manalta coal ltd.

April 10, 1994

In reply please quote file:

Mrs. Kim Stone, Coal Administrator
Mineral Titles Branch
Ministry of Energy, Mines and Petroleum Resources
Jack Davis Building
3rd Floor, 1810 Blanshard Street
Victoria, B.C.
V8V 1X4

Re: Geological Assessment Report, Telkwa Coal Property

Mrs. Kim Stone;

In compliance with the new Coal Act Regulations please find enclosed two copies of the Telkwa Coal Property; 1992 Geological Assessment Report. The report consists of six volumes, detailing information acquired from August, 1992 to April, 1993 on the Telkwa coal licences held by Manalta Coal Ltd.

I apologize for the late arrival of the report and any inconvenience this may have caused to you or your staff. Should you have any questions or require additional information please contact me in Calgary at (403) 231-7185. Thank-you.

Sincerely,

MANALTA COAL LTD.

Angelo Ledda
Project Geologist

TELKWA PROPERTY

1992 GEOLOGICAL ASSESSMENT REPORT

Property Name:	Telkwa Property	N.T.S.	93L/11
Coalfield:	Telkwa		
General Nature of Report:	1992 Assessment Report		
Specific Licences Involved:	CL4278, CL4279, CL4280, CL4281, CL8403, CL4267 and CL5839		
Location (U.T.M.):	6045000/611500 to 6056000/628500		
Owner:	Manalta Coal Limited		
Operator:	Manalta Coal Limited		
Author(s) of the Report:	Mr. Angelo Ledda, B.Sc. Geology		
Date of Performed Work:	August 15 to October 10, 1992		
Report Due Date:	1993		
Report Submission Date:	March 28, 1994		

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1.0 INTRODUCTION

1.1 GENERAL

This report presents the geological work undertaken to date on the Telkwa coal licences in west-central British Columbia held by Manalta Coal Limited. Work completed during the 1992 exploration program is particularly emphasized, detailing the geology, coal reserves and coal quality of affected license areas.

1.2 LOCATION AND ACCESS

The Telkwa Coal Property is located in west-central British Columbia approximately 15 kilometres south of the city of Smithers and about 2 kilometres southwest of the community of Telkwa (Enclosure 1), both of which are situated along the Yellowhead Highway (Highway #16) 11 kilometres apart. Smithers, in turn, is located 380 kilometres by rail east of Prince Rupert and the Ridley Island coal handling facilities (Figure 1.1). Smithers is serviced by commercial aircraft on a daily basis.

The Telkwa Property currently consists of 14,658 hectares held under 58 coal license blocks, measuring approximately 20 kilometres in the north-south direction by 14 kilometres east-west. The Telkwa River flows eastward through the property bisecting it into two approximate halves, both of which contain coal measures of economic significance.

Access to the north side of the property is via Smithers along an all-weather public road which approximately parallels the Bulkley and Telkwa Rivers. The south side of the property is accessed from the community of Telkwa, again by an all-weather road. Logging roads are common, especially on the southern half of the property, branching periodically from the all-weather access road, allowing access to more remote locations of the property via four-wheel drive and all-terrain vehicles.

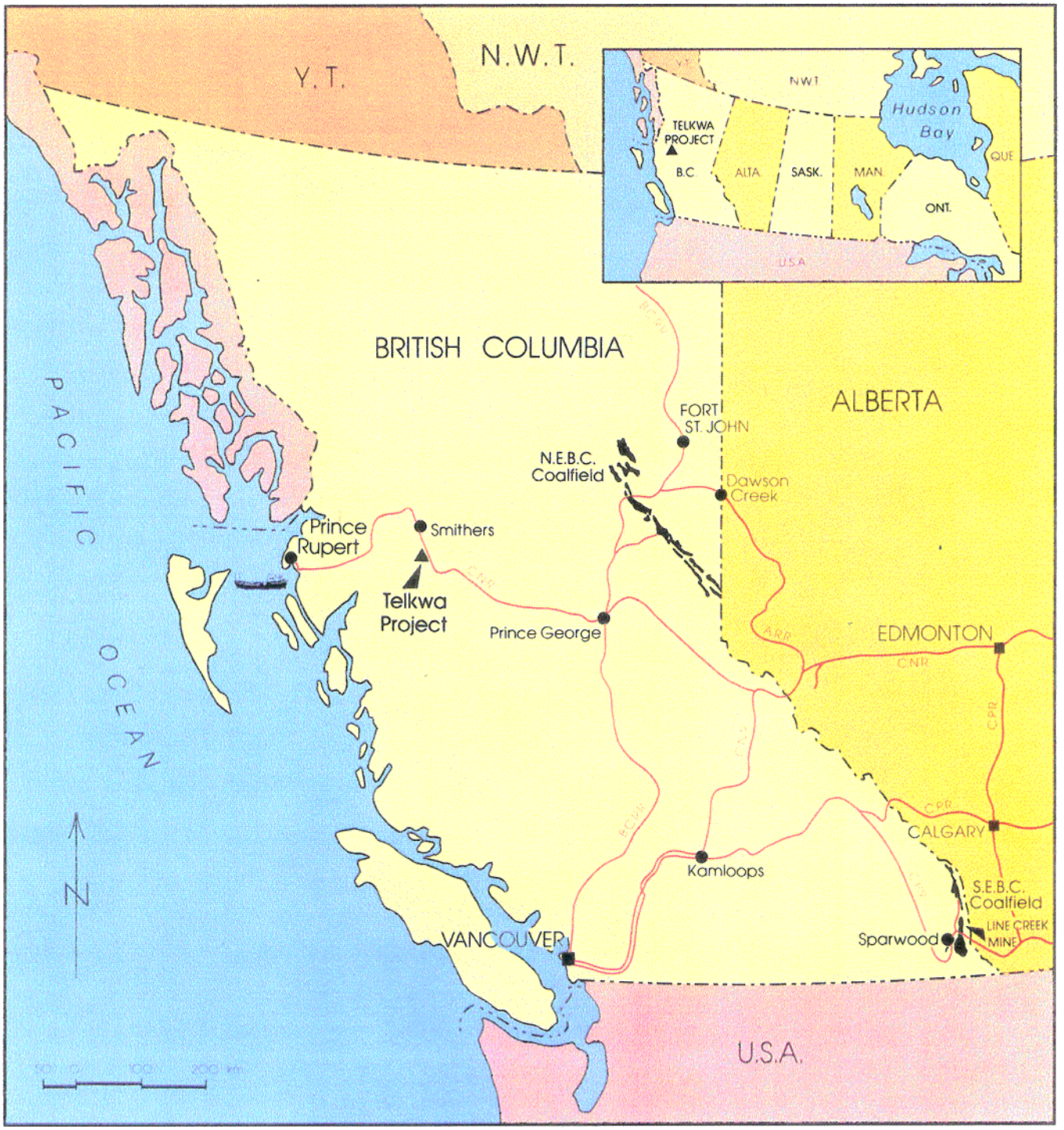


FIGURE 1.1

manalta coal ltd.

TELKWA PROPERTY LOCATION MAP

The area is serviced by a 500 KV powerline which bisects the property in an approximate east-west direction, running along the south side of the Telkwa River. In addition, Pacific Northern operates an underground natural gas transmission line which also transects the property, parallelling the south side of the Telkwa River and branching northward towards Smithers along the eastern licence blocks.

1.3 PHYSIOGRAPHY

The physiographic setting for the Telkwa property is typically foothills, intermediate to the Bulkley Range of the Hazelton Mountains and the low-lying gently rolling relief of the Nechako Plateau. The Bulkley Range is obvious to the north and west of the property where the landscape is bedrock controlled, while within the property limits and easterly topography is generally rounded and covered with widespread glacial drift. Bedrock on the property is usually obscured as glacial sediments form a shallow mantle over much of the area, exceptions occurring sporadically or along sections of deeply eroded river and stream valleys such as Goathorn Creek.

The principal drainage system on the property is the Telkwa River which flows east across the property until it ultimately flows into the Bulkley River at the community of Telkwa. Major tributaries to the Telkwa River include Pine Creek which drains much of the area on the northern licences, and Tenas and Goathorn Creeks which drain the south.

Elevations within the property limits range from a low of 530 meters above sea level at the Telkwa River's eastern contact with the property boundary to a high of 1375 metres at the property's southernmost extremity near Cabinet Creek. Most elevations, however, lie within 600 and 900 metres.

Vegetation at lower elevations along watercourses consist mainly of cottonwoods, spruce and shrubs. The tree layer is typically composed of large, widely spaced cottonwoods with scattered hybrid spruce and trembling aspen. The understorey

is composed of a rich diversity of shrub species which include high-bush cranberry, red-osier dogwood, alder, prickly rose, snowberry and black twinberry. At higher elevations the predominant vegetational cover consists of lodgepole pine, balsam fir and spruce. Understorey species include alder, willow, black twinberry and prickly rose (TAESCO, 1985). Some of the area has been commercially logged and a number of areas have been cleared for agricultural purposes.

Pacific Inland Resources Ltd. of Smithers harvests timber within the license area for the production of commercial building products. One of the principal mills in the area is situated at the outskirts of Smithers along the access road to the north side of the property.

Soils in the vicinity vary in thickness and have developed on glacial till, outwash sediments and occasionally on weathered parent material. Parent material generally tends to be represented by either sedimentary sandstones and siltstones of the Skeena Group or volcanic sediments of the Hazelton Group.

1.4 TENURE

The Telkwa Property currently consists of 14,658 hectares (36,221 acres) of coal licences as well as 1295 hectares (3200 acres) of Freehold land collectively held by Manalta Coal Limited (Enclosure 2). Surface ownership rights are held in part by the Crown (approximately 70% of the property surface area), in part by Manalta Coal Ltd. (approximately 8% in the form of Freehold land) and in part by third party land owners. The property coal licences are summarized on Table 1.1.

TABLE 1.1: TELKWA PROPERTY - COAL LICENCE SUMMARY

LICENCE NUMBER	HECTARES	ACRES	EXPIRTY DATE
3709 BV/	259.00	640.0	December 31, 1993
3710 BV/	259.00	640.0	December 31, 1993
3875 BV/	259.00	640.0	December 31, 1993
3876 BV/	259.00	640.0	December 31, 1993
3877 BV/	259.00	640.0	December 31, 1993
3878 BV/	259.00	640.0	December 31, 1993
3879 BV/	259.00	640.0	December 31, 1993
3880 BV/	259.00	640.0	December 31, 1993
3881 BV/	259.00	640.0	December 31, 1993
3882 BV/	259.00	640.0	December 31, 1993
3883 BV/	259.00	640.0	December 31, 1993
3884 BV/	259.00	640.0	December 31, 1993
4260	259.00	640.0	December 31, 1993
4261	259.00	640.0	December 31, 1993
4262	259.00	640.0	December 31, 1993
4264	259.00	640.0	December 31, 1993
4265	259.00	640.0	December 31, 1993
4267	259.00	640.0	December 31, 1993
4269	259.00	640.0	December 31, 1993
4270	259.00	640.0	December 31, 1993
4271	259.00	640.0	December 31, 1993
4272	259.00	640.0	December 31, 1993
4274	259.00	640.0	December 31, 1993
4275	259.00	640.0	December 31, 1993
4276	259.00	640.0	December 31, 1993
4277	259.00	640.0	December 31, 1993
4278	259.00	640.0	December 31, 1993
4279	259.00	640.0	December 31, 1993
4280	259.00	640.0	December 31, 1993
4281	259.00	640.0	December 31, 1993
4282	259.00	640.0	December 31, 1993
4283	259.00	640.0	December 31, 1993
5839	259.00	640.0	December 31, 1993
6040	130.00	321.2	December 31, 1993
5305	259.00	640.0	December 31, 1993
5306	259.00	640.0	December 31, 1993
5307	259.00	640.0	December 31, 1993
7691	259.00	640.0	December 31, 1993
7692	259.00	640.0	December 31, 1993
7693	259.00	640.0	December 31, 1993
7694	259.00	640.0	December 31, 1993
7695	259.00	640.0	December 31, 1993
7696	259.00	640.0	December 31, 1993
8208	130.00	321.2	May 30, 1994
8209	260.00	642.5	May 30, 1994
8210	260.00	642.5	May 30, 1994
8211	260.00	642.5	May 30, 1994
8402	269.00	664.7	January 31, 1994
8403	269.00	664.7	January 31, 1994
8422	259.00	640.0	July 30, 1994
8423	259.00	640.0	July 30, 1994
8424	259.00	640.0	July 30, 1994
8425	259.00	640.0	July 30, 1994
8426	259.00	640.0	July 30, 1994
8527	259.00	640.0	July 30, 1994
8428	259.00	640.0	July 30, 1994
8429	259.00	640.0	July 30, 1994
8442	130.00	321.2	July 30, 1994
TOTAL	14,658.00	36,221	

1.5 HISTORICAL PERSPECTIVE

Coal was initially discovered in the Telkwa area at about 1900 although production did not commence in the Goathorn Creek area until 1918. On the north bank of the Telkwa River the Aveling (Telkole) Mine produced from 1921 to 1922 and again from 1940 to 1945. Telkwa Colliery (McNiel Mine), on the south side of the Telkwa River, began producing in 1923 (Malott, 1990). Initial mining production was mainly for local consumption until after 1930 when underground operations were initiated at Bulkley Valley Collieries near Goathorn Creek. Production since that time has been sporadic, however, with underground operations often curtailed by structural complications and inadequate pre-development exploration.

Since 1950 the Telkwa Coalfield has been actively prospected by a variety of companies. The following is a summary of the area's exploration activities since that time. Regional geology, plotted annual exploration drill-holes and identified resource areas are found within Enclosure 3.

- **1951 - The Government of Canada** conducted a regional survey, much of which included the Telkwa licence area.

- **1969 - Canex Aerial Limited** completed a drilling program of approximately 20 boreholes on the Telkwa North licenses.

- **1977 to 1978 - Cyprus Anvil Mining** completed a rotary drilling program within the Telkwa South licences.

- **1979 - Shell Canada/Crowsnest Resources Ltd.** completed 13 rotary drill-holes, 4 of which were located on Telkwa South licenses, and the remaining 9 situated on the north side of the Telkwa River. Chip samples were not recovered for analysis.

- **1981 - Shell Canada/Crowsnest Resources Ltd.** completed a mapping and exploration drilling program which consisted of 11 rotary holes and one diamond drill-hole spaced randomly throughout the Telkwa property. Coal samples were recovered from 4 of the rotary holes as well as the diamond drill-hole for analyses.

- **1982 - Shell Canada/Crowsnest Resources Ltd.** drilled 72 boreholes on the property, the majority of which were located on the south side of the Telkwa River. Of the 72 holes, 7 were rotary drill-holes and 65 were diamond drill-holes. Coal samples were collected and analyzed from all holes which intersected significant coal units.

- **1983 - Shell Canada/Crowsnest Resources Ltd.** completed 69 diamond drill-holes on the Telkwa South licences, most of which were located within what has been designated as the Pit #3 resource area. Included within the program were a small number of large-diameter core-holes which, along with all other drill-holes that intersected significant coal units, were sampled and had coal analyses performed. Of the 69 boreholes completed, 11 were situated within the proposed Pit #3 test-pit limits, to provide a preview of the pit development.

Based upon drill-hole information a 219 tonne bulk sample from 7 seams was extracted from a test-pit located within the Pit #3 area. Full coal analyses were performed on various simulated washplant products.

- **1984 - Shell Canada/Crowsnest Resources Ltd.** completed 44 diamond drill-holes, the majority of which were located within the Pit #3 resource area on the south side of the Telkwa River. Less than 10% of the holes were drilled on the Telkwa North coal licences. All significant coal units were sampled and analyzed.

- 1985 - **Shell Canada/Crowsnest Resources Ltd.** completed 4 diamond drill-holes, all of which were located north of the Telkwa River. All significant coals were sampled and analyzed.

- 1986 - **Shell Canada/Crowsnest Resources Ltd.** completed 4 diamond drill-holes, again located on the Telkwa North coal licences within an area that has been designated as Pits #7 and #8 Resource Area. Coal analyses were performed on all significant seams.

- 1988 - **Shell Canada/Crowsnest Resources Ltd.** completed an exploration program exclusive to the Telkwa North licences which consisted of initially completing approximately 3.5 kilometres of surface geophysics to highlight potential target locations. The area was subsequently drilled with 14 diamond drill-holes from which coal samples were collected and analyzed.

- 1989 - **Shell Canada/Crowsnest Resources Ltd.** completed an exploration program consisting of drilling and surface geophysics on the Telkwa North coal licences, and reflection seismic exploration within the Pit #3 area of the Telkwa South licences. In addition a large-diameter coring program was undertaken specifically targeted at obtaining a bulk sample from the Pit #7 resource area.

The conventional exploration drilling program included 31 bore-holes, 18 of which were rotary drill-holes, and the remaining 13 continuous core diamond drill-holes. Coal samples for analyses were collected from all holes which intersected significant coal although only cored bore-holes were provided a full analyses as rotary drilled test samples were not considered representative. North Telkwa surface geophysics included approximately 15.4 kilometres of geophysics shared between the Pit #7 resource area, the Pit #8 proposed waste dump area and the proposed infrastructure facilities location.

Upon completion of the conventional exploration program four previously drilled sites in the Pit #7 area were selected as locations for large-diameter (6 inch) core-holes. From these a bulk sample from 7 seams was extracted and provided a full analysis.

As part of a joint investigation managed by the Coal Mining Research Company of Devon, Alberta, 4 seismic lines totalling 4.9 kilometres were laid out and a reflection seismic exploration program completed. The area chosen for the investigation was within the Pit #3 resource area where reasonable drill-hole control had previously been established.

- **1989 - The Geological Survey of Canada**, as part of a province-wide study of coal quality, drilled 9 core-holes for a combined total length of 280 metres in the vicinity of the old Bulkley Valley Collieries site near Goathorn Creek. All coal intersections were sampled and subsequently analyzed.

- **1992 - Manalta Coal Ltd.** of Calgary, Alberta acquired the Telkwa Coal licences on May 1st of 1992 from Shell Canada/Crowsnest Resources Ltd.. Since that time Manalta Coal conducted an exploration program which included 3.6 kilometres of surface geophysics, a regional airborne magnetic survey review and 43 drill-holes. The surface geophysics and 39 of the 43 holes drilled were located on the Telkwa North licences, while the remaining 4 drill-holes were completed on the south side of the Telkwa River in the vicinity of Tenas Creek (Enclosure 4).

Of the 43 bore-holes completed 19 were diamond core-holes, 3 were rotary core-holes and 21 were drilled utilizing conventional rotary techniques. All holes completed in the Tenas Creek area were of the rotary variety although one was rotary cored through its coal measures. All significant coal seam intersections from cored drill-holes were sampled and analyzed.

