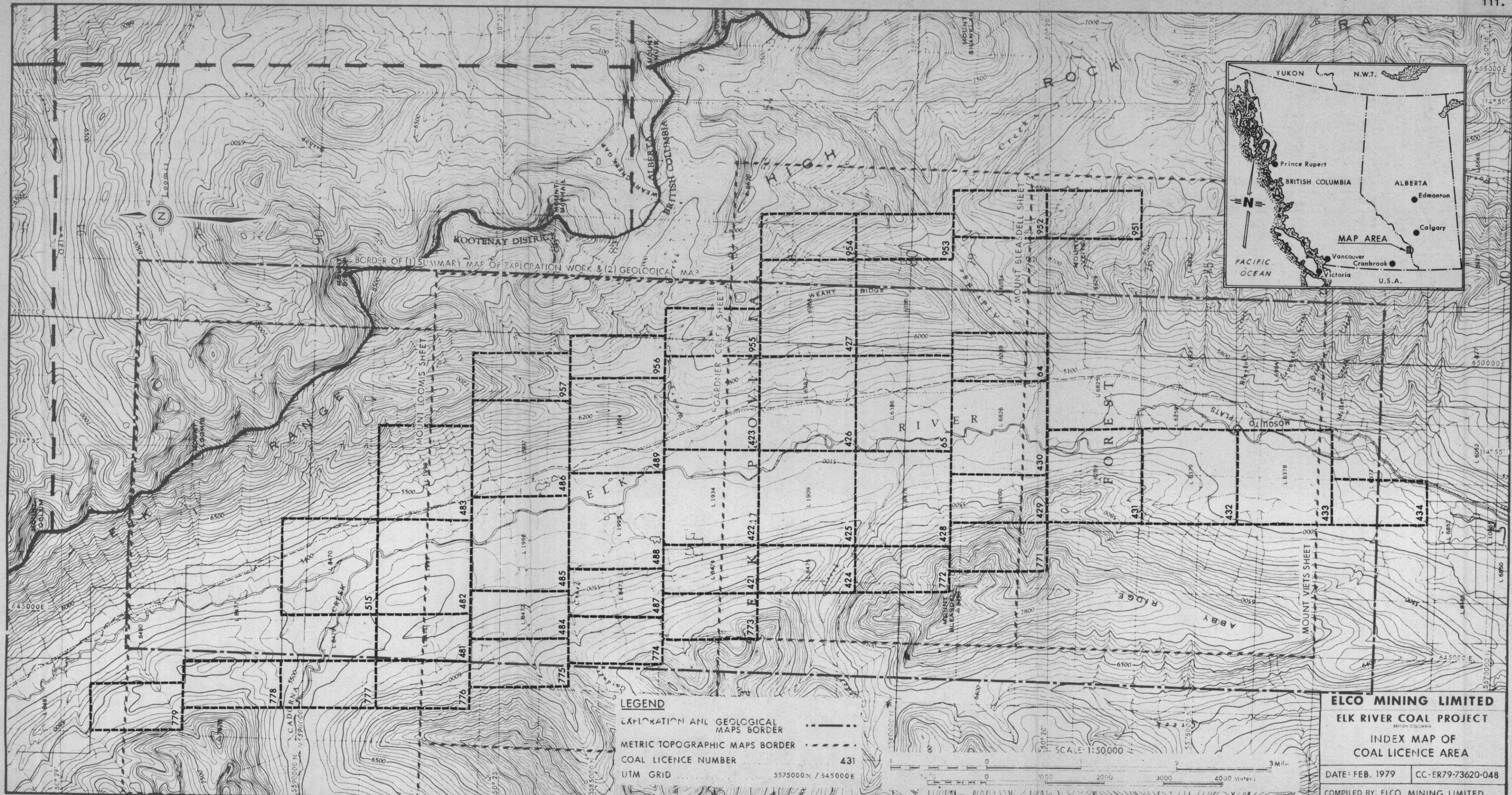
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**LEGEND**  
 EXPLORATION AND GEOLOGICAL MAPS BORDER .....  
 METRIC TOPOGRAPHIC MAPS BORDER .....  
 COAL LICENCE NUMBER ..... 431  
 UTM GRID ..... 5575000N / 545000E



**ELCO MINING LIMITED**  
**ELK RIVER COAL PROJECT**  
BRITISH COLUMBIA  
**INDEX MAP OF COAL LICENCE AREA**  
 DATE: FEB. 1979 CC-ER79-73620-048  
 COMPILED BY: ELCO MINING LIMITED



## INTRODUCTION

Unlike the 1976/77 Report, which dealt mainly with the exploration field work and coal quality test work, this Report, including the period from November 1\*, 1977 to October 31, 1978, deals mainly with the supplementary work directed towards the development of the Elk River coal licences. However, a small amount of "on-property" work is also included. The supplementary work is of the nature of feasibility studies and technical review, from which was produced, the Elk River Feasibility Report, and the Elk River Stage II Report.

