REPORT ON
THE 1982 DEVELOPMENT WORK
CARRIED OUT ON THE
ELK RIVER COAL PROJECT





ELCO MINING LIMITED

Manager Elk River Coal Project

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April 29, 1983

Ministry of Energy, Mines and Petroleum Resources, Parliament Buildings, Victoria, B.C. V8V 1X4

ATTENTION: Mr. Paul Hagen, Coal Administrator

Dear Sir:

RE: Exploration and Development Work Report for 1982, Coal Licence No.s 64, 65, 421 to 434, 481 to 489, 515, 771 to 779, and 951 to 957. Elk River Coal Project

Pursuant to Section 18 (1) and (2) of the Coal Act and in support of Elco's Schedule of Expenditures on the Elk River Coal Project during 1982 (submitted February 8, 1983) enclosed is the supporting report, titled, "Report on the 1982 Development Work Carried Out on the Elk River Coal Project". This report has been submitted within the requested 90-day extension, pursuant to Section 18 (4) of the Coal Act.

Further to your letter of April 18, 1983, I concur with you that out of Elco's 1982 Exploration and Development Work Expenditures, work credits of \$169,369.00 can be realized and applied to the coal licences, subject to approval of the enclosed report.

Should you approve Elco's report, I, on Elco's behalf, request that the approved work credits be applied proportionately to all subject coal licences.

Should this approval be realized, could you please supply me with a schedule of accummulated work credits on these subject licences.

Sincerely,

LAWRENCE CONSULTING AND RESOURCES LTD.

Per: . Bay four 2

Consultants to Elco Mining Limited.

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REPORT ON THE 1980/81 DEVELOPMENT WORK CARRIED OUT ON THE ELK RIVER COAL PROJECT

Coal Licence Numbers:

64, 65, 421-434 incl., 481-489 inc.,

515, 771-779 incl., 951-957 incl.

Location:

East Kootenay Regional District of

Southeastern British Columbia.

NTS Map Designation:

Mount Head 82J/7W

Centre of Project:

50°, 24' North Latitude

114⁰, 56' West Longitude

Licence Owners:

Coal Licences are "Held in Trust" by

Canada Permanent Trust Ltd. for the

following owners:

Elco Mining Limited

50%

Stelco Inc.

25%

Home Oil Company Limited

15%

Scurry-Rainbow Oil Limited

10%

Operator:

Elco Mining Limited

Author of This Report:

G. F. Lawrence

Work Performed From:

January - December 1982

Submitted to:

Ministry of Energy, Mines and Petroleum

Resources, Victoria, British Columbia

Date:

April 29,1983

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SECTION 1.0 INTRODUCTION

1.1.0 General Geographic and Physiographic Position of Licences

The Elk River Coal Project is located in the East Kootenay regional district of southeastern British Columbia. Approximate centre of the project area, which consists of 7,782 ha of coal licences on Elk Provincial Forest land, is 50° 24' north latitude and 114° 56' west longitude. The licence area roughly covers the upper part of the Elk River Valley between the confluence of Aldridge Creek and the Elk River in the south and Cadorna Creek and the Elk River in the north. This represents a section of the Elk River Valley approximately 12 km long and includes the eastern and western flanks of the valley. Access is gained to the area along approximately 44 km of B.C. Forest Service Road running northward from Elkford (see Index Map, page 2).