Coincidental with the exploration drilling program representatives from the British Columbia Ministry of Energy, Mines and Petroleum Resources (MEMPR), and the Institute of Sedimentary and Petroleum Geology (ISPG) were on site to conduct coalbed methane desorption tests on selected Telkwa coal samples. The study conducted by the MEMPR and the ISPG is part of a regional study of methane desorption in British Columbia coalfields.

1.6 ACKNOWLEDGEMENTS

The work undertaken for the Telkwa geological study was carried out by various contractors and consultants under the management and supervision of Manalta Coal Limited's staff. This report was prepared by Mr. A. Ledda of Manalta Coal Ltd. with input from the following groups:

- Dames and Moore for geochemistry technical support.
- David E. Pearson & Associates for petrographic analysis.
- Dr. Barry Ryan of the British Columbia MEMPR.
- Geophysicon Co. Ltd. for surface geophysical surveys.
- Loring Laboratories Ltd. for coal quality analyses.
- The Orthoshop for aerial photography, survey control and mapping.

Mr. Angelo Ledda of Manalta Coal Ltd. has received a Bachelor of Science Degree in Geology (1986) from the University of Calgary as well as a Diploma in Petroleum Technology - Geology (1982) from the Southern Alberta Institute of Technology. Since graduation with his B.Sc. he has been employed as an exploration and development geologist with Gulf Canada Resources Ltd., taught evening classes in the Petroleum Technology - Geology program at S.A.I.T., and is currently an Intermediate Project Geologist with Manalta Coal Ltd. His 7 years of work experience as a geologist includes some work within the oil and gas industry although the majority of his experience has been within the coal industry

throughout western Canada. Much of his coal experience lies within studies conducted in the Bowser Basin, including the Klappan, Groundhog and Telkwa Coalfields.

2.0 GEOLOGICAL WORK

On the basis of preliminary geological work carried out by various groups prior to 1992 the exploration program conducted by Manalta Coal Ltd. was designed to further delineate high potential mining targets and to initiate reconnaissance of other areas. It was also intended to provide additional data on the geology, reserves and coal quality of those potential mining targets. Licence blocks on which 1992 exploration activities took place include CL4278, CL4279, CL4280, CL4281 and CL8403 on the north side of the Telkwa River and CL4267 and CL5839 on the south side (Enclosure 4).

2.1 SCOPE OF WORK

Work completed during the 1992 field exploration program, which included an airborne magnetic survey review, 43 drill-holes, 3.6 kilometres of surface geophysics and reclamation, spanned from mid-August to mid-October. Surface geophysics work took place coincidentally with drilling activities while reclamation continued until adverse weather halted reclamation efforts.

2.1.1 Topographic Mapping

In 1992 high as well as low level survey control was established over much of the Telkwa licence area and an updated set of aerial photographs was generated. The affected licence area consisted of approximately 21.5 square miles within the western licence blocks, which included those blocks where 1992 exploration activities were focused. From the newly generated airphotos topographic mapsheets were prepared, at a scale of 1:5000, with a 5-metre contour interval. These were, in turn, tied to existing adjacent 1:5000 topographic mapsheets.

2.1.2 Surface Geophysics

The applicability of surface geophysics as a coal exploration tool was tested on licence blocks CL4279, CL4280, CL4281 and CL8403, where 3.6 kilometres were completed. This area was selected because intrusive rocks were known to exist over part of the area and faults of significant displacement were present within coal measures sediments. Specific methods tested include:

1. **Total Field Magnetics Survey;** for locating the subsurface position of igneous rocks.

2. **Horizontal Loop Electromagnetic Survey (Max-Min);** its best application is for locating steeply dipping bedding as well as conductive structures such as faults, or shales bounding coal subcrop.

3. **Direct Current Profiling Survey;** which detects the presence of high resistivity units such as coals or igneous rocks.

Detailed results of the geophysical program are presented within the report presented by Geophysicon Co. Ltd. (Enclosure 5).

2.1.3 Airborne Magnetic Survey

Results of airborne magnetometer surveys flown in 1967 over the Telkwa area have been reviewed to determine whether this data provides a cost-effective method of evaluating the extent of the Hazelton Volcanics. Detailed results of the review are presented within the report prepared by Geophysicon Co. Ltd. (Enclosure 6).

2.1.4 Drilling

During the 1992 field season 19 continuous core diamond drill-holes, 3 rotary core-holes and 21 conventional rotary drill-holes were completed, for a total of 4,787 metres. All drill-holes, which are summarized on Table 2.1, were geophysically logged upon completion and surveyed prior to site reclamation. Including 1992 exploration 306 drill-holes have been completed on the Telkwa Property since 1979 (Enclosure 7). For the 1992 exploration program a Failing 1250 truck-mounted drilling rig was used to complete all rotary drill-holes while an Acker Diamond Drilling Rig completed all diamond drill-holes. McAuley Drilling Co. of Spruce Grove, Alberta completed the rotary component of the program while J.T. Thomas Diamond Drilling of Smithers, British Columbia completed all diamond drilling requirements.

Wireline as well as conventional coring techniques were employed during the exploration program. Diamond drill-holes were continuously cored, extracting 6.3 centimetre diameter (NQ) core from the top of competent strata through the entire length of the hole. For rotary wireline core-holes, a conventional rotary pilot hole was drilled initially at the site location and subsequently a second adjacent hole was drilled, where selected coal units were cored, and rock units between core intervals were conventionally drilled. Ten centimetre diameter core was recovered at these locations. Core recoveries from both methods were excellent, generally ranging from 80% to 100%.

Table 2.1 Telkwa 1992 Drill-hole Summary

Drill-hole #	Site #	Total Depth (m)	Logs run	Casing (m)	Till thknss (m)	# of samples	A.R.D. holes (samples)	Date Drilled	Driller	Comments
T92D-01	23	143.2	GDVCDp	26		31	—	Sept. 2/92	J.T. Thomas	
T92D-02	26	155.4	GDVCDpS	15.1		21	—	Sept. 3	J.T. Thomas	
T92D-03	24	152.4	GD	19.7		41	—	Sept. 4	J.T. Thomas	No open hole log.
T92D-04	22	191.5	GDVC	18.3		57	—	Sept. 5	J.T. Thomas	
T92D-05	9	134.1	GDVC	19.8		24	46	Sept. 6	J.T. Thomas	A.R.D. Box #1
T92R-06	27	152.4	GDVC	24.4	23.17	—	—	Sept. 6	McAuley	No coal.
T92D-07	19	234.7	GDVC	21.3		41	—	Sept. 8	J.T. Thomas	
T92R-08	18	134.1	GDVC	20.6	19.82	—	—	Sept. 8	McAuley	
T92D-09	10	131.1	GDVC	7.5		54	61	Sept. 8	J.T. Thomas	A.R.D. Box #2
T92R-10	17	97.5	GDVCDpS	5.5	4.88	—	—	Sept. 8	McAuley	
T92R-11	21	121.9	GDVCDp	5.5	7.01	—	—	Sept. 10	McAuley	
T92D-12	7	176.8	GD	10.6		1	—	Sept. 10	J.T. Thomas	No open hole log.
T92R-13	16	76.2	GDVC	5.5	4.88	—	—	Sept. 11	McAuley	
T92R-14	8	73.1	GDVC	5.5	3.05	—	—	Sept. 12	McAuley	
T92R-15	15	85.3	GDVC	11.5	11.28	—	—	Sept. 18	McAuley	
T92R-16	14	85.3	GDVC	5.5	3.96	—	—	Sept. 18	McAuley	
T92R-17	11	127.7	GDVC	5.5	2.13	—	—	Sept. 19	McAuley	Sms 5 & 2 tested for methane.
T92R-18	13	48.8	GDVC	5.5	4.27	—	—	Sept. 20	McAuley	
T92R-19	12	67.1	GDVCDp	5.5	4.27	—	—	Sept. 21	McAuley	
T92R-19C	12	58.6	GDC	6	4.27	20	—	Sept. 28	McAuley	
T92D-20	3	84.5	GDVC	12.2		28	22	Sept. 22	J.T. Thomas	A.R.D. Box #3
T92R-21	20	134.1	GDVC	5.5	2.74	—	—	Sept. 22	McAuley	
T92D-22	5	104.6	GD	7.5		31	34	Sept. 23	J.T. Thomas	No open-hole. CH2.ARD Bx #3.
T92R-23	25	164.6	GDVC	5.5	3.05	—	—	Sept. 24	McAuley	
T92D-24	101	112.8	GD	22.9		37	33	Sept. 25	J.T. Thomas	No open-hole log. ARD Box #2.
T92R-25	104	79.2	GDC	5.5	3.05	—	—	Sept. 25	McAuley	
T92D-26	102	152.4	GDVC	34.9		0	—	Sept. 26	J.T. Thomas	No coal.
T92R-27	1	48.9	GDVC	10.6	9.75	—	—	Sept. 25	McAuley	
T92R-28	2	60.9	GDVC	6.1	8.69	—	—	Sept. 26	McAuley	No coal.
T92R-29	4	48.8	GDVC	6.1	12.20	—	—	Sept. 27	McAuley	
T92R-30	106	121.9	GDVCDp	6.7	6.70	—	—	Sept. 29	McAuley	
T92R-30C	106	84.1	GDC	6	6.70	38	—	Oct. 3/92	McAuley	
T92D-31	105	121.9	GDVCDp	22.9		20	37	Sept. 29	J.T. Thomas	A.R.D. Box #1.
T92D-32	108	146.3	GDVCDp	30.4		62	—	Oct. 1	J.T. Thomas	
T92R-33	107	97.5	GDC	9.5	9.60	—	—	Oct. 1	McAuley	
T92D-34	109	121.9	GDCV	21.9		34	—	Oct. 2	J.T. Thomas	
T92R-35	110	152.4	GDVC	12.8	11.28	—	—	Oct. 2	McAuley	
T92D-36	111	70.1	GDCDp	22.9		15	—	Oct. 3	J.T. Thomas	
T92D-37	112	76.8	GDCDp	13.7		4	—	Oct. 4	J.T. Thomas	
T92D-38	113	42.7	GDC	12.1		7	—	Oct. 5	J.T. Thomas	
T92R-39	114	62.5	GDCDp	6.4	2.29	—	—	Oct. 5	McAuley	Tenas Ck. drill-hole.
T92R-39C	114	16.3	GDC	5.5	2.29	11	—	Oct. 7	McAuley	Tenas Ck. core-hole.
T92R-40	115	67.4	GDCDp	8.5	12.80	—	—	Oct. 5	McAuley	Tenas Ck. drill-hole.
T92D-41	103	53.9	GDC	4.6	4.57	8	—	Oct. 6	J.T. Thomas	
T92R-42	116	29.6	GD	0	5.50	—	—	Oct. 6	McAuley	Tenas Ck. No open-hole log.
T92R-43	117	83.3	GDCVDp	8.5	1.83	—	—	Oct. 7	McAuley	Tenas Ck. drill-hole.
TOTALS:		4786.6 metres				585	233			

Diamond: 2407.1
Rotary: 2220.5
Rotary Core: 159.0
4786.6 metres

where: G = Gamma Log
D = Density Log
C = Caliper Log
V = Verticality Log
Dp = Dipmeter Log
S = Sonic Log
A.R.D. = Acid Rock Drainage

2.1.4.1 Drill-hole Numbering

Drill-holes completed between 1979 and 1989 were not numbered utilizing a common numbering scheme. As a result, in 1992, all drill-holes completed to date on the property were renamed to reflect a common system. The original numerical component of the name was retained to avoid confusion but prefixes denoting the year drilled and the type of drill-hole were made consistent. An example of the adopted system would be T85D-502 where:

T - denotes it as a Telkwa Property drill-hole.
85 - classifies it as being drilled in 1985.
D - denotes it as a diamond drill-hole; R as a rotary.
502 - is its original numerical component.

For rotary core-holes a C would follow the numerical component. A complete drill-hole listing is provided within Enclosure 7.

2.1.4.2 Geophysical Logging

When physically possible all holes were open-hole geophysically logged shortly after drilling was suspended. Where poor downhole conditions were encountered a slimline gamma-density tool was lowered through the drillstem so as to obtain at least one complete log of the hole. Detail logging (1:20 Scale) was undertaken over significant coal seam intervals only. Copies of geophysical log responses for each borehole are presented within Enclosure 30. In most cases downhole conditions were satisfactory and the following open-hole geophysical log responses were obtained:

Gamma Ray General	1:100 Scale
Long Spaced Density General	1:100 Scale
Sonic General	1:100 (on selected holes only)
Dipmeter General	1:100 (on selected holes only)
Caliper	
Deviation	
Gamma Ray Detail	1:20 Scale
Long Spaced Density Detail	1:20 Scale
Bed Resolution Density Detail	1:20 Scale

2.1.4.3 Drill-hole logging, Sampling and Analysis

All core-holes completed during the 1992 exploration program were logged in detail (Enclosure 8) and a total of 585 coal ply samples collected. In addition rock samples from representative core-holes were collected for subsequent analyses for Acid Rock Drainage potential. Cuttings descriptions from rotary drill-holes, as described in the field, are found within Enclosure 9. Specific details of analyses conducted and test results are discussed in Section 4.0.

2.1.5 Reclamation

Reclamation activities were undertaken in areas disturbed by 1992 exploration activities, as well as the old Bulkley Valley Collieries Mine site located along the east bank of Goathorn Creek. All disturbed areas were recontoured, reseeded and fertilized using Forestry approved mixtures. Access trails on sloping ground were water barred for erosion control, and additional topsoil was added to areas that inhibited new plant growth. All work was carried out in accordance with the regulations and guidelines of

B.C. Forestry. Areas which were not reclaimed in 1992 due to the onset of adverse weather were completed during June of 1993.

3.0 GEOLOGY

3.1 REGIONAL GEOLOGIC SETTING

During Jurassic and Cretaceous time much of the western portion of British Columbia was formed as the result of several terranes that moved slowly toward and eventually collided with the North American craton. The Telkwa coalfield is the product of sedimentation that occurred as one such terrane, the Stikine Terrane, pushed eastward to eventually become sutured to the North American landmass (Richards, 1988).

Successor basins, which formed in response to the approaching terrane, were the focus of rapid sedimentation, subsidence and increased tectonic activity. One such successor basin, the Bowser Basin, had developed during Middle Jurassic time near the present-day location of Smithers. It was a centre of deposition, bounded on the north by the Stikine Arch, on the south by the Skeena Arch and on the east by the early uplifting of the Columbian Orogeny. The Telkwa coalfield developed along the northern flank of the Skeena Arch near the southern limit of sedimentary rocks in the Bowser Basin (Figure 2.1) (Palsgrove and Bustin, 1991).

Deposition of the coal-bearing sediments in the Telkwa area was initiated into the Bowser Basin during the Lower Cretaceous, following uplift and erosion of the Skeena Arch. Although this sedimentation initially came from the south and west, an eastern provenance soon dominated, a response to the increased uplift of the Columbian Orogeny. The result in the Telkwa area is represented by more than 500 metres of coal-bearing strata referred to as the Lower Cretaceous Skeena Group. In the Telkwa coalfield Skeena Group sediments unconformably overlie Jurassic Hazelton volcanics.

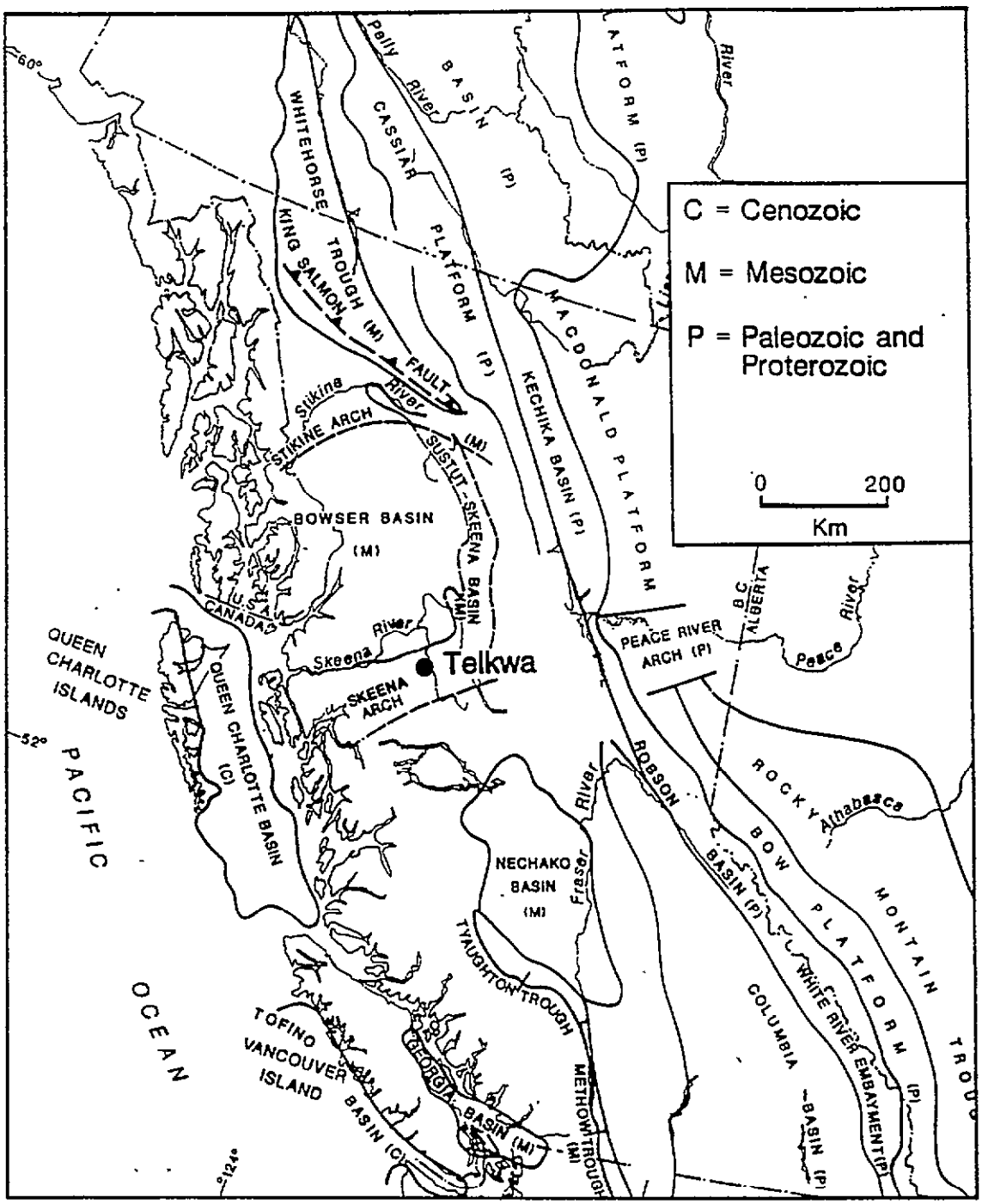


Figure 2.1. Tectonic Elements of British Columbia (R.J. Palsgrove, 1990).