Much of the supplementary work was begun in the 1976/77 report period, but extended into the 1977/78 report period. In certain sections, the work conducted in the previous report period is briefly described in order to indicate to the reader the nature and purpose of the work conducted in the current report period. Work costs, however, were only taken from the current report period. Some so-called "residual costs" which were included in the 1977/78 statement were incurred in the 1976/77 period. These are costs which were either not charged to Elco in 1976/77 or are audit corrections.

## EXPLORATION SUPPORT WORK

The early part of this report period saw the completion of the evaluation of the earlier exploration work. The work completed during this report period is briefly described below.

### Topographic Map Development

Final editing and updating of the new metric topographic mapping, as produced by the Geomap 80 computer system was completed. The use of this mapping system made it possible to store the surface data from within the proposed minesite into the geological data bank for later mining evaluations. This mapping was described in detail in the 1976/77 report.

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\*Due to monthly accounting procedures, Elco is not able to report from December 6 to December 5, the licence calendar year, therefore, the October month end statement is used.

### Residual Exploration Costs

Minor drilling and camp operation costs have been claimed for this report period. These are residual costs that were incurred in the previous report period, but were neither charged to, nor claimed by Elco until this period. These late charges are mainly due to audit corrections.

### Government Permits and Reports

Several weeks of work were spent preparing various government reports and permits. The following is a list of these activities:

- Extending Term of the Coal Licences - 1978,
- Payment of stumpage fees for 1976/77 field work,
- Reclamation Report on 1976/77 Field Work,
- Renewal of Reclamation Permit, C-49,
- Preparation of an adit location map for the Mines Inspection Branch.

In addition, some time was spent evaluating the effects which the 1978 Amendments to the Coal Act would have on the Elk River Project.

### Reclamation

Upkeep maintenance work was required on two of the 1976/77 exploration trenches. Subsidence combined with spring runoff caused minor erosion and slumping. Installation of a drainage pipe into a natural spring outlet, regrading and reseeding was completed.

### Laboratory and Quality Control Work

Samples retained from the 1976/77 drilling program were rerun to double check earlier phosphorous tests and to test, in particular, the phosphorous content of the ultrafine fractions. The analysis results indicated lower phosphorous contents for some peak values. Phosphorous content is extremely critical in the European steelmills.

Additional flotation tests were run in support of the Elk River preparation plant design. Evaluation of these tests indicated the possible existence of certain middling fractions. Since Elco no longer had enough sample material left over from the 1976/77 exploration program, and due to the extremely high costs of obtaining additional bulk samples, especially in the early winter months, arrangements were made to obtain a 10 tonne bulk sample from Fording Coal Ltd. Fifty drums were packed, sealed and sent to Humboldt/Wedag in West Germany. Details of the testing are described later under Coal Preparation.

#### Geological Data Bank

The geological database and its programs which were established within the 1976/77 report period for coal reserve and quality calculations, waste rock calculations and graphical output in the form of geological and mine plans, was tested and partially used to support Elco's feasibility studies and technical review during this report period.

### TECHNICAL REVIEW AND FEASIBILITY STUDIES

#### Raw Material Assessment

##### Feasibility Study

Supported by both computer and conventional methods, assessments of the Elk River geology, coal quality, geological coal reserves, mineable reserves, together with waste rock calculations and product blend determinations were completed. Final chapter reports and supportive graphics were completed and incorporated into the Feasibility Report. Assistance was rendered to mine planning by compiling specially drafted sections and bench faces.

Economic analysis of the Elk River Project was carried out on the results of the geological assessment work, and the engineering assessment work which is described later.



### Stage II Report Preparation

Upon completion of the Feasibility Report, work began on the preparation of data for the Stage II Report. Several months' work involving report writing and graphics was involved here. The final draft was compiled into the main Report and submitted to the Coal Guidelines Steering Committee (CGSC) for review.

### Coal Licence Boundary Investigations

Using the original coal licence survey data, circa 1906, a plan of the coal licences was produced. The plan was overlain on existing topographic maps in order to check the surveyed land features with the more recent mapping. It was found that some features matched quite well while others did not. In September 1978, two Elco staff spent three days in the field searching for old survey evidence, however, nothing was found. Preliminary estimates were obtained from a B.C. survey firm for relocating the licence boundaries. To date, no further action has been taken.

### Phase Ib Planning and Scheduling

In March 1978, a work schedule and budget for the 1978/79, Phase Ib planning activities was prepared.