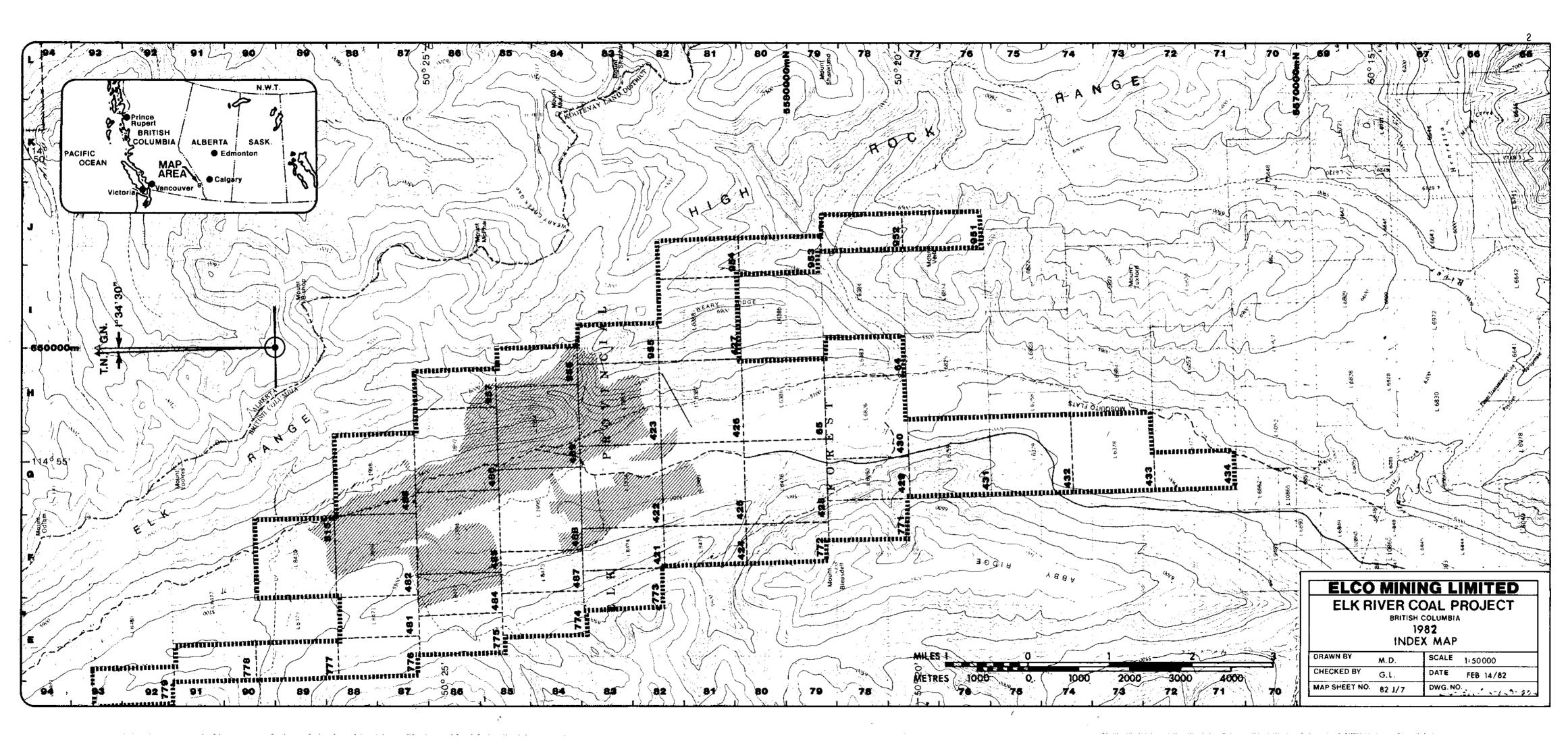
1.2.0 Property Definition

1.2.1 Historical Background

The Elk River coal deposit has been known since 1883 when first examined by Dr. G. M. Dawson of the Canadian Geological Survey. As early as 1905, prospectors had uncovered 22 seams and by 1910, three coal companies had acquired leases in the area. The year 1920 was the first attempt to explore the deposit in any systematic way, with the driving of a 650 foot adit (Aldridge Tunnel) into Big Weary Ridge, approximately one mile south of Weary Creek.

Interest in the Elk River deposit receded after 1920 and most licences were dropped. The area was idle until 1952 at which time, West Canadian Collieries carried out sampling on the Big Weary Ridge exposures.

In 1967, Scurry-Rainbow Oil Ltd. began acquiring the present Elk River licences. In 1968, North American Coal



Corporation, under an option agreement with Scurry-Rainbow Oil Ltd., undertook an exploration program centered primarily on the Big Weary Ridge Area. In 1969, when North American Coal Corporation did not exercise its option, Scurry-Rainbow Oil Ltd. independently extended exploration of the deposit north to include the Little Weary Ridge area.