3.2 STRATIGRAPHY

Sedimentation of Skeena Group sediments occurred throughout the Lower Cretaceous, during which time deposition was influenced by two regressive / transgressive episodes. As a result the stratigraphic sequence (Enclosure 10) is divisible into four lithostratigraphic units (Palsgrove and Bustin, 1989) described below. Porphyritic Tertiary and Cretaceous intrusive dykes and sills commonly disrupt local stratigraphy as does a large Tertiary granodiorite plug identified on the northern coal licences.

3.2.1 Unit I

The basal unit, Unit I, was deposited in a fluvial environment on an eroded Hazelton volcanic basement of Jurassic age. In the Telkwa area Unit I may be in excess of 100 metres in thickness and consists mainly of conglomerate, sandstone, mudstone and coal. Sands and gravels were typically deposited in braided channels and bars while mudstones accumulated in floodplains. Coals within this unit, collectively referred to as Coal Zone 1, formed in poorly drained backswamps and are characterized by lateral variation throughout the study area. Deposition of Unit I ended with a marine transgression and deposition of Unit II.

3.2.2 Unit II

Unit II was deposited within a deltaic / shallow marine environment and consists of up to 140 metres of sandstone, silty mudstone and occasional thin coaly mudstone. Sands were deposited in distributary channels and mouth-bars while mudstones and silty mudstones accumulated in interdistributary bays. The thin discontinuous peat beds, none of which are of economic significance, accumulated in local salt marshes.

3.2.3 Unit III

Unit III is indicative of the second regressive episode for the area and represents the deposition of the main coal-bearing stratigraphic sequence. The unit averages 85 metres in thickness and comprises of sandstone, siltstone, carbonaceous mudstone and thick, laterally extensive coal seams. Restricted nearshore marine, tidal flat and coastal swamp environments persisted throughout much of the deposition of Unit III. Sandstone units were deposited within tidal channels while interbedded sandstones and siltstones were deposited nearshore within intertidal environments. Mudstones are representative of tidal flat deposits. Indications are that there was significant marine influence during deposition of the entire unit.

Coal Zones 2 through 11 are represented in Unit III, collectively consisting of up to 17 coal seams of economic significance. The coal zones were likely formed in freshwater peat swamps, located landward of the tidal flat, somewhat isolated from influxes of brackish water. The presence of sulphur in most of the coal seams suggests, however, that the peat was infiltrated periodically by marine water. Thus the major coal seams are interpreted to have formed from peat accumulated in a freshwater marsh that was proximal to a brackish environment. The Snuggedy Swamp of South Carolina is considered a modern analog for the paleoenvironment in which Unit III was deposited.

3.2.4 Unit IV

Unit IV overlies the coal measures and represents a marine transgression that terminated coal deposition over the study area. The unit exceeds 150 metres in thickness and consists of sandstone overlain by silty mudstone. The basal sandstone is a transgressive lag deposit while the remainder represents deposition within a near-shore, shallow marine environment.

3.3 STRUCTURAL GEOLOGY

Since deposition of the Skeena Group of sediments during the Lower Cretaceous the Telkwa area has undergone at least two episodes of structural significance. The Upper Cretaceous of the Bowser Basin reflects a time of deformation, when high angle faulting and plutonism were occurring eastward within the Omineca Crystalline Belt, and increasing uplift was occurring to the west. This was a result of the suturing of the Stikine Terrane to the North American craton and also the effects of additional terranes approaching from the west. Although folding in the Telkwa area was not as significant as in other portions of the basin, high angle faulting roughly trending in a north-south direction are apparent in the Telkwa coalfield, especially on the south side of the Telkwa River. Porphyritic Late Cretaceous dykes and sills also occur locally within the coal measures.

During the Tertiary much of the area on the north side of the Telkwa River was intruded by a large granodiorite and quartz monzonite intrusion. The igneous body, which vertically intruded the Skeena sediments, complicated the structural geology of the area further. This is especially apparent at close proximities to the intrusive body on the northern coal licences. Structural repercussions in the Skeena sediments appear to be represented by high angle faulting, establishing a mosaic of structural blocks that have been rotated and tilted into a variety of orientations. No specific orientation has been observed to the faulting although faults are apparent in concentric geometries near the intrusive body and also appear to crudely radiate from the intrusive edge. Fault displacements have been observed to range from only a few metres to more than 150 metres.

Although bedding orientations for the area tend to be fault block controlled, each with independent orientations, dips generally range from 10 to 30 degrees. In the fault blocks associated with the Pit #3 resource area dips are typically 20 degrees to the east, while within the blocks of Pit #7 & #8 they average 17 degrees to the east and northeast respectively. In the Northwest Area, block orientations are to the southeast and southwest, with dips ranging from 10 to 35 degrees.

3.4 DETAILED GEOLOGY

Exploration work completed by Manalta Coal Limited in 1992 was performed mainly on the north Telkwa coal licences and was focussed on further delineation of the Pits #7 and #8 resource areas, with some reconnaissance work completed in the Tenas Creek area on the south side of the Telkwa River (Enclosure 4). In the Pits #7, #8, and the Northwest resource areas the seams represented within Unit III (Seams #2 - 11) are of economic significance. In the Tenas Creek area, however, the main seams of interest are those of the Seam #1 coal package of Unit I.

The Pit #7 and #8 resource areas have been modelled utilizing the Lynx Mine Modelling System. The resultant models are considered to be an accurate representation of the geological information obtained to date. The northwest extension of the Pit #8 area (the Northwest Area) has not been modelled thus far, as additional drilling is considered necessary to accurately determine its geometry. Tenas Creek Area, which contains 5 drill-holes, only 3 of which have intersected coal units, is also considered to have inadequate drill-hole control to merit modelling at this time. No additional work was undertaken within the Pit #3 area in 1992, and time did not allow modelling of the deposit within the Lynx system during the current year.

The stratigraphic columns prepared for each of the main resource areas (Enclosure 10) clearly illustrate some of the regional variations and trends which occur within seam and interseam lithologies throughout the Telkwa Coalfield. Some of the more notable trends are as follows:

- The coal seams within Lithostratigraphic Unit I, collectively referred to as Seam #1, are separated from the overlying coals of Unit III by up to 140 metres of shallow marine origin sediments. As such the seams have not been intersected by drilling, except on occasion, within most of the resource areas drilled to date. The exception is the Tenas Creek Resource

Area where the Unit I coals are the represented target of interest. Correlation of the #1 seams between resource areas is currently unrefined and additional information is required to further determine the consistency and lateral variability of individual seams.

- Seam #2 remains consistent throughout much of the property although thin partings are apparent within the Pit #3 and #7 resource areas. The seam does, however, exhibit some thickness variability over short distances especially within the northwest portion of Pit #8. Seam #2 Upper, which overlies Seam #2, is thin and developed only within the eastern resource areas north of the Telkwa River. Seam #2 Lower, which underlies Seam #2, also occurs on the northern side of the river but is significant only within the western resource areas.

- Seam #3 remains one of the most consistent seams in the stratigraphic sequence of Unit III. It is found throughout the resource areas which exploit Unit III, and is consistently split into Seams #3 Lower and Upper by a mudstone parting rarely exceeding one metre in thickness.

- Seam #4 is not developed within the Pit #7 area nor is it found within the southeast portion of Pit #8. This seam, and eventually Seam #4 Upper, develops westward into Pit #8 and the Northwest Area, and southward into the Pit #3 area. The parting thickness between Seam #4 and #4 Upper increases progressively in a northwesterly direction.

- Seam #5 is well-developed throughout the property but splits to become Seams #5 Lower and Upper in the western resource areas on the north side of the Telkwa River.

- Seam #5ex is undeveloped throughout most of the property but begins to develop within the Pit #8 resource area, becoming increasingly apparent on the west side of Pit #8. Within the Northwest Area the seam continues

to thicken and represents one of the thickest and best developed seams of the area.

- Although Seam #6 exhibits some variability between Pit #3 and #7, splitting from a single seam in Pit #3 to more than 3 seams in Pit #7, it remains consistent, found throughout the resource areas. Throughout Pit #8 and Northwest Area the seam is represented as #6 Lower and Upper, separated by a parting averaging approximately one metre in thickness.

- Although generally thin and considered uneconomic throughout most of the resource areas Seam #7 is laterally continuous and shows little variability throughout the coalfield. The exception is within Pit #7 where the seam is commonly absent from the sequence.

- Seam #8, although present throughout most of the resource areas, exhibits considerable variability with respect to seam thickness, often over short lateral distances. Seam #8, as well as those seams overlying it, are not well represented within the Pit #7 area since most of that sequence was eroded from that area prior to glaciation.

- Seam #9, due to its thickness and quality characteristics, is rarely considered of economic significance. The seam is characterized by visible pyrite banding and as a result has higher than average raw sulphur values compared to other seams. Like underlying Seam #8 it often exhibits seam thickness variability and lateral discontinuity.

- Seam #10 is a relatively consistent seam, present throughout most of the Pit #3, Pit #8 and Northwest areas. The seam varies in thickness, however, often over short lateral distances.

- Seam #11, the roof of which forms the top of Lithostratigraphic Unit III, is found throughout the Telkwa North resource areas where it is usually a

consistent, continuous seam. It does, however, exhibit some regional thinning within the northeast segment of Pit #8.

- Four notable sandstone units have been identified within or proximal to the Seam #2 to #11 coal seam package. The #2 Sandstone, which underlies the #2 and #2 Lower seams represents the thickest, most consistent and predictable sandstone unit of the four. Forming the top of Lithostratigraphic Unit II, it is a massive sandstone in excess of 10 metres in thickness which has been observed to commonly contain pelecypod shells or shell fragment horizons within it. The sandstone unit is most strongly developed on the resource areas located on the north side of the Telkwa River.

The #3 Sandstone, stratigraphically located in Unit III between Seams #3 Upper and #4, is present throughout the resource areas but remains thickest and best developed within the Pit #3 area. The sandstone unit thins considerably in Pit #7 and continues to thin becoming siltier westward into Pit #8 and Northwest Area.

The #7 Sandstone is situated stratigraphically within Unit III between Seam #7 and #8 and is laterally continuous throughout the resource areas on both sides of the Telkwa River. The unit commonly is interbedded with finer-grained lithologies and is least developed in the Pit #7 area.

The #11 Sandstone, or Unit IV Sandstone as it is sometimes referred to, represents the base of Lithostratigraphic Unit IV and usually directly overlies Seam #11. This marine sandstone is regionally correlatable across the resource areas, displaying only minor variability. The unit does, however, tend to be slightly thinner in Pit #3 than within Pit #8 and Northwest Area.

3.4.1 Pit #7 Resource Area

To date 18 drill-holes have intersected the Unit III coal measures (Seams #2 - 11) within the Pit #7 area (Enclosure 11). Drill-hole spacing for the area is currently approximately 125 metres. Enclosure 12 presents a summary of all drill-hole seam intersections and average seam thicknesses encountered within the Pit #7 resource area to date. Individual drill-hole details and seam intersection data is provided within Enclosure 13.

The coal measures trend in a north-south direction and dip east to northeastward until they terminate against a northeast-southwest trending near vertical fault. This normal fault exhibits considerable displacement (approximately 150 metres) juxtaposing thin coal seams characteristic of the #1 seams against the Unit III coal seams found in Pit #7. The coal measures also abruptly terminate to the north where Skeena sediments have been intruded by a large Tertiary granodiorite plug. The intrusive truncates the sediments at nearly 90 degrees to bedding and extends beyond Pit #7, Pit #8 and into the Northwest Area. Small-scale faulting has been identified at close proximities to the intrusive contact in other areas and is suspected in Pit #7 as well. The coal seams subcrop to the west and south, as illustrated on cross-sections 7A through 7E (Enclosure 14). Cross-section locations are referenced on the Pit #7 Geology Map (Enclosure 11).

3.4.2 Pit #8 Resource Area

Current exploration for the Pit #8 resource area is such that 44 drill-holes intersect the coal measures of the #2 - #11 seam package of Unit III, providing a drill-hole spacing of approximately 150 metres. Drill-hole data has identified that the area consists of two parallel trending fault blocks which present a repetition of the Unit III coal-bearing sequence (Enclosure

15). Displacement on the normal fault separating the two blocks ranges from 40 metres near its southeastern end, to 80 metres at its northwestern terminus with the Tertiary intrusive body. Several smaller-scale displacement faults have also been identified, at close proximities to the intrusive body and near the southeastern limits of current exploration in the area. The deposit geometry is complicated further by localized occurrences of seam thickness variability and some uncertainty as to the limits of the deposit at its southeast end.

The coal seams subcrop to the southwest and are constrained on the northeast by the granodiorite intrusive. An area of intense faulting and the absence of coal-bearing sediments terminates the Pit #8 resource area to the northwest. Indications are, however, that the Pit #8 structure is not closed to the southeast where the coal trend may continue. Further exploration is required. Bedding orientations throughout the resource area are generally to the northeast as indicated by area cross-sections 8A through 8L (Enclosure 18). Cross-section locations are referenced on the Pit #8 Geology Map (Enclosure 15). Drill-hole seam intersections have been summarized within Enclosure 16 and specific hole details are found within Enclosure 17.

3.4.3 Northwest Resource Area

Indications from drill-hole information and surface geophysics are that the coal sequence present within Pit #8 is re-established at mineable depths in the Northwest Area (Enclosure 19). The area is, however, characterized by north-south trending faults near the intrusive boundary and a thick till cover which ranges up to 35 metres. Some thinning of seams #2 through #5 appears to exist although the upper seam package continues to be well-developed. Additional exploration is required in the area to fully establish field limits and the deposit geometry. Seam intercept summaries are within

Enclosure 20 and a detailed summary of drill-holes is presented in Enclosure 21.

Bedding orientations within the area's western fault block range from 10 - 35 degrees to the south-southwest, while near the intrusive body bedding dips range up to 30 degrees to the southeast. The cross-section generated through the area illustrates the current interpretation of the field geometry (Enclosure 22).

3.4.4 Tenas Creek Resource Area

The coal measures intersected by 1992 exploration drilling (Enclosure 24) are considered to represent the #1 Coal Zone of Unit I and may be correlatable, although fault displaced, to seams intersected by 1982 drilling in the vicinity of Cabinet Creek. Bedding orientations at Tenas Creek, based upon dipmeter logs and three rotary drill-holes which intersected Seam #1, are 9 degrees to the northeast (Enclosure 23). A summary of drill-holes completed in the Tenas Creek area to date, including those of Cabinet Creek, is provided within Enclosure 25. Tenas Creek coal-bearing sediments are presumed to lie unconformably over Jurassic Hazelton volcanic rocks.

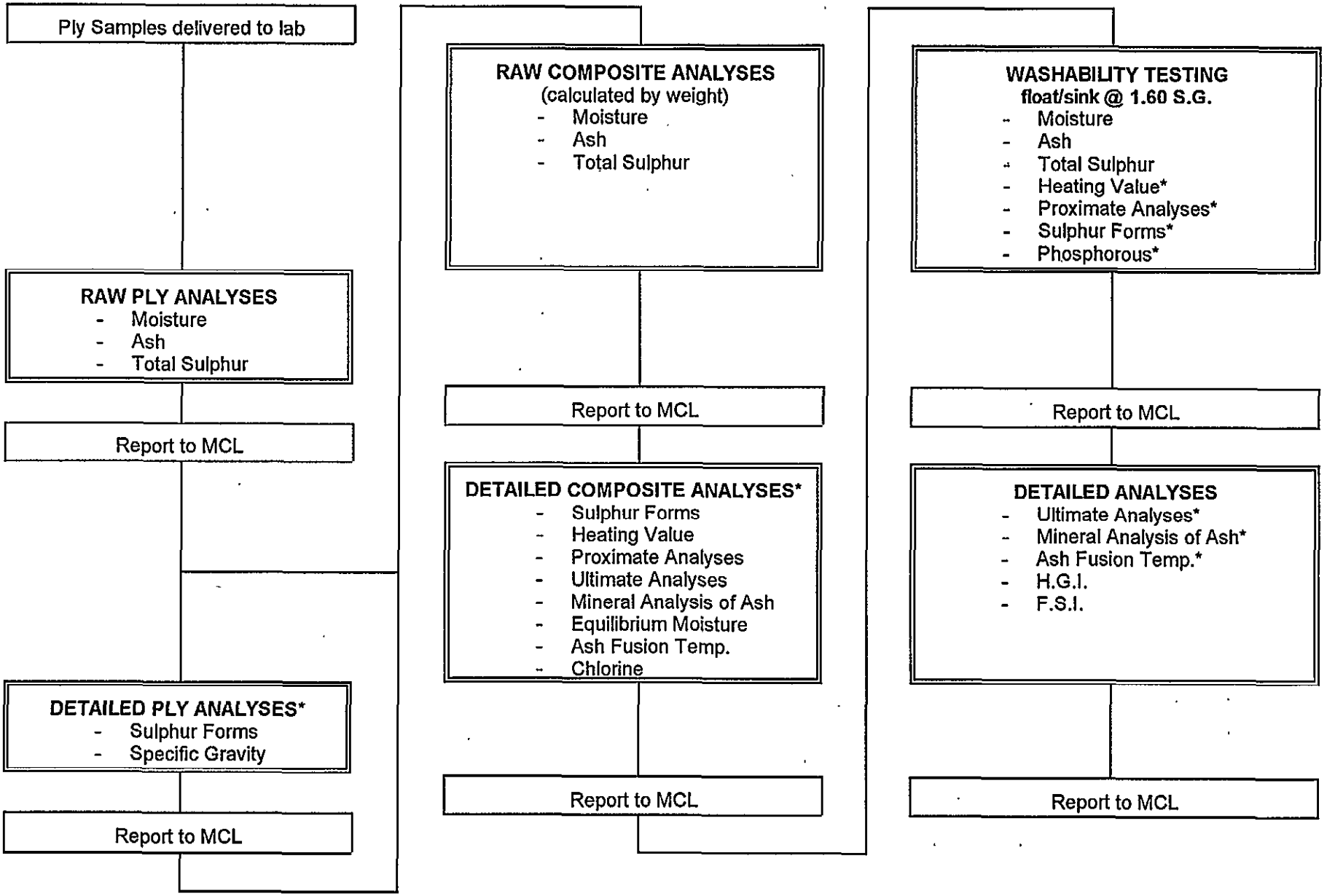
4.0 COAL QUALITY

The evaluation of coal quality for the 1992 exploration program is based upon the analytical results from core obtained from diamond and rotary drill-holes. The primary purpose of the coring program was to obtain sufficient samples of significant coal seams for a reliable determination of the raw and clean characteristics of the Telkwa Coalfield. Analytical data received from 1992 analyses, as well as those from previous years' analyses, have been compiled and summarized for the Pit #7, Pit #8, Northwest Area and Tenas Creek resource areas (Enclosures 13,17,21 and 25 respectively).