### Geotechnical Investigations

In September 1978, a review of the 1976/77 geotechnical exploration work on the mine was undertaken. In October 1978, preliminary planning of the Phase Ib-3 geotechnical work requirements was undertaken. Arrangements were made with geotechnical engineering firms to make detailed work proposals and budgets. This planning will continue in the 1978/79 report period.

### Engineering Development Work

Several areas of investigative engineering work aimed at developing the

Elk River coal licences have been undertaken. Thorough studies in these areas were required to determine the feasibility of developing a mine. These studies, which were mainly carried out during the 1976/77 report period, were finalized and compiled into the successful Elk River Feasibility Report during the current (1977/78) report period. The Stage II Report was also completed during this period. Following its submission to the B.C. Coal Guidelines Steering Committee (CGSC), Elco staff has been engaged in interfacing and follow-up work with various CGSC sub-committees. Review of existing technical studies, and planning and budgeting for upcoming pre-construction design studies has been started.

The following is a summary of the various studies and engineering work which has been carried out during this report period.

#### Mine Engineering

The mine planning concept which had been conceived earlier was finalized and checked in detail with particular emphasis on the proposed equipment selection and mine operating costs. Performance charts were established and final equipment selections were made. The amount of equipment required and the operating hours from year -3 to year +20 were determined. An initial investment and a replacement capital schedule was compiled.

A drilling and blasting concept and a yearly manpower schedule for hourly paid personnel were also established.

Final drafts and supportive graphics for the sections covering Mining Conditions, Mining Potential, Ultimate Pit Design, Mining Concepts, Equipment Selection and Preproduction were completed for the Feasibility Report. All backup material for the mining chapters of the Feasibility Report was compiled and documented.

A mining report and supportive graphics was prepared and completed for the Stage II Report which was submitted to the B.C. Coal Guidelines Steering Committee for review.

Investigations were made regarding further development of the Data Bank.

A detailed work scope and budget was prepared for the 1978/79 Phase Ib mine development planning activities.

### Coal Preparation

In the previous report period it was determined that in order to produce a product which would meet both European and Canadian steel mill requirements, blending of the three main quality seam groups would be necessary. To handle the blending, a large raw coal blending facility had been designed. During this report period, the final draft and the supportive graphics for the Raw Coal Blending Facility was prepared and completed for the Feasibility Report.

Final yield range calculations were made for the proposed preparation plant facility. The final draft and supportive graphics for Coal Preparation were then completed for the Feasibility Report.

The Raw Coal Handling and Preparation Plant sections for the Stage II Report were drafted and reviewed. The final draft and the supportive graphics were then completed.

A ten tonne bulk sample was obtained from Fording Coal Limited and sent to KHD/WEDAG in Bochum, West Germany for washability tests. Samples were then sent to Rohstofftechnologie Overseas Engineering GmbH in Berlin for flotation testing. The test results indicated that two cut point flowsheets for this coal can be developed, that is, mid-gravity coals do exist in this East Kootenay coal. These results are now being compared with the washability data of the Elk River R.O.M. coal and the degree of similarity will be defined. The final report is expected early in the 1978/79 report period.

### Service and Support Facilities

Investigative studies on the service and support facilities for the



proposed mine were undertaken in the previous report period. Capital cost estimates were assembled and the final draft and supportive graphics were prepared and completed for the Feasibility Report during this report period. The facilities studied and reported on include the following:

Support Facilities

Central Service Shop  
 Heavy Equipment Shop  
 Preventative Maintenance Shop  
 Light Equipment Shop  
 Yard Shop  
 Warehouse  
 Bulk Fuel Storage  
 Lube Storage  
 Large Spare Parts Storage  
 Ammonium Nitrate Prill Storage  
 Changehouse  
 Environmental Facility  
 Administration Building

Onsite Utilities

Utilities Building  
 Steam Heating System  
 Fire and Potable Water  
 Sewage Treatment Plant  
 Power Distribution  
 Communications

The Service and Support Facilities section for the Stage II Report was drafted and reviewed. This was later incorporated into the main report and submitted to the B.C. Coal Guidelines Steering Committee for review.

Meetings were held with various mine and heavy equipment manufacturers to discuss and inspect new equipment that is becoming available. Elco is very interested in the large new hydraulic shovels, which may be ideally suited to the mining of thin, dipping coal seams. Two, newly marketed, large dozer tractors were inspected and assessed as well.

A comparison study between Elco's equipment mechanical availability figures and operating costs used in the Feasibility Report proved favourable with Fording Coal Limited's actual experience.

Elco conducted a small study in support of B.C. Hydro's feasibility study on the availability and characteristics of refuse and thermal coals from the East Kootenay Region, with a view to firming supplies for a possible 600 MW thermal generating plant.

### Infrastructure

Access Road: Capital cost and operating cost estimates were assembled and finalized. The final draft and supportive graphics were completed for the Feasibility Report.