In December 1969, Emkay Canada Natural Resources Ltd., a wholly owned Canadian subsidiary of Morrison-Knudsen Company, Inc., acquired a 50% interest in the coal licences. Exploration of the licences by the joint owners resumed in July 1970 and continued through the spring of 1971. During this time, additional coal licences were acquired, bringing the total number of individual licences to 42 for a total area of 19,200 acres (7,782 ha).

In May 1975, Elco Mining Limited, acting on behalf of a group of European steel companies, acquired Emkay Canada Natural Resources Ltd.'s 50% interest in the coal licences. During 1975/76, Elco Mining Limited carried out a prefeasibility study which involved exploration in the Big Weary and Little Weary Ridge areas.

In October 1976, the Steel Company of Canada Ltd. and Home Oil Company Ltd. acquired 25% and 15% respective interests from Scurry-Rainbow Oil Limited. A joint venture agreement was then concluded between the following partners with their respective interests:

Elco Mining Limited	50%
Stelco Inc.	25%
Home Oil Company Limited	15%
Scurry-Rainbow Oil Ltd.	10%

1.2.2 Current Owner

Elco Mining Limited was appointed Project Manager and immediately undertook a feasibility study which involved the most extensive exploration program to date. This program, which extended from October 1976 to June 1977, concentrated mainly on the northern half of the valley's east flank which included Little Weary Ridge and part of Big Weary Ridge. Also, for the first time, detailed investigations were carried out on the vertical to overturned seams on the west flank of the valley. The feasibility study was completed January 1978 and preparations of the Stage II submissions ere underway.

The Stage II Report $_1$) for the Elk River Coal Project was submitted on August 28, 1978. Following this, a significant amount of additional work $_2$) was undertaken at the request of the government reviewing agencies.

On February 22, 1979, the Environment and Land Use Committee of the B.C. Cabinet gave approval-in-principle to the project, subject to, however, the completion of an additional program of Stage III work₃).

In 1980 Elco carried out detailed surveying, mapping and geotechnical investigations on the proposed mine and plant site areas, and the proposed rail and access road alignments in preparation for the securing of Stage III development permits and development of engineering designs₄). This work continued into 1981, but at a much smaller scale however. Only the Elk River diversion area was investigated by geophysical survey methods at that time₅). The environmental monitoring programs continued full scale during this period.