Specific lab analyses were performed by Loring Laboratories Limited of Calgary, Alberta, while Tenas Creek reflectance analyses were completed by David E. Pearson & Associates Ltd. of Victoria, British Columbia. Most samples collected were representative of selected coal lithologies, although some seam roof, floor and parting lithologies were also collected and subsequently analyzed. Specific analyses performed were completed in accordance with the coal quality flowsheet provided as Figure 4.1.

Coal in the Telkwa Coalfield varies from High Volatile A bituminous to semi-anthracite by the ASTM classification of coal rank. The vast majority of the area coals, however, are a High Volatile A bituminous product with RoMax vitrinite values generally ranging from 0.80 to 1.00 percent. Within the coal measures of the Skeena Group sediments, observations are that, coal rank generally tends to decrease slightly for coal units situated higher in the stratigraphic column. Localized occurrences of medium-volatile and semi-anthracite coals are thought to have resulted from either post-Cretaceous heat sources, deeper burial and subsequent uplift of some coal-bearing units, or from localized higher heat flux from the pre-Cretaceous basement. Slight increases in coal rank have been observed in coals situated at close proximities to the Tertiary intrusive on the northern resource areas.

TELKWA EXPLORATION PROGRAM, 1992
COAL TESTING



* on selected samples only.

Figure 4.1

4.1 QUALITY CHARACTERISTICS

Coal quality parameters have been determined from core samples recovered since 1979 from each of the resource areas identified thus far in the Telkwa coalfield. The results presented in this report represent a compilation of all analytical results thus far accumulated within resource areas Pit #7, Pit #8, Northwest Area and Tenas Creek. Analytical results of 1992 ply samples are presented within Enclosure 26 and compiled analytical results for seam composites are available for each area, providing details for individual drill-holes, within Enclosures 13, 17, 21 and 25.

Analytical results from core extracted in 1992 have provided additional information to the existing Telkwa coal quality database. Raw ash values for main seams vary widely ranging from 7.85 % to up to 56.22%. A similar variability exists with respect to the raw sulphur contents of individual seams, with values ranging from 0.30% to 7.77%. It has been observed, however, that although the sulphur contents between seams may vary, values for specific seams normally remain relatively consistent throughout the field. In contrast, volatile matter, fixed carbon and calorific values show considerably more consistency between seams.

Petrographic analysis was performed on one 1992 core sample collected from Seam #1 in the Tenas Creek resource area. Results of the analysis are presented within Enclosure 27.

5.0 COAL RESOURCES

Quantities of in-situ coal have been determined from drill-hole seam intersection information gathered between 1979 and 1992. Specific resource areas have been identified, each of which represents an independent field within the Telkwa Coalfield. Each possess unique characteristics with respect to deposit geometries and all exploit the coal measures of either Unit I or Unit III.

Coal resources prepared for this report have been classified according to the Standardized Coal Resource/Reserve Reporting System for Canada compiled by the Geological Survey of Canada (1989). Due to the nature of the Telkwa deposit, the resource areas identified thus far within the coalfield have been classified as complex geological deposits. As a result the drill-hole density which currently exists allows the Pit #7 and much of the Pit #8 coal reserve to be classified as measured, while the Northwest Area is considered inferred to indicated. The Tenas Creek prospect has been classified as inferred, as it requires additional work to establish field limits, deposit geometry and coal quality characteristics.

5.1 RESOURCE CRITERIA

It is the intent of this study to report the total quantity of significant coal occurring within resource areas identified or further delineated by 1992 exploration activities. Resource areas reported on include Pit #7, Pit #8, Northwest Area and Tenas Creek. The reader is referred to previous years' Assessment Reports for reserve estimate details of other resource areas identified on the Telkwa Property. Table 5.1 presents a summary of the estimated in-situ coal reserve established to date for each of the Telkwa Property resource areas.

Reserve estimates have been prepared based upon drill-hole seam intercept information established from geophysical log signatures. Resource areas for which geological models were generated (Pit #7 and Pit #8) have had total in-situ reserves estimated via the Lynx Mine Modelling System. For the Northwest and

Tenas Creek areas, reserve estimates are based upon simpler, more direct measurement methods.

For those areas not computer modelled average seam thickness values were calculated for each resource area and subsequently the surface area that each seam occupied was measured for each area. The resultant reserve estimates for the Northwest and Tenas Creek resource areas are based upon the following formula:

$$R = A \times Th \times SG$$

where R = Coal Reserves (tonnes).
A = Area occupied by a particular seam (m2).
Th = average seam thickness for a particular resource area (m).
SG = the Specific Gravity of a particular seam (g/cm3 = t/m3).

5.1.1 Pit #7 Reserve

Only significant seams were modelled, and thus ultimately considered during the reserve calculations of the Pit #7 resource block. Criteria for seam selection were based mainly upon seam thickness; generally seams which exhibited thicknesses of 0.50 metres or greater were included in the volume calculations. Partings with thicknesses exceeding 0.30 metres were considered separable and were not included as part of the seam package. Seams utilized in the reserve calculations, which are equivalent to those modelled, include:

- Seam 2
- Seam 3L
- Seam 3U
- Seams 5 and 5R
- all of the Seam 6 coals

Seams overlying the #6 coal package were not considered as they were intersected only with one drill-hole and are in turn not adequately represented within the field. The total in-situ coal reserve thus calculated for Pit #7 is 4,327,000 tonnes.

Table 5.1 Estimated In-situ Geological Coal Reserve; Telkwa Property

	Resource Area	1992 In-situ Coal Reserve: Geological Reserve (M. tonnes)		Confidence Level
Telkwa North:	Pit #7 Area	4.33		Measured
	Pit #8 Area	14.25		Measured
	Northwest Area	11.06		Indicated & Inferred
		29.64		
Telkwa South:	Pit #1,2 Area	3.37	*	Indicated
	Pit #3 Area	12.86	*	Meas - 80%; Ind - 20%
	Pit #4 Area	0.56	*	Inferred
	Pit #5 Area	0.34	*	Inferred
	Pit #6 Area	1.80	*	Indicated
		18.93		
	Cabinet Creek	3.71	*	Inferred
	Tenas Creek	8.69		Indicated & Inferred
		12.39		
Telkwa Property Total:		60.96	Million tonnes	

where: * = Resource area reserve estimates from previous years' Geological Reports

5.1.2 Pit #8 Reserve

Pit #8 represents a more complex geological deposit than does Pit #7, consisting of two main fault blocks and several smaller fault zones that exhibit minor displacement. In addition the Pit #8 resource area is considerably larger, within which the entire Unit III coal package is well represented. Criteria utilized for reserve estimate calculations were equivalent to those of Pit #7. Seams considered in the reserve calculations, which are equal to those which were modelled, include:

- Seam 2
- Seam 2L where present in significant thicknesses
- Seam 3L and 3U
- Seam 4
- Seam 4U when significant thicknesses were attained
- Seam 5 (which splits to become 5U and 5L westward)
- Seam 5ex where present in significant thicknesses
- Seam 6L and 6U
- Seam 7 in areas where thicknesses met the desired criteria
- Seam 8 in areas where thicknesses met the desired criteria
- Seam 9 in areas where thicknesses met the desired criteria

The reserve estimates are inclusive of all modelled coal seams northwest of the faults situated near the southeast limit of the area (6059000 / 617600; Enclosure 15). They do not speculate upon coals which are present southeast of the faults or which may exist beyond the current limits of geological control. The total in-situ coal reserve thus far established for the Pit #8 resource area is 14,254,300 tonnes.

5.1.3 Northwest Area

Drill-hole seam intersection summaries for Northwest Area are found within Enclosure 20 while the table within Enclosure 28 lists average specific gravities for each of those seams encountered. Seam surface areas were planimetered from the area geology map (Enclosure 19), specifically for the western fault block. The eastern block adjacent to the intrusive body was not considered for the reserve calculations as interpretations in this area are based solely on one drill-hole that intersected the coal measures. Significant folding has not been observed within the western block and bedding dips average 22 degrees. As a result drilled seam thicknesses were not corrected for true thickness and therefore bedding dips were also not considered during the seam surface area calculation.

The total in-situ coal reserve for the current explored limits of the Northwest Area has been estimated at 11,058,868 tonnes for all seams considered mineable. Additional work is considered necessary to further delineate field limits, deposit geometry and ultimately bring the coal reserve to a measured level.

5.1.4 Tenas Creek Area

The Tenas Creek resource area contains limited drill-hole information and has in turn had its coal reserve classified as inferred. Until such time that the field's geometry and limits are further established the area's coal reserve estimate has been calculated based upon that area which extends to 200 metres beyond the current limit of drill-hole control.

Tenas Creek drill-hole seam intersection summaries are provided within Enclosures 24 and 25. An average specific gravity of 1.43 was used for the #1 Seam, based upon analytical results from the sole core-hole in the

area. Bedding orientations for the Tenas Creek deposit are calculated at 9 degrees to the northeast.

The total inferred in-situ coal reserve thus far identified for Tenas Creek Area is 8,686,400 tonnes, based upon the main seam of interest, Seam #1/ #1 Upper. Like the Northwest Area additional exploration work is required to delineate field limits and deposit geometry.

6.0 COSTS INCURRED

Details of costs incurred during the 1992 exploration program are provided within the Cost Summary Report (Enclosure 29). The summary presented represents the total expenditures to date relating to the Telkwa Project 1992 exploration activities.

7.0 SUMMARY

The Skeena Group of sediments of the Telkwa Coalfield is an erosional remnant of Lower Cretaceous sedimentary rock deposited along the southern flank of the Bowser Basin. Throughout the Lower Cretaceous sedimentation occurred during which time deposition was influenced by two regressive / transgressive episodes. As a result the stratigraphic sequence is divisible into four lithostratigraphic units, Units I through IV. The lithologies within Units I and III are representative of the regressive episodes and, in turn, the periods of significant peat development in the Telkwa area. The coals within Unit I, collectively referred to as Coal Zone 1 are separated from the Unit III coals by as much as 140 metres of mainly marine sediment. Coal seams #2 through #11, represented in Unit III, collectively contribute 20.5 metres of coal to the Unit's 85.0 metre average thickness.

Since deposition the Skeena Group sedimentary package has been modified by faulting and minor folding resultant from continental stresses that persisted throughout much of the Upper Cretaceous and Tertiary. In addition, during the Eocene of the Tertiary Period, an igneous body intruded the Skeena sediments, further disrupting and faulting the sedimentary package. As a result much of the area is characterized by high angle faulting, breaking the area into a mosaic of structural blocks that have been rotated and tilted into a variety of orientations. Resource areas Pit #7, Pit #8, Northwest Area and Tenas Creek Area are each representations of such fault blocks.

Several resource areas have been identified in the Telkwa area and since the early 1900s the area has been sporadically mined, exploiting the Unit I and Unit III coals. It was not until the late 1960s, however, that drilling as a means of identifying potential resource areas was utilized. Between 1979 and 1989 Shell Canada/Crowsnest Resources completed several exploration programs, completing 263 drill-holes and highlighting several resource areas, most of which are located on the south side of the Telkwa River.

The Telkwa Property coal licences have been held by Manalta Coal Limited since May 1st, 1992 and since that time Manalta has completed one exploration program on the property. While several areas of potential economic interest were identified by the

property's previous owners, 1992 exploration activities were focused on further delineation of the Pit #7 and Pit #8 resource areas, and reconnaissance exploration of the Northwest and Tenas Creek areas. Between mid-August and mid-October Manalta Coal completed 43 drill-holes, 3.6 kilometres of surface geophysics and an airborne magnetic survey review. The majority of work undertaken by Manalta in 1992 was completed on the north side of the Telkwa River in resource areas Pit #7, Pit #8 and Northwest Area. Four of the 43 drill-holes, one of which was cored, was completed in the Tenas Creek resource area on the south side of the Telkwa River. Coal samples were collected from all cored drill-holes for subsequent coal quality analysis as were rock samples from 6 representative cores for Acid Rock Drainage analysis.

The vast majority of the Telkwa area coals explored to date are a High Volatile A bituminous product by ASTM classification of coal rank. Medium Volatile bituminous as well as occurrences of semi-Anthracite coal are also known to exist. While the majority of Telkwa coals are relatively consistent with respect to raw calorific value, volatile matter and fixed carbon values, variations in raw ash and sulphur values have been observed between seams. Sulphur content variations between some seams is attributed to periodic infiltrations of marine water into the developing peat swamp, while inundations are thought to have terminated development of some of the coal seams.

Resources calculated for the Pit #7 and Pit #8 Resource Areas by Manalta Coal Limited were completed using computer models constructed via the Lynx Mine Modelling system. For Northwest Area and Tenas Creek Area manual methods for reserve estimates were utilized. Estimated in-situ geological coal reserves for the four resource areas detailed in this report total 38.33 million tonnes. In-situ reserves for all resource areas identified thus far within the Telkwa Property limits are estimated at 60.96 million tonnes.

8.0 CONCLUSIONS

Significant reserves of High Volatile A bituminous coal have been identified within the Telkwa Coal Property limits currently held by Manalta Coal Limited. While the primary value of Telkwa coal is as a thermal product, some of its properties allow it consideration as a low grade coking coal. The majority of the coal reserve identified thus far within the property licences is represented by Seams #2 through #11 of Unit III, most of which has been identified within resource areas Pit #3, Pit #7, Pit #8 and Northwest Area.

The coal reserve identified to date is known to lie within individual fault blocks, or Resource Areas, each with independent field limits and deposit geometries. Results from the 1992 exploration program have aided in further definition of the geology of the Pit #7 and Pit #8 resource areas, providing additional coal quality information and allowing the coal reserve within them to be classed as measured. While the structure encompassing Pit #7 Resource Area is closed, Pit #8 field limits have not yet been established at its southeastern end and as a result additional exploration in this area is required. The resource areas identified as Northwest Area and Tenas Creek Area were previously unexplored and, in 1992, were identified and partially delineated by the year's exploration activities. Additional exploration in both areas is required to fully evaluate their geometries and resource potential.

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93 L/11 | 1:50,000 | EDITION 2 | 93 L/11

CANADA

Joins 93 L/14

127°30' 25' 20' 15' 10' 05' 127°00'

54°45'

40'

35'

54°30'

Joins 93 L/6

Joins 93 L/12

Joins 93 L/10

TELKWA

COAST LAND DISTRICT RANGE 5

BRITISH COLUMBIA

Scale 1:50,000 Échelle

Miles 1 0 1 2 3 Miles

Metres 1000 0 1000 2000 3000 4000 Mètres

Yards 1000 0 1000 2000 3000 4000 Verges

T.N.

GRID NORTH

LEASE BOUNDARY

manalta coal ltd.

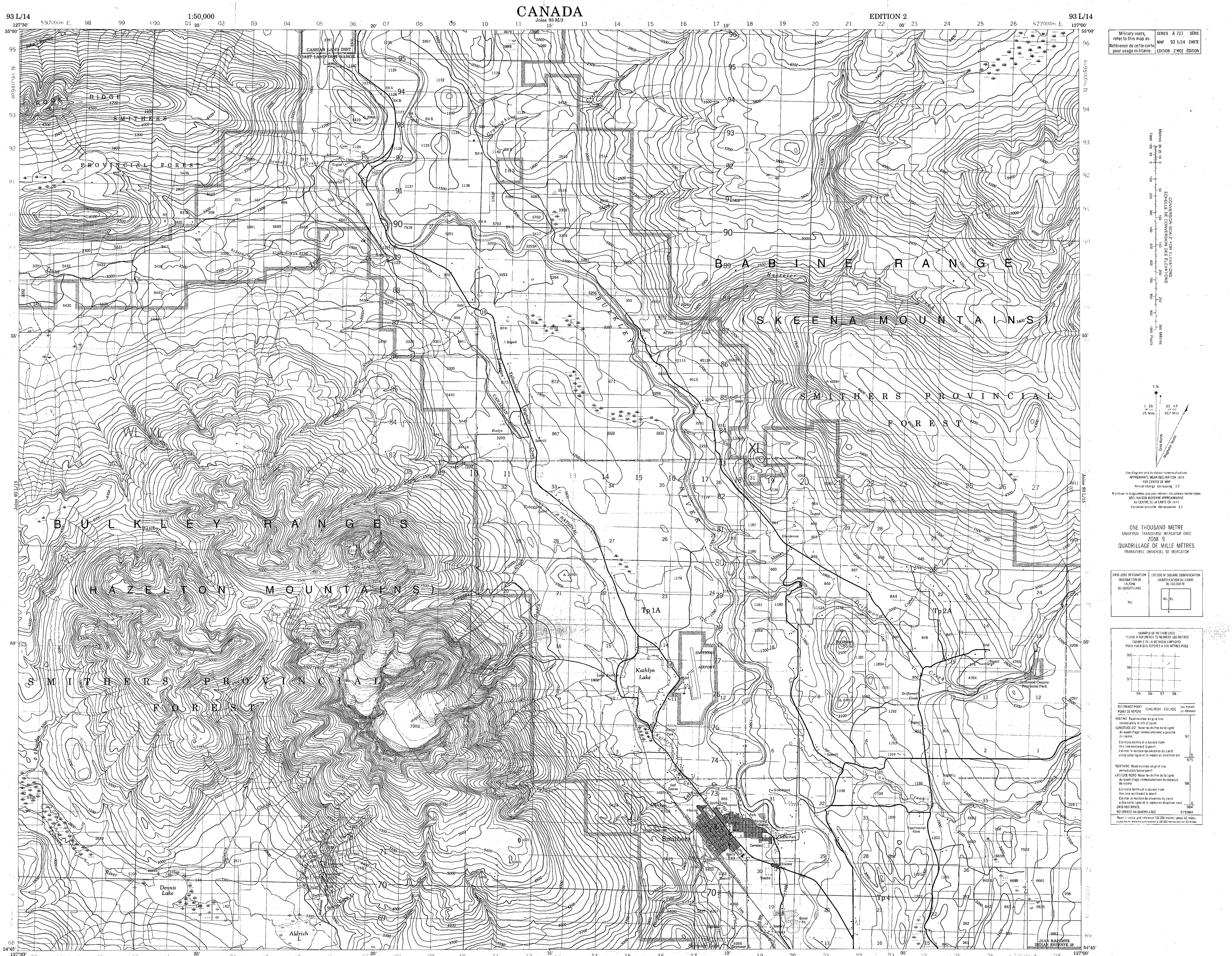
WEST CENTRAL B.C.