Railway: The final draft and supportive graphics for the sections covering Railway Line, Rolling Stock, and Unit Train Operations were completed for the Feasibility Report.

Technical discussions were held with CP Rail regarding car weights and identification.

Negotiations with CP Rail regarding tariff on rate and non-rate items have been conducted.

Port: The final draft was completed for the Feasibility Report.

Offsite Power: The capital cost estimate for offsite power was finalized. The final draft was completed for the Feasibility Report.

Elco was advised by B.C. Hydro and Calgary Power that these two companies have signed an agreement to construct a 500 kv intertie between Cranbrook and Calgary. This agreement is expected to have a positive affect on reducing the capital cost of obtaining power for the Elk River Project.

Natural Gas Supply: Columbia Natural Gas Limited confirmed a gas supply to 1992 with an assured supply to 1996 and a probable supply beyond that date. An evaluation of the use of natural

gas on the Elk River Project was included in the Feasibility Report. The final draft was completed for the Feasibility Report.

Townsite: In the previous report period, studies for development land selection, environmental analysis, slope analysis, suitability analysis, concept development plans, development phasing plans, major road and sewage line plans and sewage treatment concept plans and the capital and operating cost estimates were completed for two town development alternatives. During this report period, the final draft and supportive graphics for these sections were completed for the Feasibility Report.

Reports and supportive graphics for all of the above infrastructure sections were prepared for the Stage II Report and submitted to the B.C. Coal Guidelines Steering Committee for review.

Substantial additional information, as requested by the Townsite subcommittee of the CGSC, was supplied in order to facilitate its review.

A work scope and budget for the 1978/79 Phase Ib infrastructure development planning activities were prepared.

### Environment

During this report period, the final draft and supportive graphics for the environmental sections of the Feasibility Report and the Stage II Report were completed. The Stage II section was submitted to the B.C. Coal Guidelines Steering Committee for review.

Monthly stream gauging and water quality sampling have been conducted. The growing records from this monthly testing will provide better hydrological design parameters for the mine. One stream flow recording device had to be replaced this year due to vandalism.



A dispersion climatology field study was conducted for Elco during this report period.

A work scope and budget for the 1978/79 Phase Ib environmental work was prepared.

#### Reclamation

Two consulting firms were retained to conduct baseline studies and provide input for the Stage II Report's Development and Reclamation Plan.

A preliminary version of this section has been prepared and was submitted to the B.C. Coal Guidelines Steering Committee for review on October 27, 1978.

#### Socio-Economic Affairs

In the previous report period, a consultant team was retained to complete an economic benefit analysis, and prepare a report on the socio-economic effects of the Elk River Project.

During this report period, the final drafts were completed for the Feasibility Report and the Socio-economic Affairs section for the Stage II Report was completed and submitted to the B.C. Coal Guidelines Steering Committee for review.

A consulting firm was retained to conduct the community consultation program that is required by the Coal Guidelines Steering Committee.

#### Stage II Report Processing

The Stage II Report, less Volume VI - Reclamation, was forwarded to the Coal Guidelines Steering Committee on September 1, 1978. Shortly after, work on producing 35 copies for line agency review under the ELUC-CGSC aegis was commenced.

Since submitting the Stage II Report, Elco has held several informal meetings with subcommittees of the CGSC for the purpose of expediting this Report's review.

### Other Work

Elco has conducted other work in areas that are not necessarily directly related to the above categories. This work is briefly summarized below:

Upon completion of the Feasibility Report, fifty copies were printed and distributed among the technical departments of all the partners involved in the Elk River Project.

Soon after distribution of the Feasibility Report, work began on a project sensitivity analysis using various technical parameters.

Elco has been conducting detailed work, using both inhouse staff and consultants to prepare amendments to the Service Agreements and the fixation of the construction fee with Morrison-Knudsen.

Presentations of the Elk River Project were made to Japanese, South Korean, and Brazilian delegations during this report period. Emphasis was made on the quality of the Elk River product.

Four seminars were attended by Elco staff which were considered important for the development of the Elk River Project. These were:

1. Seminar on "Law and the Construction Industry", Edmonton,
2. First International Symposium in "Stability in Coal Mining", Vancouver,
3. Seminar on "Elements of Geotechnology in the Excavation and Reclamation of Surface Coal Mines", U of A, Edmonton,

4. Fourth International Conference on Coal Research, Vancouver.

#### SUPPLEMENTARY PLAN OF OPERATIONS

Elco, at this time, foresees no exploration field activities in the 1978/79 report period. Should such work become necessary, a Supplementary Plan of Operations will be submitted at least 30 days before commencement of activities.

Elco staff will be engaged in review of previous work, and in the planning and budgeting of preliminary design work foreseen to be commenced during the 1979/80 report period.