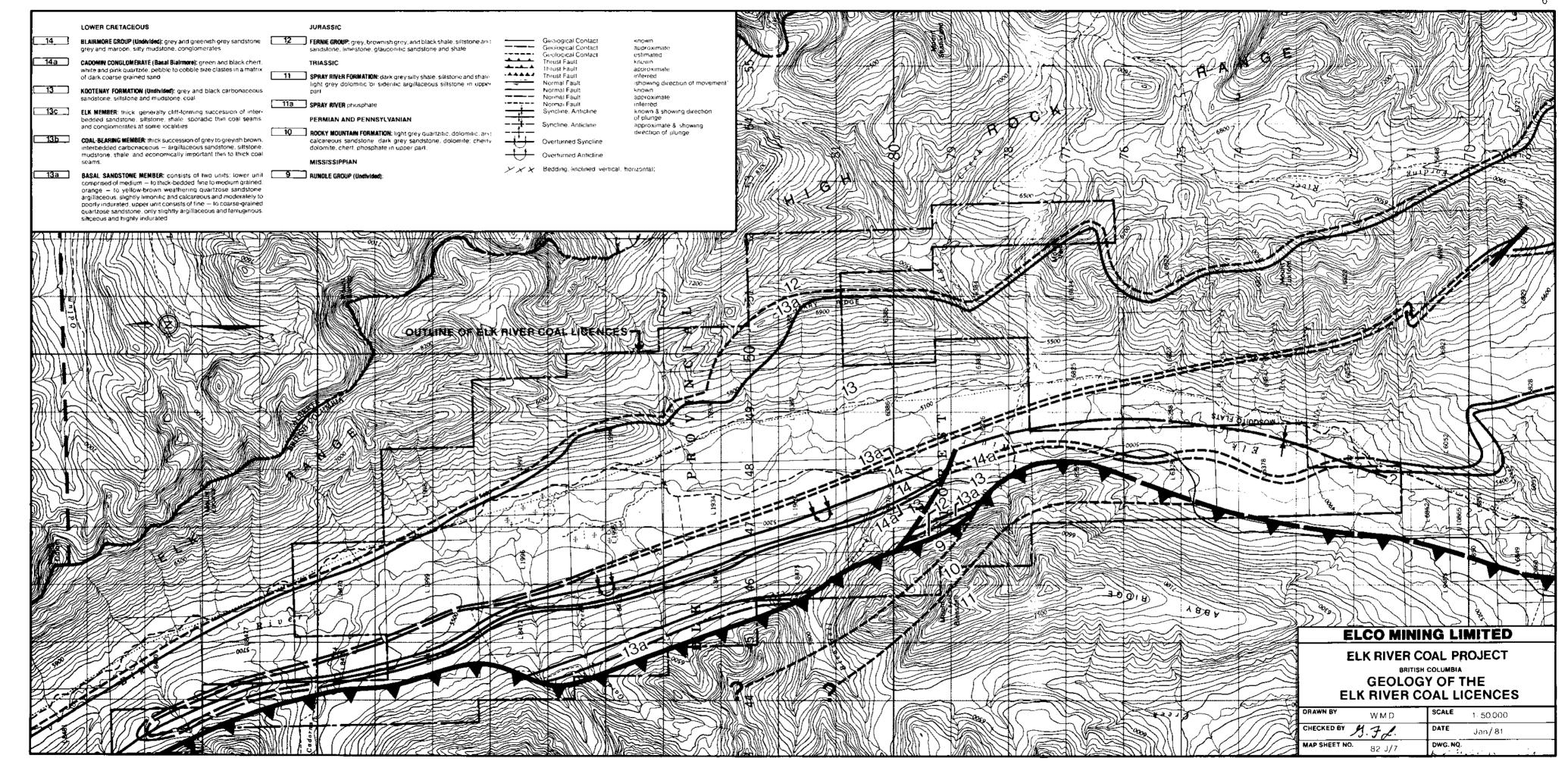
The full impact of first, the high interest rates and inflation of the late 1970's and early 1980's, and second, the world-wide recession and the respective decline in the demand for coal, hit the Elk River Coal Project in September, 1982 when Elco made the decision to temporarily place the Project "on hold". The reclamation and stream gauging programs, however, continue to be maintained at this time.

1.2.3. Brief Economic Assessment

Elco's feasibility study involved a 36-year open pit operation which would produce 4.0 million tonnes of clean, high grade metallurgical coal per year at an overall stripping ratio of 3.27bm³/t. This plan involved the mining and blending of more than 18 seams of varying quality to produce a low volatile, good cokeability product which will meet the requirements of most of the world's coking coal consumers. Additional open pit reserves of similar quality extend southwards into the Big Weary Ridge area which would give at least an additional 20 years of mining at the above rate of production, however, at a somewhat higher stripping ratio (approximately 6.0 bm³/t).

The vertical to slightly-overturned seams located on the west flank of the Elk River coal deposit, in which investigations todate indicate to be a low cokeability, high volatile coal, have an indicated open pit potential of 174 million tonnes of clean coal with an approximate stripping ratio of $7.0 \text{ bm}^3/\text{t}$.

Underground reserves of clean coal from within the total licence area are estimated to be in the order of 600 million tonnes for coking coal and 558 million tonnes for thermal coal (see Geological Map of the Elk River Coal Licences, page 6).