TELKWA PROJECT

COAL LAND DISPOSITION MAP

AUTHOR: A.L.	SCALE: 1:50000	DRAWN BY: M.L.E.	
DATE: OCT. 1993	REVISED: 91-06-25	DRAWING No: 42074	B
To Accompany			

93 L/14 | 1:50,000 | CANADA | EDITION 2 | 93 L/14



SMITHERS
BRITISH COLUMBIA

Scale 1:50,000 Échelle

Produced by the SURVEYS AND MAPPING BRANCH, DEPARTMENT OF ENERGY, MINES AND RESOURCES. Updated from aerial photographs taken in 1968. Culture check 1971. Printed 1975.

Copies may be obtained from the Canada Map Office, Department of Energy, Mines and Resources, Ottawa, or your nearest map dealer.

Roads:	Routes:		
hard surface, all weather	pavée, toute saison	dual highway / 2 chaussées séparées	more than 2 lanes / plus de 2 voies
hard surface, all weather	pavée, toute saison	2 lanes / 2 voies	less than 2 lanes / moins de 2 voies
loose or stabilized surface, all weather	gravier aggloméré, toute saison	2 lanes or more / 2 voies ou plus	less than 2 lanes / moins de 2 voies
loose surface, dry weather and unclassified streets	de gravier, temps sec et rues hors classe		
cart track	de terre		
trail, cut line or portage	sentier, percée ou portage		

This Provisional Map is equivalent to a standard map in accuracy of content.

Some names on this map are not yet official. Corrections or additions are invited by the Surveys and Mapping Branch.

CONTOUR INTERVAL 100 FEET
Elevations in Feet above Mean Sea Level
North American Datum 1927
Transverse Mercator Projection

Cette carte provisoire équivaut une carte régulière au point de vue précision de l'information

Certains noms inscrits sur cette carte ne sont pas encore officiels. La Direction des levés et de la cartographie saurait gré au public de lui signaler corrections et additions.

ÉQUIDISTANCE DES COURBES 100 PIEDS
Élévations en pieds au-dessus du niveau moyen de la mer
Système de référence géodésique nord-américain, 1927
Projection transverse de Mercator

Établie par la DIRECTION DES LEVÉS ET DE LA CARTOGRAPHIE, MINISTÈRE DE L'ÉNERGIE, DES MINES ET DES RESSOURCES. Mise à jour à l'aide de photographies aériennes prises en 1968. Vérification des ouvrages en 1971. Imprimée en 1975.

Ces cartes sont en vente au Bureau des Cartes du Canada, ministère de l'Énergie, des Mines et des Ressources, Ottawa, ou chez le vendeur le plus près.

93 L/14
EDITION 2

93 L/11

1:50,000

CANADA

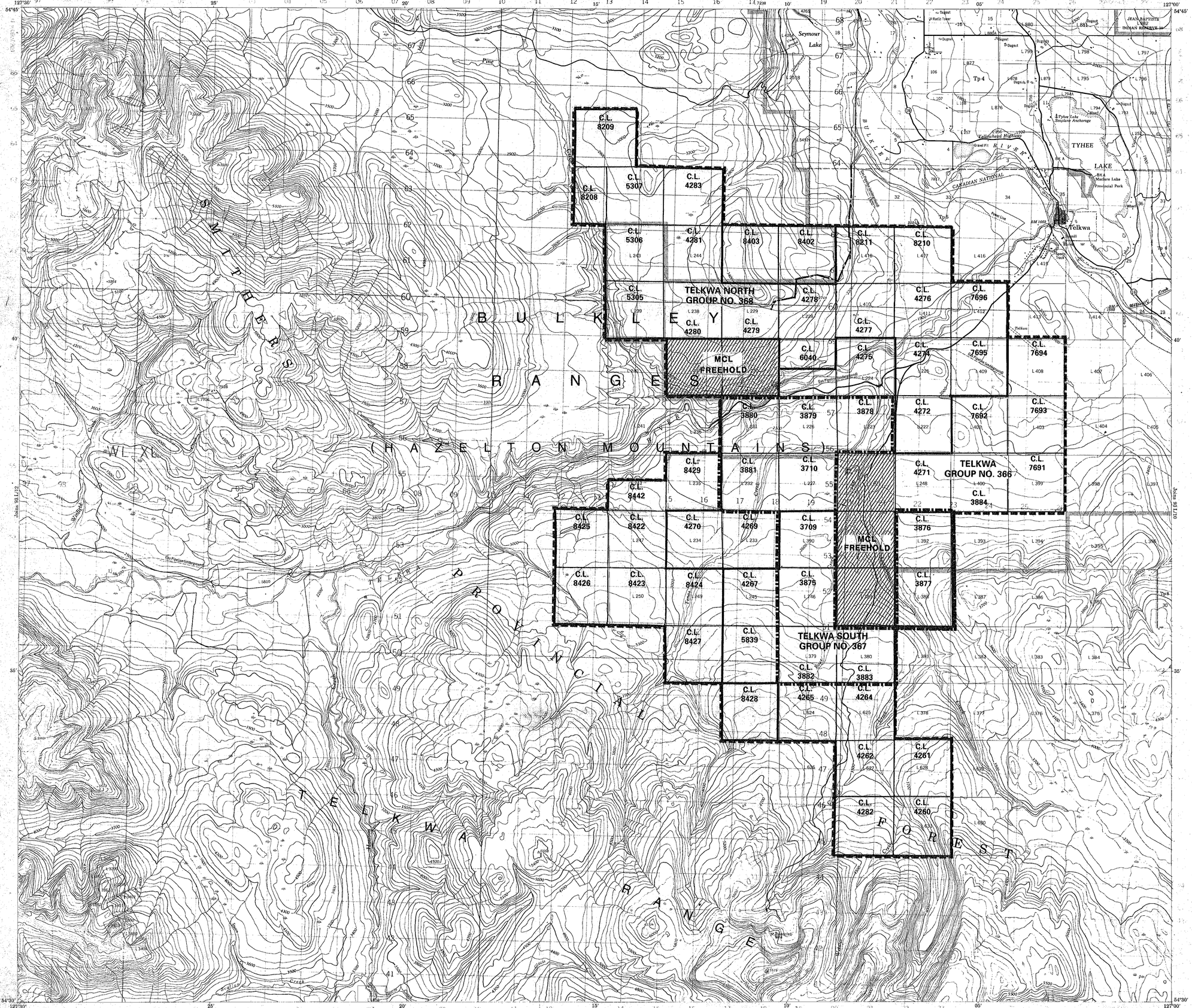
Joins 93 L/14

EDITION 2

93 L/11

127°30' 54°45'

127°00' 54°45'



Joins 93 L/6

TELKWA

COAST LAND DISTRICT RANGE 5

BRITISH COLUMBIA

Scale 1:50,000 Échelle

Miles 0 1 2 3 Miles

Metres 1000 0 1000 2000 3000 4000 Mètres

Yards 1000 0 1000 2000 3000 4000 Verges

T.N.

GRID NORTH

LEASE BOUNDARY

BULKLEY VALLEY COAL OPTION LTD.

manalta coal ltd.

WEST CENTRAL B.C.

TELKWA PROJECT

COAL LAND DISPOSITION MAP

AUTHOR: A.L.	SCALE: 1:50000	DRAWN BY: M.L.E.	
DATE: OCT. 1993	REVISED: 91-06-25	DRAWING No: 42074 A,B	
To Accompany			

615 000m E

620 000m E

6 057 500m N

6 047 500m N

NORTHWEST AREA

PIT 8 AREA

PIT 7 AREA

PIT 4 AREA

PIT 6 AREA

PIT 1/2 AREA

PIT 5 AREA

PIT 3 AREA

TENAS CREEK AREA

CABINET CREEK AREA

SUBCROP

1992 GEOPHYSICAL LINES

MCL FREEHOLD

MCL FREEHOLD L401

MCL FREEHOLD L391

MCL FREEHOLD L389

TELKWA

BULKLEY RIVER

TELKWA RIVER

TYHEE LAKE

Pine Creek

Tenas Creek

Cabinet Creek

Goathorn Creek

16

C.L. 8209
C.L. 8208
C.L. 5307
C.L. 4283
C.L. 5306 L243
C.L. 4281 L244
C.L. 8403
C.L. 8402
C.L. 8211 L418
C.L. 8210 L417
C.L. 5305 L239
C.L. 4280 L238
C.L. 4276 L228
C.L. 4277 L410
C.L. 4276 L411
C.L. 7696 L412
C.L. 4279 L229
C.L. 4275 L224
C.L. 4274 L225
C.L. 7695 L409
C.L. 7694 L408
C.L. 6040 L221
C.L. 3880 L231
C.L. 3879 L226
C.L. 3878 L223
C.L. 4272 L222
C.L. 7692 L402
C.L. 7693 L403
C.L. 8429 L235
C.L. 3881 L232
C.L. 3710 L227
C.L. 3884 L400
C.L. 7691 L399
C.L. 8442 L242
C.L. 8425
C.L. 8422 L247
C.L. 4270 L234
C.L. 4269 L233
C.L. 3709 L309
C.L. 4271 L248
C.L. 3876 L392
C.L. 8426
C.L. 8423 L250
C.L. 8424 L249
C.L. 4267 L245
C.L. 3875 L246
C.L. 3877 L388
C.L. 8427
C.L. 5839
C.L. 3882 L379
C.L. 3883 L380
C.L. 8428
C.L. 4265 L624
C.L. 4264 L625
C.L. 4262 L627
C.L. 4261 L628
C.L. 4282
C.L. 4260 L631

N

LEGEND

- ROAD
- C.L. 8428 — COAL LICENSE
- COAL LICENCE BOUNDARY
- POWERLINE
- HAZELTON VOLCANICS
- EXISTING DRILL HOLE
- TERTIARY INTRUSIVE
- RESOURCE AREA
- REVERSE FAULT
- NORMAL FAULT

1000 0 1000 2000

METRES

manalta coal ltd.

TELKWA

REGIONAL GEOLOGY MAP

Dwn. by:	M.L.E.	Date:	MARCH,1994
Chk'd by:	A.L.	File no.:	42087

614 000mE
616 000mE
618 000mE
620 000mE
622 000mE
6 064 000mN
6 062 000mN
6 060 000mN
6 058 000mN
6 057 000mN

1992 GEOPHYSICAL LINES

AVELLING COAL MINE
1920-1921

BULKLEY
C.N.R.
RIVER
TELKWA
RIVER
Pine Creek
Goathorn Creek
Tenas Creek

1000 0 1000
METRES

LEGEND

- HAZELTON VOLCANICS
- NORMAL FAULT (TEETH ON DOWNTHROWN
- THRUST FAULT (TEETH ON UPTHROWN SI
- EXISTING DRILL HOLE
- COAL MINE (ABANDONED)

manalta coal ltd.

TELKWA

1992 EXPLORATION
TELKWA NORTH

Dwn. by:	M.L.E.	Date:	MARCH, 1994
Chk'd by:	A.L.	File no.:	41825 F

615 000mE 616 000mE 618 000mE 620 000mE 622 000mE

6 057 000mN 6 055 000mN 6 053 000mN 6 051 000mN 6 049 000mN

TELKWA RIVER

Telkwa Creek

McNEILL COAL MINE
Pre.1930

LUSCAR OPEN PIT

B.V.C. No.4 MINE

M.C.L. Core Storage Facility

1983 Test Pit

B.V.C. No.2 MINE
1943-1951
(90,500T)

B.V.C. No.1 MINE
1930-1943
(60,000T)

B.V.C. No.3 MINE
1950-1951
(23,500T)

SUBCROP

N

LEGEND

- HAZELTON VOLCANICS
- NORMAL FAULT (TEETH ON DOWNTHROWN SIDE)
- THRUST FAULT (TEETH ON UPTHROWN SIDE)
- EXISTING DRILL HOLE
- COAL MINE (ABANDONED)
- OLD WORKING SITE
- B.V.C. BULKLEY VALLEY COLLERIES

1000 0 1000
METRES

manalta coal ltd.

TELKWA

1992 EXPLORATION TELKWA SOUTH

Dwn. by:	M.L.E.	Date:	MARCH, 1994
Chk'd by	A.L.	File no.:	41826 B

GEO-PHYSI-CON

GROUND GEOPHYSICAL SURVEYS
TELKWA, BRITISH COLUMBIA

Prepared For

MANALTA COAL LTD.
CALGARY, ALBERTA

Prepared By

GEO-PHYSI-CON CO. LTD.
CALGARY, ALBERTA

OCTOBER 1992
92-55

TABLE OF CONTENTS

GEO-PHYSI-CON

GEOPHYSICAL CONSULTANTS

6939 Farrell Road S.E., Calgary, Alberta T2H 0T3
Telephone: (403) 253-7621
Fax: (403) 259-6185

Job #92-55
November 2, 1992

Manalta Coal Ltd.
700 - 9 Avenue S.W.
Calgary, AB
T2P 3V4

Attention: Mr. M. Angelo Ledda

Dear Mr. Ledda:

I am enclosing an additional copy of the report entitled "Ground Geophysical Surveys, Telkwa, British Columbia" following our recent telephone conversation.

If you have any questions or comments concerning this report, please do not hesitate to contact our office.

Yours truly,

GEO-PHYSI-CON CO. LTD.

per:

Mark Bowman, P.Geoph
Project Geophysicist

encl.

MB:pda

1.0 INTRODUCTION

This report presents the results of a geophysical survey in the vicinity of Telkwa, British Columbia. The general location of the site is illustrated in Figure 1.

The objective of the survey was to map changes in physical properties of the subsurface associated with variations in structure and rock type. Variations in geology were expected to include coal subcrops and intrusive volcanics (Hazelton Volcanics). In order to address this objective, a combination of electromagnetic induction, direct current resistivity and magnetic techniques were employed.

On-site activities have been performed in accordance with Manalta Coal Ltd. Purchase Order Number 5114, dated August 25, 1992.

2.0 LOGISTICS AND DATA ACQUISITION

The geophysical surveys were conducted between September 14 and 20, 1992. The crew consisted of a professional geophysicist and a geophysical technician from Geo-Physi-Con Co. Ltd. An additional person was hired from the Smithers, BC area to assist with a portion of the data acquisition.

The geophysical surveys were performed over a grid prepared by Manalta Coal Ltd. personnel. Four crosslines and one baseline, totalling approximately 3.5 line kilometres, were slashed and chained. Electromagnetic induction and magnetic surveys were performed over the entire grid. Direct current resistivity data was acquired along the four crosslines.

2.1 Electromagnetic Induction (EM) Methods

The electromagnetic induction method uses a time varying magnetic dipole source to induce current flow in the ground. This current flow induces a secondary magnetic field which is sensed by a similar receiver dipole. The measured amplitude and phase of the secondary field is related to the conductivity distribution in the subsurface. The equipment used was the Max-Min I-10 horizontal loop EM system. The basic principles of operation of this system are

summarized in Appendix A. The corresponding Manufacturer's specifications are given in Appendix B.

2.1.1 Max-Min I-10 Horizontal Loop EM (HLEM)

The Max-Min I-10 system consists of a transmitter and transmitter coil connected by a flexible reference cable at a receiver and receiver coil. Depth of penetration of the system can be varied by altering either the transmitter-receiver coil geometry, or the operation frequency.

Max-Min I-10 data were recorded with the transmitter and receiver loops in horizontal coplanar configuration. Transmitter-receiver coil separation was 50 metres. This configuration enabled sufficient resolution while minimizing noise due to variation in transmitter-receiver coil separation. Measurements at four different frequencies of operation (1760 Hz, 7040 Hz, 14080 Hz and 56320 Hz) were digitally recorded and subsequently downloaded into an IBM-PC compatible computer.

2.2 Direct Current Profiling (DCP) Method

The DCP method involves driving current into the ground through a pair of current electrodes. The resulting current distribution in the earth is mapped by measuring the voltage across a

second pair of potential electrodes. The basic principles of the DCP method are summarized in Appendix A.

The survey used a 20 metre station interval with the measurement array oriented along the direction of the survey line. At each station, measurements were made to four different effective depths of exploration using Schlumberger array configuration. Table 1 lists the current potential electrode separations and an estimate of the effective depth of exploration for each of the four configurations.

TABLE 1

DCP Measurement Arrays

Current Electrode Separation (m)	Potential Electrode Separation (m)	Estimated Effective Depth of Exploration (m)
20	2	5
60	20	15
100	20	25
140	20	35

DCP data was recorded with the Scintrex RAC-8 Low Frequency resistivity system. The Manufacturer's specifications are listed in Appendix B.

2.3 Magnetic Method

Total field magnetic measurements were recorded with an Omni EDA IV proton precession magnetometer. Measurements were taken at 10 metre intervals along the survey lines.

The tie-line survey method was used to correct the data for the time varying component of the earth's magnetic field.

The basic principles of the magnetic method are summarized in Appendix A. The Manufacturer's specifications for the Omni IV proton precession magnetometer are given in Appendix B.

3.0 DATA PRESENTATION

In general, the 7040 Hz, HLEM data best illustrates the position and relative magnitude of the HLEM conductors at this site. HLEM profiles illustrating this data on an individual line basis

are presented in Figures 2 to 6. In addition, the 7040 Hz data has been presented as an HLEM profile map in Figure 7, illustrating the relative positions of the survey lines. Corresponding conductor labels between the survey lines indicate interpreted line to line continuation of conductor axes.

HLEM data profiles illustrating the 1760, 14080 and 56320 Hz data are presented in Appendix C (Figures C1 to C15).

The DCP measurements have been converted to apparent resistivity using mathematical relations incorporating measurement array geometry. The apparent resistivity is the total resistivity measured at ground surface due to the combined effect of subsurface layers of various thicknesses and resistivity within the effective exploration depth of the survey array used.

Direct current profiles of apparent resistivity for each of the four measurement arrays have been plotted on a logarithmic scale versus array midpoint station location along Lines 1 South, 2 South, 3 South and 4 South in Figures 8 to 11.

Total field magnetic data has been presented as data profiles in Figures 12 to 16. Magnetic intensity, measured in gammas, has been plotted versus survey station locations for the five

survey lines. In addition, the total field magnetic data has been presented as a contour map (Figure 17) to further illustrate the distribution of magnetic intensity at the site.