1.3.0 Summary of 1982 Development Work

A small portion of Elco's 1982 work expenditures can be attributed to work programs that were initiated in the previous report period and overlapped into the present report period. Specifically these expenditures were for the geophysical investigations of the Elk River diversion area. Only a brief description of this work will be made in this report since a comprehensive report was included in Elco's report₅) of last year. Other work which Elco undertook in 1982 include:

- Core Storage Repair
- Stream Gauging
- Hydrology Summary Report
- Climatic Monitoring
- Climatological Summary Report
- Reclamation Work
- Harbour Study
- Project Feasibily Update
- Government Permit and Report Preparation

SECTION 2.0 WORK PROGRAMS

2.1.0 Exploration Work

2.1.1 Residual 1981 Geophysical Survey Work Costs

In late 1981, Elco contracted Geo-Physi-Con Ltd. of Calgary to carry out a series of electro-magnetic surveys along the proposed river diversion system. The purpose of these surveys was to identify by other than very extensive drilling investigations, bedrock profiles and overburden types, where structures, such as buried channels, and deposits, such as coarse-grained alluviums, could be water-bearing and potentially hazardous to the stability of the near-by open pit walls.

In all 51 lines totaling 22.9 km were surveyed. It was possible to interpret 74% of the area surveyed. Crosssections showing conductivity profiles and overburden deposit profiles were constructed. As well, maps showing surface overburden types, areas of fine-grained overburden/bedrock contacts and overburden isopachs were constructed. Sufficient information was obtained in order to accurately target those areas requiring followup drilling. Detailed results of this program were given in Elco's 1980/81 report5).

2.1.2 Core Storage Repair Work

Elco contracted Mike Czech Contracting of Coleman to carry out repairs to the Elk River Project's core storage building located in Blairmore, Alberta. Vandals had broken through a door and two dozen windows and tipped over thirteen boxes of core. Repairs consisted of installing heavy planking over the doors and windows and heavy steel hinges and locks to the main door.

2.1.3 Coal Licence Permits and Reports

Considerable time and expense was inccured with the preparation of Elco's 1980/81 exploration and development work report₅) and 1981 annual reclamation report₆). These reports were submitted to the B.C. Ministry of Energy, Mines and Petroleum Resources on February 22, 1982 and May 26, 1982 respectively.

2.2.0 Engineering Work

2.2.1 Coal Transportation - Harbour Study

Elco continued as a member of the Roberts Bank Bulk Terminal Consortium until June 1982 when the membership was dropped. During this time Elco participated in the prefeasibility studies for the proposed port expansion at Roberts Bank.

2.2.2 Project Feasibility Update

As in previous years, Elco, since the completion of it's Elk River Feasibility Report₇, has carried out an annual update of, primarily the economic sections, using the latest coal prices and investment and operating costs. Also considered are the latest technological advances in both mining and transport equipment. For example, the new and now proven, large capacity hydraulic excavators versus the standard heavy duty cable shovels, the use of electric trolly attachments on the haulage trucks along main haul roads, and the substitution of either trolly-truck, cableway or overland conveyor in place of a railway spur line.

The 1982 update not only considered the proposed coking coal project, but also the 1980/81 case study of a possible thermal coal operation on the west flank of the Elk River coal deposit.

As in the previous year's update the economic returns are reflecting the negative impact of high interest rates and inflation figures. In addition, the impending world-wide recession and respective decline in coal markets may in the long term have a more serious impact on the Project than that caused by high interest and inflation rates.

2.3.0 Environmental Work

2.3.1 Stream Gauging

Elco's stream gauging program continued throughout all of 1982 despite the fact that Elco has temporarily placed the Project on hold. Five field trips for the purpose of servicing four permanent hydrometric stations and conducting detailed in-stream flow measurements were made by Elco's hydrological consultant, Hydrocon Engineering (Continental) Ltd. of Calgary.

In August, 1982, in addition to the normal measurements and equipment servicing, the Lower Elk River station, EL-52.5 was decommissioned and the remaining three stations were back-flushed in order to insure that good hydraulic connections were being maintained between the streams and tha gauging wells.

Station EL-52.5 was origanally commissioned to monitor stream flows within Elco's proposed townsite area at Forsyth Creek. Since the townsite is now a dead issue, the data from this station was no longer required.

A summary report₈₎ of the hydrological monitoring results, obtained between the years of 1977 and 1981, was prepared in October, 1982. The results of this report were submitted to the Regional Director, East Kootenays, Ministry of Environment for review by the Water Investigations Branch.

2.3.2 Climatological Monitoring

The 1981 climatological monitoring program was extended to the end of September, 1982, at which time the two climatic monitoring stations and six dustfall monitoring stations were decommissioned. Promet Environmental Group Limited of Calgary carried out bi-monthly field trips in order to retrieve the data and service the instruments. The data was read into Promet's computor facilities and analyzed after each trip.

A report₉) summarizing the results of the climatological work for the period January to September, 1982 was prepared in October, 1982 for subsequent submission to the East Kootenay Regional Director, Ministry of Environment for review by the Pollution Control and Waste Management Branches.

2.3.3 Reclamation Work

Pursuant to Elco's exploration reclamation permit (Permit C-49) requirements, the annual reclamation report₆) for 1981 was prepared and submitted by March1, 1982.

During 1982, based on the 1981 field assessment, Elco carried out touchup seeding and fertilizing on areas where poor seed germination resulted from the previous year's seeding. Two local labourers, one four-wheel-drive truck and two hand broadcasters were employed to carry out this work, which was directly supervised by Elco personnel.

In October, 1982, Lawrence Consulting and Resources Ltd. of Calgary was employed by Elco to carry out the field assessment for 1982. In addition, minor touchup seeding and fertilizing was carried out where required.

2.4.0 Elco Support Work

Elco's 1982 field support was of a minor nature, relative to previous years, due to the fact that only a limited amount of field work was actually carried out by Elco. Four-wheel-drive trucks were rented to support the recalation and field assessment work. Room and board during this field work was secured at the hotel and catering camp (National Caterers Ltd.) in Elkford. Reproduction and drafting services were provided by contractors located in Calgary, mainly for report preparation.

SECTION 3.0
SCHEDULE OF 1982
DEVELOPMENT WORK
EXPENDITURES FOR THE
ELK RIVER COAL LICENCES

TABLE 3.0-1 (Sheet 1)

ELCO MINING LIMITED

SCHEDULE OF 1982 EXPLORATION AND DEVELOPMENT WORK EXPENDITURES ON THE ELK RIVER COAL LICENCES

REPORTED PURSUANT TO SECTION 18, COAL ACT AND SECTION 15, COAL ACT REGULATIONS
FOR THE PERIOD JANUARY TO DECEMBER 1982

CATEGORY OF WORK	TOTAL PHASE L-b2	LICENCE GROUP			
CATEGORI OF WORK	Extensions 3 & 4	318	319	320	321
EXPLORATION & DEVELOPMENT WORK					
Exploration Work					
Geophysical Survey of River Diversion Area -residual 1981 Costs	7,571.91	2,018.01	1,388.48	2,398.45	1,766.97
Core Storage Repair	774.68	206.46	142.05	245.39	180.78
Coal Licence Related Activities - Permits & Reports	5,351.50	1,426.24	981.32	1,695.12	1,248.82
Engineering Work					
Coal Transportation Harbour Study	10,414.43	2,775.58	1,909.71	3,298.84	2,430.30
Project Feasibility Update	34,659.58	9,237.21	6,355.59	10,978.65	8,088.13
Environmental Work					•
Stream Gauging - Consult. Hydrocor - " LCR - Governm.Consultation - Drafting & Reprod.	27,095.26 1,813.80 457.88 725.67	7,221.23 483.40 122.03 193.40	4,968.51 332.60 83.96 133.07	8,582.60 574.53 145.04 229.86	6,322.92 423.27 106.85 169.34
Climatic Monitoring - Consult. PROMET - " LCR - Governm.Consultation - Drafting & Reprod Other	34,028.54 400.00 357.88 519.05 118.72	9,069.03 106.61 95.38 138.33 31.64	6,239.88 73.35 65.63 95.18 21.77	10,778.77 126.70 113.36 164.41 37.61	7,940.87 93.34 83.51 121.13 27.70
Reclamation - Seed, Fertilizer and Supplies - Labour - Field Assessment	1,024.32 592.80	272.99 157.99	187.83 108.70	324.46 187.77	239.03 138.34
Study.	2,684.00	715.32	492.17	850.17	626.3