4.0 RESULTS

4.1 Line 1 South

HLEM data profile (7040 Hz) along Line 1 south is shown in Figures 2 and 7. A moderately strong conductor, identified as **A**, is evident at approximately Station 0+30 East. Small variations in the HLEM profile are evident at Stations 0+30 West, 1+20 East, and 2+20 East. These locations are in the vicinity of roads intersecting the survey lines. The slight anomalous HLEM response in these areas is likely a result of variations in transmitter-receiver coil separation as the road cut was traversed.

Line 1 south DCP data, illustrated in Figure 8, shows a region of anomalously high apparent resistivity east of Station 3+50 East. This resistivity anomaly is evident in all four array modes, indicating a depth of up to 35 metres. A somewhat smaller increase in apparent resistivity west of Station 0+50 West is evident predominantly in the 20, 60 and 100 metre current electrode separation data (effective depth of exploration of up to 25 metres).

In general, the total field magnetic data, presented as a data profile in Figure 12 along Line 1 South, shows an increase in magnetic intensity from west to east. This may indicate a reduction of overburden thickness in this direction.

A relatively large magnetic anomaly is evident to the east of Station 3+50 East. An area of low magnetic intensity is apparent to the west of Station 0+50 West.

The coincident HLEM (conductor A), DCP and magnetic anomalies at the east end of Line 1 South (centered at approximately Station 4+00 West) likely map the west edge of the Hazelton Volcanics. Increased apparent resistivity and magnetic intensity are generally characteristic of igneous rocks. The HLEM conductor A may be a response to the conductivity contrast at the contact between the two different rock types and/or to conductive material (eg. clays) that may be present at the contact.

The increase in apparent resistivity and a corresponding decrease in magnetic intensity west of Station 0+50 West may indicate the presence of coal in this region. No corresponding anomalous HLEM response is apparent.

4.2 Line 2 South

The 7040 Hz HLEM data profile for Line 2 South is presented in Figures 3 and 7. The HLEM profiles along Line 2 South are similar to that along Line 1 South, with conductor A being the most prominent feature. Other, somewhat smaller variations are evident in the data, as illustrated in Figure 3. The weak conductor at 1+40 West is coincident with an intersecting road and is likely a result of variations in transmitter-receiver coil separation. The weak response at Station 2+80 East may be due to two weak, parallel conductors, or to a single weak, relatively wide conductor (see Appendix A, Figure A).

Line 2 South DCP data, illustrated in Figure 9, has identified regions of anomalously high apparent resistivity at both the east and west ends of the survey line. The anomalies are most apparent in the arrays resulting in the greatest exploration depths (25 metres and 35 metres).

Total field magnetometer survey results, shown in profile for Line 2 South in Figure 13, illustrate a gradual increase in magnetic intensity from west to east. This may indicate decreased overburden from west to east. A slight reduction in magnetic intensity is evident at the west extent of the line. The low magnetic intensity shown at the east end of the line may be only a portion of an anomalous magnetic response which may extend east beyond the limit of the survey line.

Coincident anomalous DCP apparent resistivity and HLEM conductor A at the east end of Line 2 South (east of Station 4+00 East) may indicate a rock contact (west edge of the Hazelton Volcanics). Anomalous magnetic response is also evident in this region.

Increased apparent resistivity with a coincident reduction in magnetic intensity west of approximately Station 1+50 West may indicate the presence of coal.

4.3 Line 3 South

The 7040 Hz HLEM data profile for Line 3 South is presented in Figures 4 and 7. Conductor A, at the eastern extent of Line 3 South, appears to be the most prominent feature along the survey line. A somewhat weaker HLEM anomaly at Station 3+80 East, is likely due to variations in transmitter-receiver coil separation as a result of traversing a relatively steep embankment at this location. A weak conductor, centered at approximately Station 2+80 East, may be due to a weak, relatively wide conductor, or to the combined effect of two separate conductors.

Line 3 South DCP data is presented as a data profile in Figure 10. High apparent resistivity is evident in all four array configurations east of Station 4+00 East. Increased apparent resistivities are evident extending east of Station 3+10 East in the array configuration yielding

the shallow effective depth of exploration (5 metres), indicating a greater lateral extent in the shallow data. A slight increase in apparent resistivity is also evident between Stations 1+80 East and 0+70 West.

A relatively large magnetic anomaly is evident to the east of Station 3+80 East as illustrated in Figure 14. A gradual increase in magnetic intensity from west to east may indicate a decrease in overburden in this section.

Coincident HLEM conductor A, increased apparent resistivity and a relatively strong magnetic anomaly at the east end of Line 3 South (at approximately Station 4+20 East, extending to the eastern limit of the survey line) may indicate the occurrence of the Hazelton Volcanics.

The slight increase in apparent resistivity between Stations 1+80 East and 0+70 West, evident predominantly in the 5 metre depth of exploration data, suggests a relatively weak resistor within approximately 5 metres of ground surface. This is likely due to variations in soil type.

4.4 Line 4 South

The axis of conductor A is centered just beyond the eastern limit of Line 4 South (Figures 5 and 7). Several weaker HLEM conductors have also been identified along Line 4 South in Figure 5.

Results of the DCP survey along Line 4 South (Figure 11) indicate very little apparent resistivity variation along the extent of the line. Increased apparent resistivity between Stations 2+70 East and 4+50 East may indicate a coal subcrop and/or variations in soil type. A slight increase in apparent resistivity, in the 5 metre depth of exploration data only, is evident at the east end of the survey line (east of Station 5+50 East). Apparent resistivity decreases slightly between Station 0+50 West and the west end of Line 4 South.

Total field magnetometer results along Line 4 South (Figure 15) identifies a relatively large magnetic anomaly at the west end of the survey line. The cause of this anomaly is unknown.

4.5 Baseline

Results of the HLEM and total field magnetometer survey along the Baseline are illustrated in Figures 6 and 16, respectively. The HLEM results are further illustrated in the HLEM Profile Map (Figure 7).

A relatively strong HLEM conductor at Station 2+85 South has been identified in Figures 6 and 7. Geological mapping has suggested the occurrence of a northeast - southwest striking fault in this region. Continuation of this fault is not readily evident on either of Lines 1 South or 2 South along the proposed strike. This is most likely due to the acute angle at which the fault is expected to intersect survey Lines 1 South and 2 South. A somewhat weaker conductor has been identified at Station 4+40 South. In addition, the HLEM response signature at the west end of the Baseline suggests that the axis of a conductor may occur just beyond the southern limit of the survey line.

Results of the total field magnetometer survey (Figure 16) indicates a minimal variation in magnetic intensity along the Baseline. An area of slightly lower magnetic intensity of relatively limited lateral extent centered at Station 5+25 South is coincident with an access road. The survey line intersects the road at an acute angle such that several magnetic measurements have

been taken on the road. Thus, variations of soil type may be the cause of the variant magnetic intensities within this region.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The geophysical surveys in the Telkwa, BC region have identified several areas where additional testing should be considered. It is suggested that the following regions be tested by drilling and/or correlated with geological mapping which may exist:

i) The eastern regions of any or all of lines 1 South, 2 South and 3 South where coincident HLEM, DCP and magnetic anomalies exist, suggesting the presence of the Hazelton Volcanics.

ii) The western regions of Lines 1 South and/or 2 South where coincident increases in apparent resistivity and decreased magnetic intensity may indicate the presence of a coal subcrop.

iii) In the vicinity of Station 2+85 South along the Baseline to verify the occurrence of faulting.

iv) The western limit of Line 4 South to determine the cause of the anomalous magnetic intensity in this region.

v) The region between Stations 2+70 East and 4+50 East along Line 4 South to determine the cause of the increased apparent resistivity.

The present geophysical survey results should be further correlated with all available geological information for this area to enable a more detailed and complete geological interpretation.

PERMIT TO PRACTICE
GEO-PHYSI-CON CO. LTD.
Signature
Date Nov 2 1992
PERMIT NUM
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

Respectfully submitted,

GEO-PHYSI-CON CO. LTD.

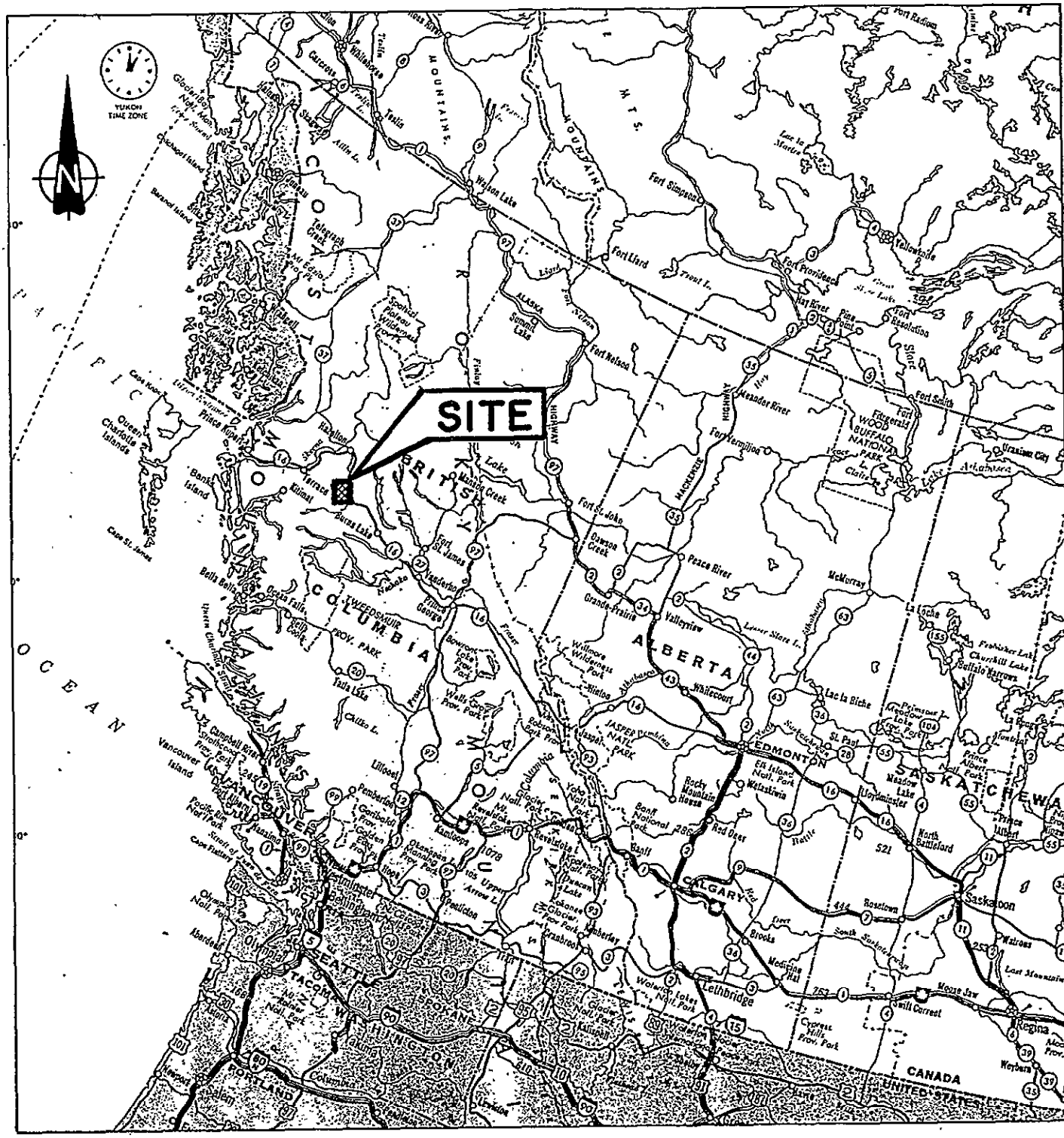
per:

Mark Bowman, P.Geoph.
Project Geophysicist

reviewed by:

J. Colin MacDonald
President

Calgary, Alberta
October 1992
92-55



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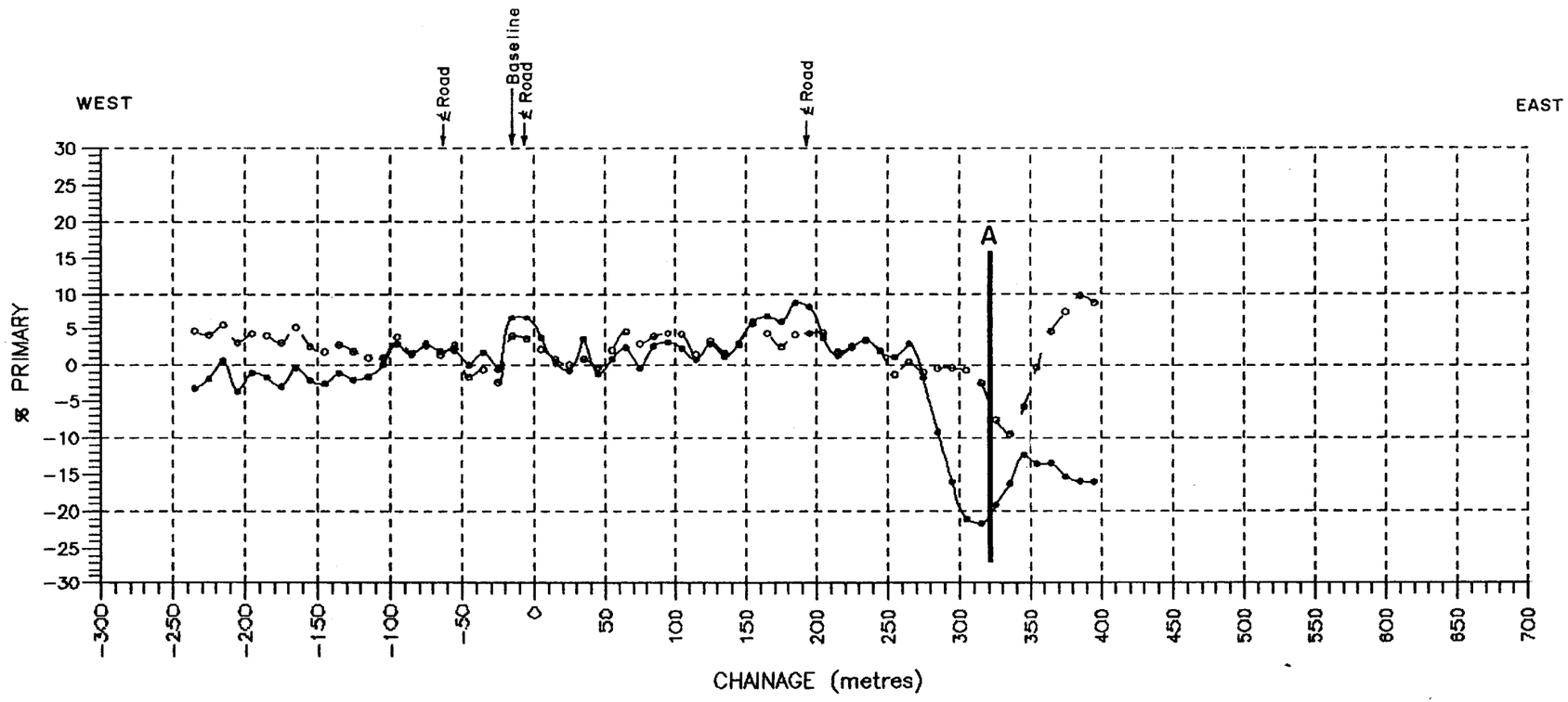
TELKWA , B.C.

SITE LOCATION MAP

GEO-PHYSI-CON	SCALE	DRAWN BY	DATE
	N.T.S.	PROJECT NO.	FIGURE
		C92-55	1

Sept., 1992



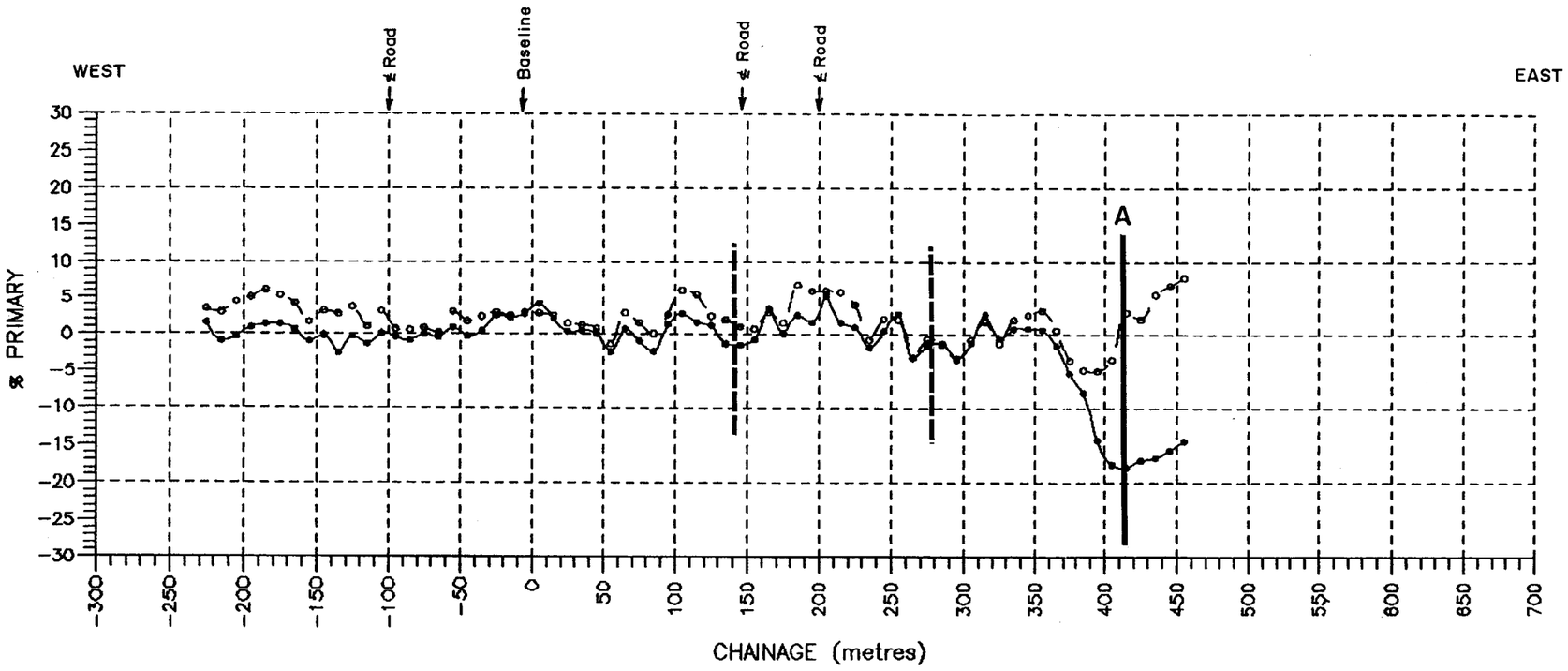
IN-PHASE
QUADRATURE
APPROXIMATE AXIS OF CONDUCTOR (moderate to strong)
APPROXIMATE AXIS OF CONDUCTOR (weak)
A CONDUCTOR LABEL

NOTE : 50 metre transmitter-receiver coil separation

MANALTA COAL LTD.
TELKWA , B.C.