TABLE 3.0-1 (Sheet 2)

CATEGORY OF WORK	TOTAL PHASE				
	Extensions 3 & 4	318	319	320	321
Elco Support Work					
Living & Accomod.				,	
(Field)	613.55	163.52	112.51	194.34	143.18
Transport.(Field)	935.85	249.41	1,71.61	296.44	218,39
Drafting & Reprod.	5,355.70	1,427.36	982.09	1,696.45	1,249.80
SUBTOTAL EXPLOR. &	305 405 30	00 333 34	04 045 00	40 030 00	
DEVELOPMENT WORK	135,495.12	36,111.14	24,845.99	42,918.98	31,619.01
ADMINISTRATION			,		
	202 716 22	E4 202 02	27 255 02	C4	47 500 00
Salaries Admin, Cons. Fees	203,716.23 15,388.52	54,292.92 4,101.23	37,355.83 2,821.82	64,528.46 4,874.42	47,539.02
Temporary Staff	294.00	78.35	53.91	93.13	3,591.05 68.61
Office Supplies	2,441.01	650.56	447.61	773.21	569.63
Vehicle Lease,	-,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			,,,,,,,	003,00
Operating/Maint.	5,744.00	1,530.85	1,053.29	1,819.45	1,340.41
Legal Fees	17,008.98	4,533.10	3,118.97	5,387.71	3,969.20
Audit Fees	7,282.15	1,940.78	1,335.34	2,306.67	1,699.36
Accounting Fees	3,000.00	799.54	550.11	950.27	700.08
Travel Exp.&Meet.	1,919.81	511.65	352.04	608.11	448.01
Taxes, Permits	A7 271 2A	12 500 27	0 660 00	14 072 40	11 001 17
& Fees Office Rent, Util.	47,271.24	12,598.37	8,668.22	14,973.48	11,031.17
& Maintenance	37,065.53	9,878.42	6,796.78	11,740.75	8,649.58
Equipment Rental	13,917.67	3,709.23	2,552.11	4,408.52	3,247.81
Office Copying	3,086.52	822.60	565.98	977.67	720.27
Postage	2,462.69	656.34	451.59	780.07	574.69
Telephone/Telex	8,533.63	2,274.32	1,564.83	2,703.08	1,991.40
Insurance	1,908.18	508.55	349.91	604.43	445.29
SUBTOTAL					
ADMINISTRATION	371,040.16	98,886.83	68,038.34	117,529.42	86,585.57
GRAND TOTAL	506,535.28	134,997.97	92,884.33	160,448.40	118,204.58

SECTION 4.0 REFERENCES

- Elco Mining Limited
 August 28, 1978: Stage II Report
- 2. Elco Mining Limited 1978-79: Follow-up Work (reviews, meetings, additional submissions) in response to ELUC review of the Stage II Report
- 3. Elco Mining Limited
 January 17, 1979: Section 7, Coal Mines Regulation Act, Work
 System, Presentation to Ministry of Mines
 and Petroleum Resources
- 4. Elco Mining Limited
 March 3, 1981: Report on the 1979/80 Development Work Carried
 Out on the Elk River Coal Project
- 5. Elco Mining Limited

 May 26, 1982: Report on the 1980/81 Development Work Carried

 Out on the Elk River Coal Project
- 6. Elco Mining Limited
 February 22, 1982: Annual Reclamation Report For 1981 and
 Proposed Program For 1982
- Elco Mining Limited
 January, 1978: Elk River Feasibility Report
- 8. Prepared for Elco Mining Limited by Hydrocon Engineering Ltd.

 December3, 1982: Elk River Project Hydrology Summary 1977-1981
- 9. Prepared for Elco Mining Limited by Promet Environmental Group Ltd.

 November 25, 1982: Summary of Climatic Observations Elk River

 Mine January-September 1982