MAX-MIN I - 10 HLEM PROFILE
LINE 1 SOUTH - 7040 Hz

GEO-PHYSI-CON	SCALE N.T.S.	DRAWN BY	DATE Sept., 1992
		PROJECT C92-55	FIGURE 2



IN-PHASE
QUADRATURE

APPROXIMATE AXIS OF CONDUCTOR (moderate to strong)

APPROXIMATE AXIS OF CONDUCTOR (weak)

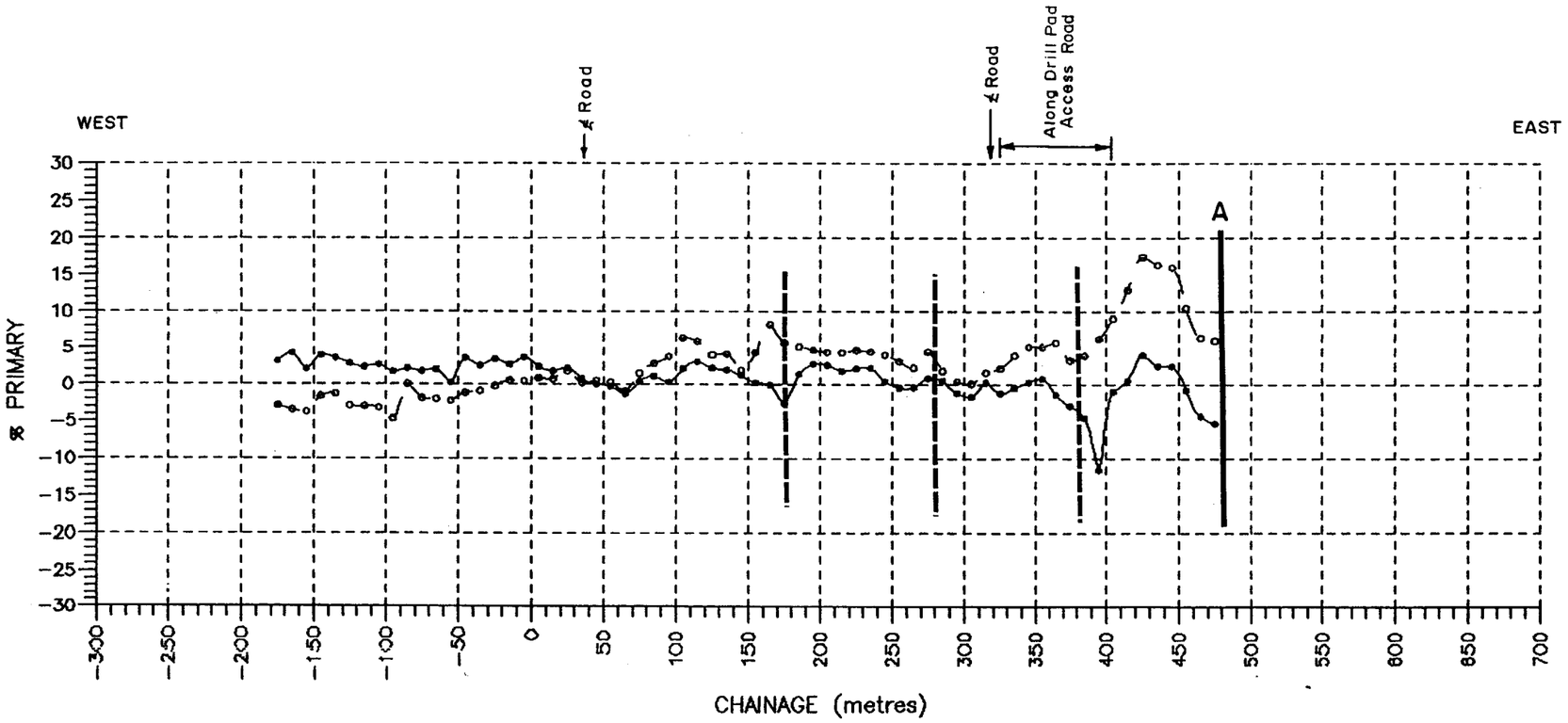
A CONDUCTOR LABEL

NOTE : 50 metre transmitter-receiver coil separation

MANALTA COAL LTD.
TELKWA , B.C.

MAX-MIN I - 10 HLEM PROFILE
LINE 2 SOUTH - 7040 Hz

GEO-PHYSI-CON	SCALE	DRAWN BY	DATE
	N.T.S.	PROJECT C92-55	Sept., 1992
			FIGURE 3



IN-PHASE

QUADRATURE

APPROXIMATE AXIS OF CONDUCTOR (moderate to strong)

APPROXIMATE AXIS OF CONDUCTOR (weak)

A CONDUCTOR LABEL

NOTE : 50 metre transmitter-receiver coil separation

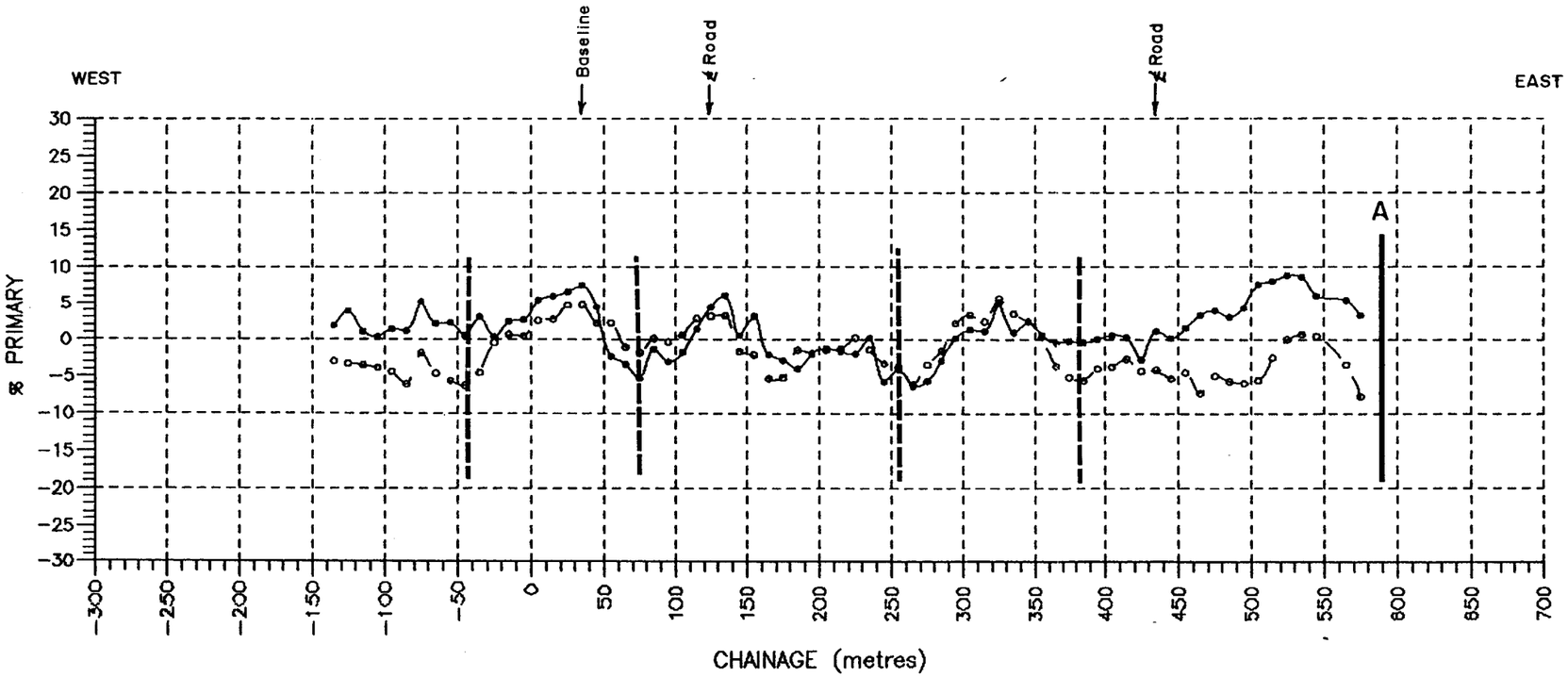
MANALTA COAL LTD.

TELKWA , B.C.

MAX-MIN I - 10 HLEM PROFILE

LINE 3 SOUTH - 7040 Hz

GEO-PHYSI-CON	SCALE N.T.S.	DRAWN BY	DATE Sept., 1992
		PROJECT C92-55	FIGURE 4



IN-PHASE

QUADRATURE

APPROXIMATE AXIS OF CONDUCTOR (moderate to strong)

APPROXIMATE AXIS OF CONDUCTOR (weak)

A CONDUCTOR LABEL

NOTE : 50 metre transmitter-receiver coil separation

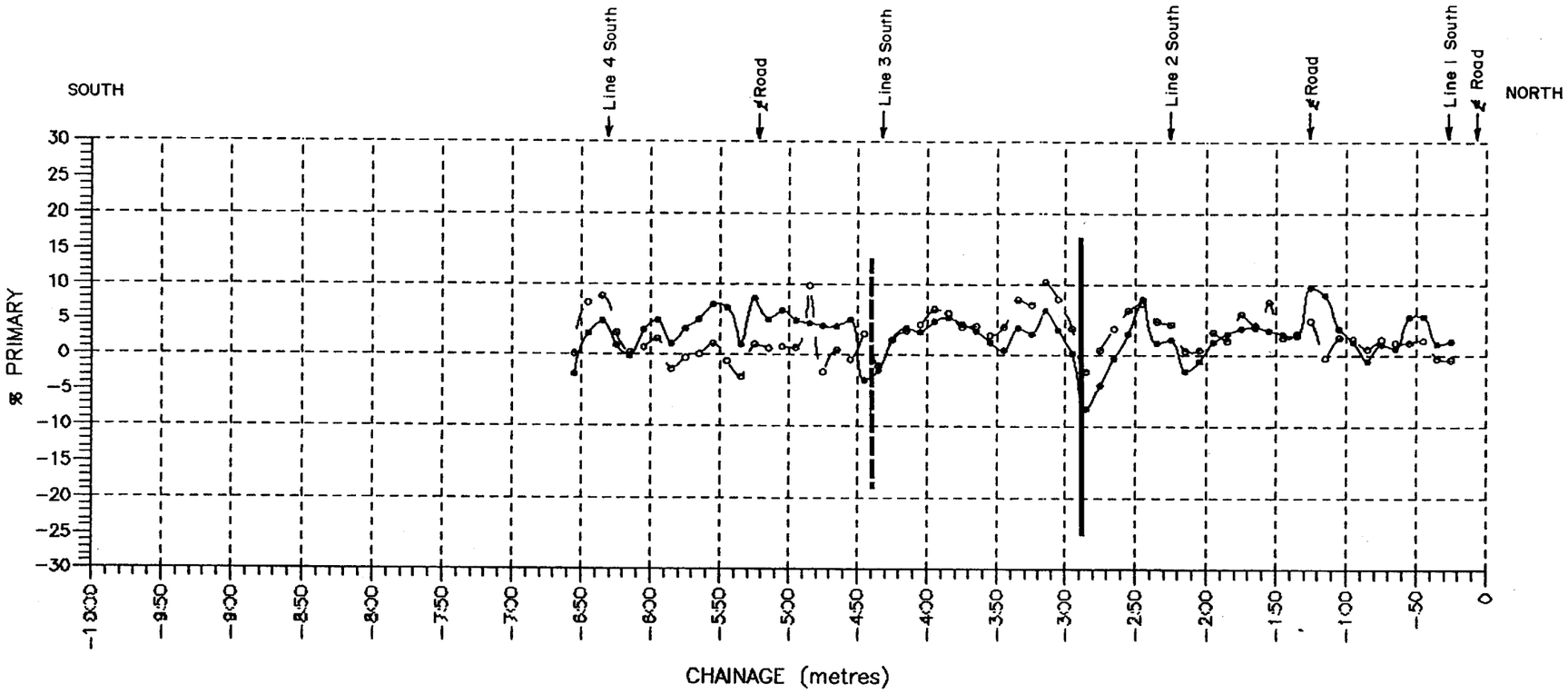
MANALTA COAL LTD.

TELKWA , B.C.

MAX-MIN I - 10 HLEM PROFILE

LINE 4 SOUTH - 7040Hz

GEOPHYSICON	SCALE N.T.S.	DRAWN BY	DATE Sept., 1992
		PROJECT C92-55	FIGURE 5



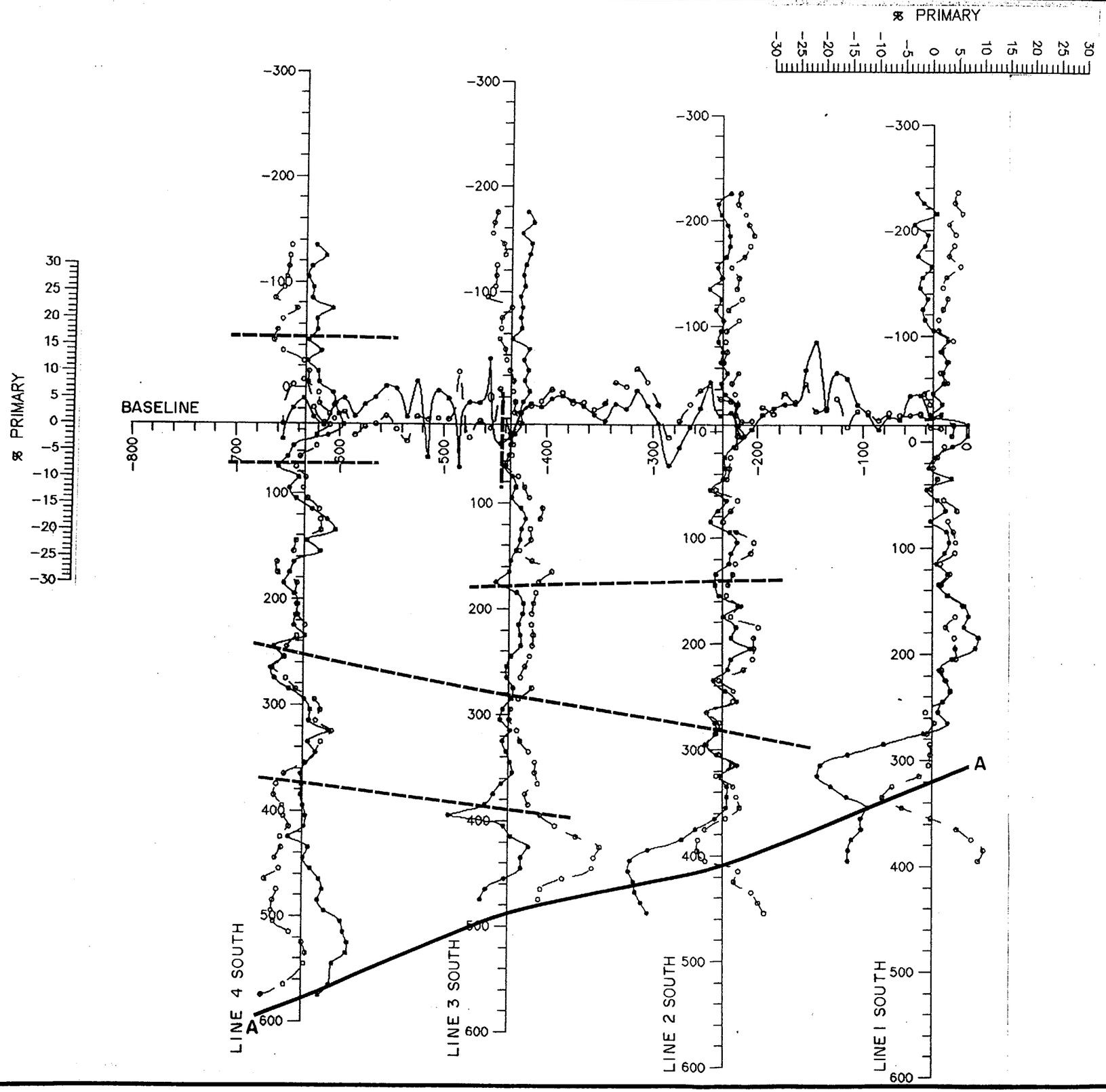
IN-PHASE
QUADRATURE
APPROXIMATE AXIS OF CONDUCTOR (moderate to strong)
APPROXIMATE AXIS OF CONDUCTOR (weak)
A CONDUCTOR LABEL

NOTE : 50 metre transmitter-receiver coil separation

MANALTA COAL LTD.
TELKWA , B.C.

MAX-MIN I - 10 HLEM PROFILE
BASELINE - 7040 Hz

GEOPHYSICON	SCALE N.T.S.	DRAWN BY	DATE Sept., 1992
		PROJECT C92-55	FIGURE 6



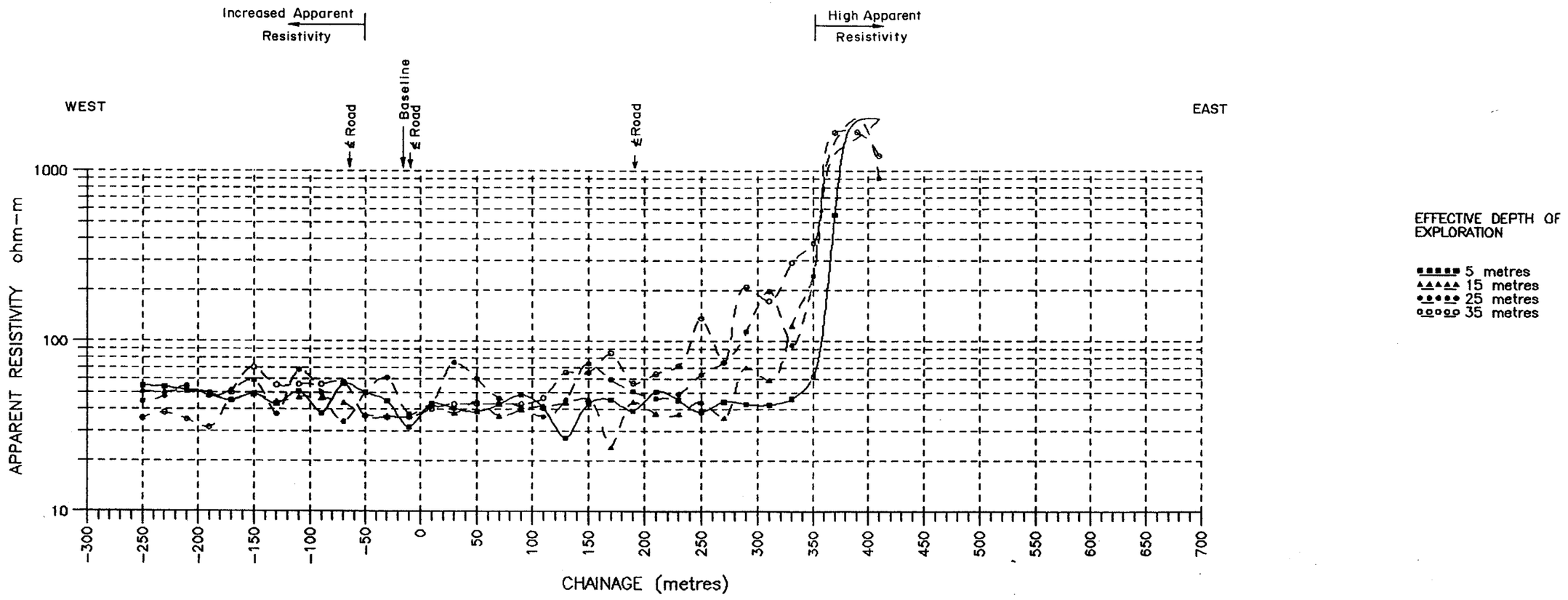
IN-PHASE
QUADRATURE
APPROXIMATE AXIS OF CONDUCTOR (moderate to strong)
APPROXIMATE AXIS OF CONDUCTOR (weak)
A CONDUCTOR LABEL

NOTE : 50 metre transmitter-receiver coil separation

MANALTA COAL LTD.
TELKWA , B.C.

MAX-MIN I - 10 HLEM PROFILE MAP
7040 Hz

GEO-PHYSI-CON	SCALE: N.T.S.	DRAWN BY	DATE: Sept., 1992
		PROJECT: C92-55	FIGURE: 7



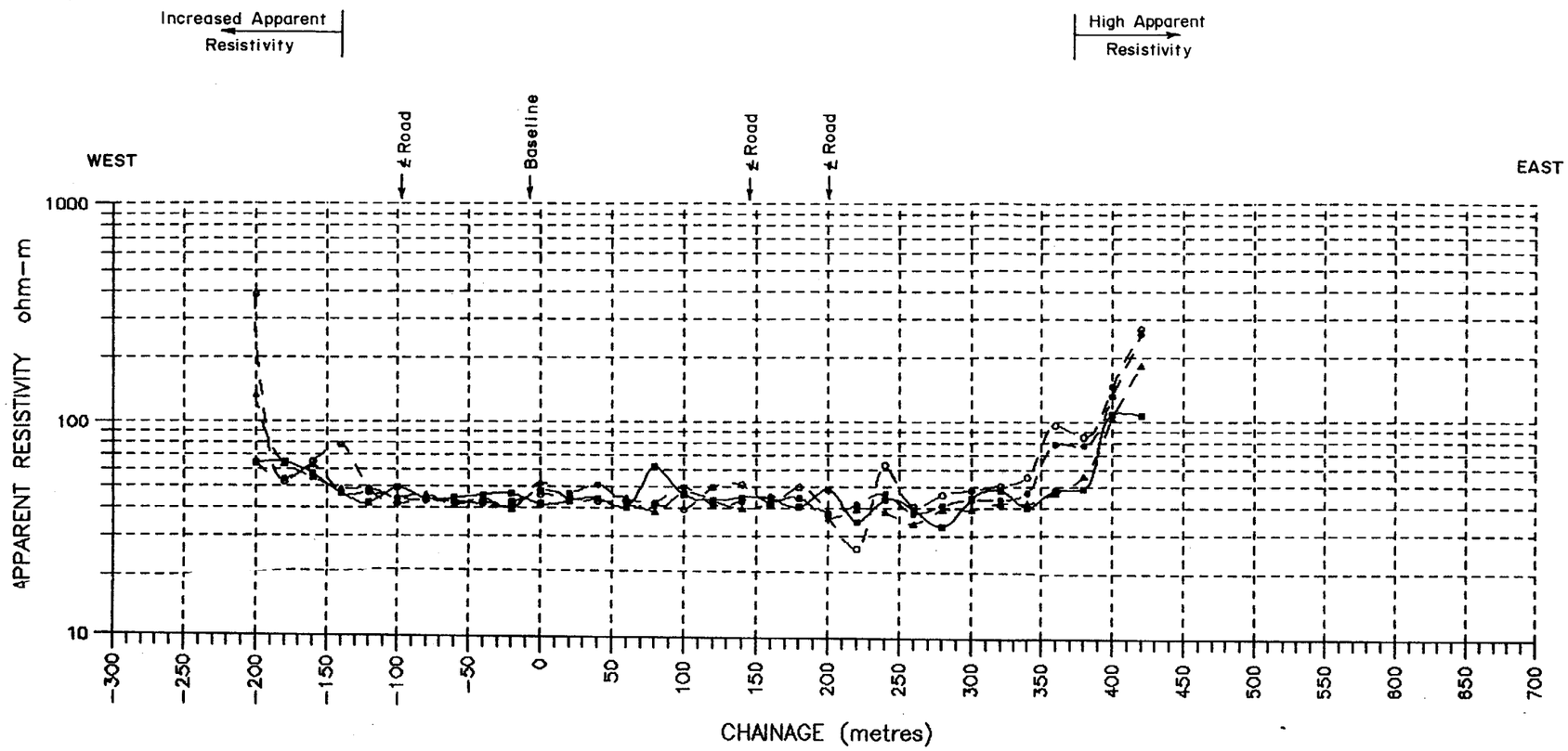
EFFECTIVE DEPTH OF EXPLORATION

- 5 metres
- 15 metres
- 25 metres
- 35 metres

MANALTA COAL LTD.
TELKWA , B.C.

DIRECT CURRENT PROFILING SURVEY
LINE I SOUTH

GEO-PHYSI-CON	SCALE	DRAWN BY	DATE
	N.T.S.		Sept., 1992
		PROJECT C92-55	FIGURE 8



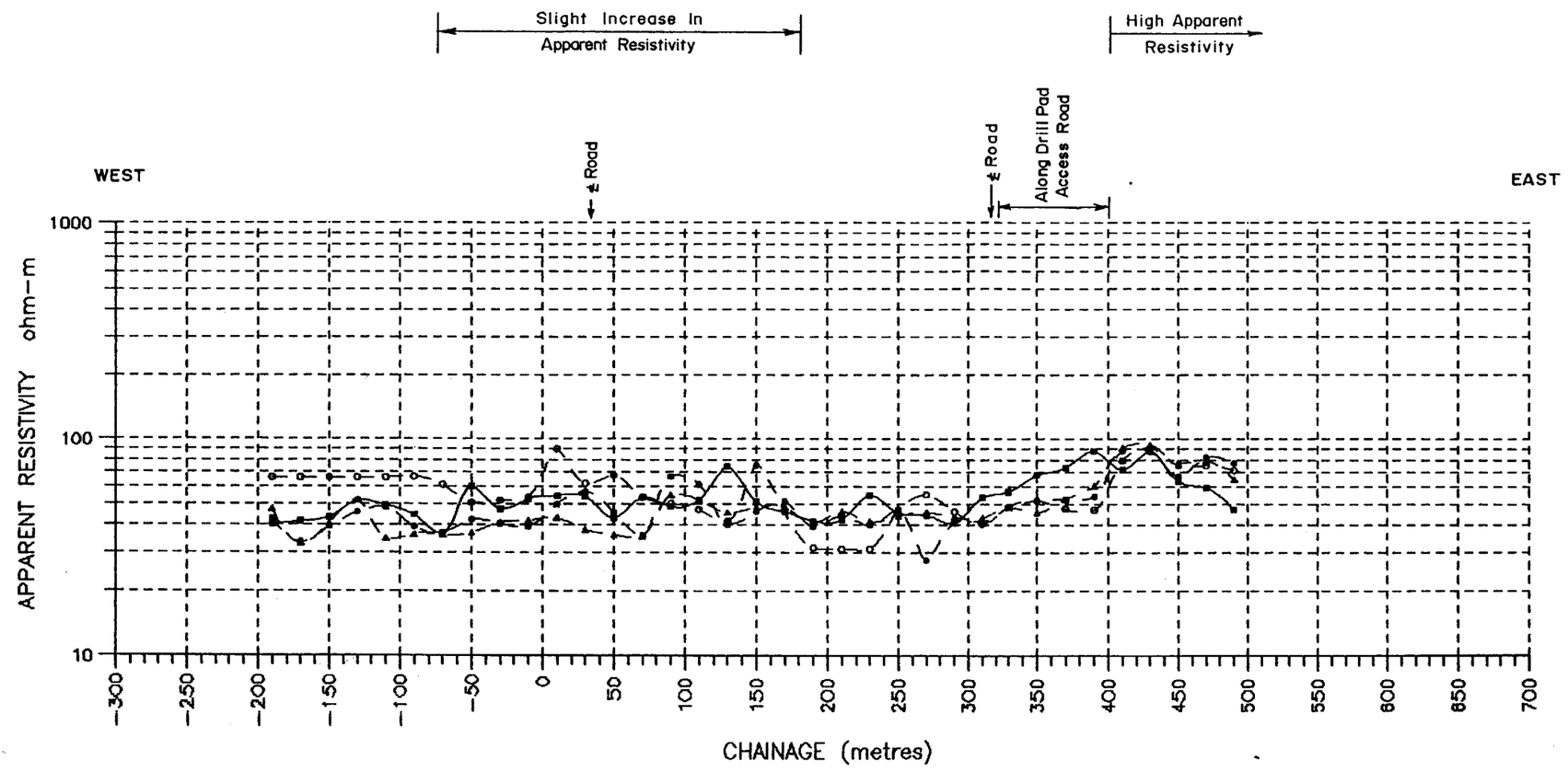
EFFECTIVE DEPTH OF EXPLORATION

- 5 metres
- 15 metres
- 25 metres
- 35 metres

MANALTA COAL LTD.
TELKWA , B.C.

DIRECT CURRENT PROFILING SURVEY
LINE 2 SOUTH

GEO-PHYSI-CON	SCALE: N.T.S.	DRAWN BY:	DATE: Sept., 1992
		PROJECT: C92-55	FIGURE: 9



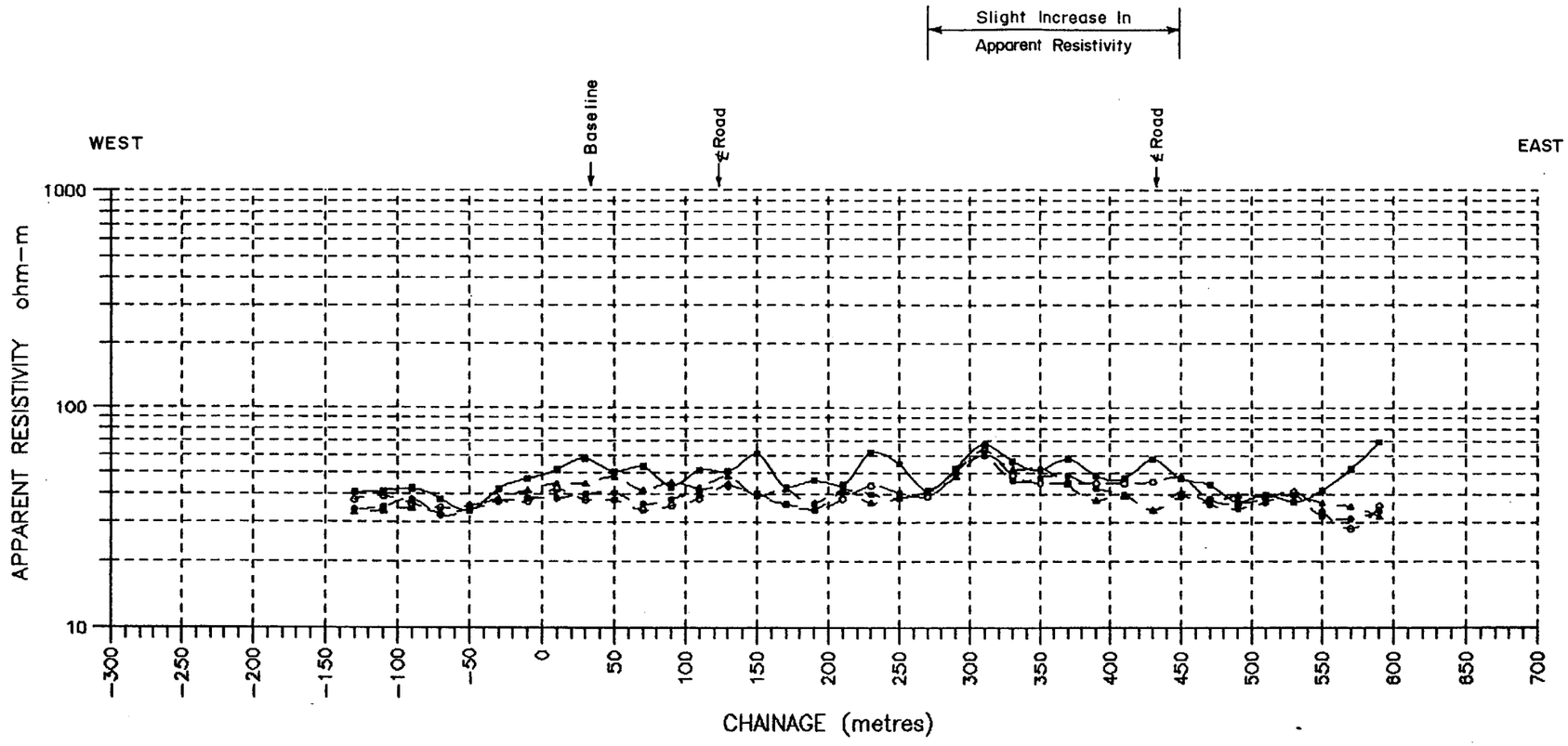
EFFECTIVE DEPTH OF EXPLORATION

- 5 metres
- 15 metres
- 25 metres
- 35 metres

MANALTA COAL LTD.
TELKWA , B.C.

DIRECT CURRENT PROFILING SURVEY
LINE 3 SOUTH

GEO-PHYSI-CON	SCALE N.T.S.	DRAWN BY	DATE Sept., 1992
		PROJECT C92-55	FIGURE 10



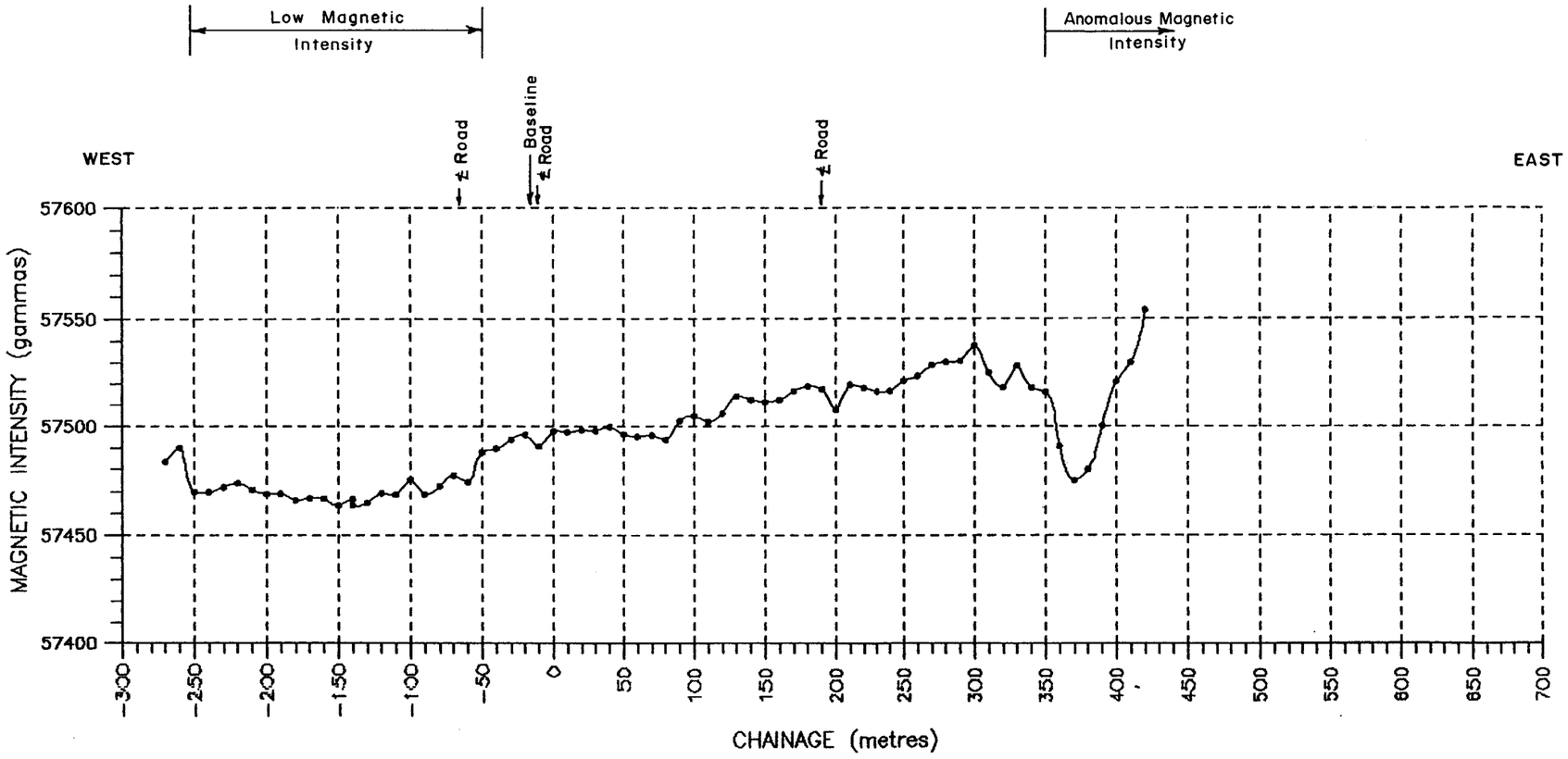
EFFECTIVE DEPTH OF EXPLORATION

5 metres
15 metres
25 metres
35 metres

MANALTA COAL LTD.
TELKWA , B.C.

DIRECT CURRENT PROFILING SURVEY
LINE 4 SOUTH

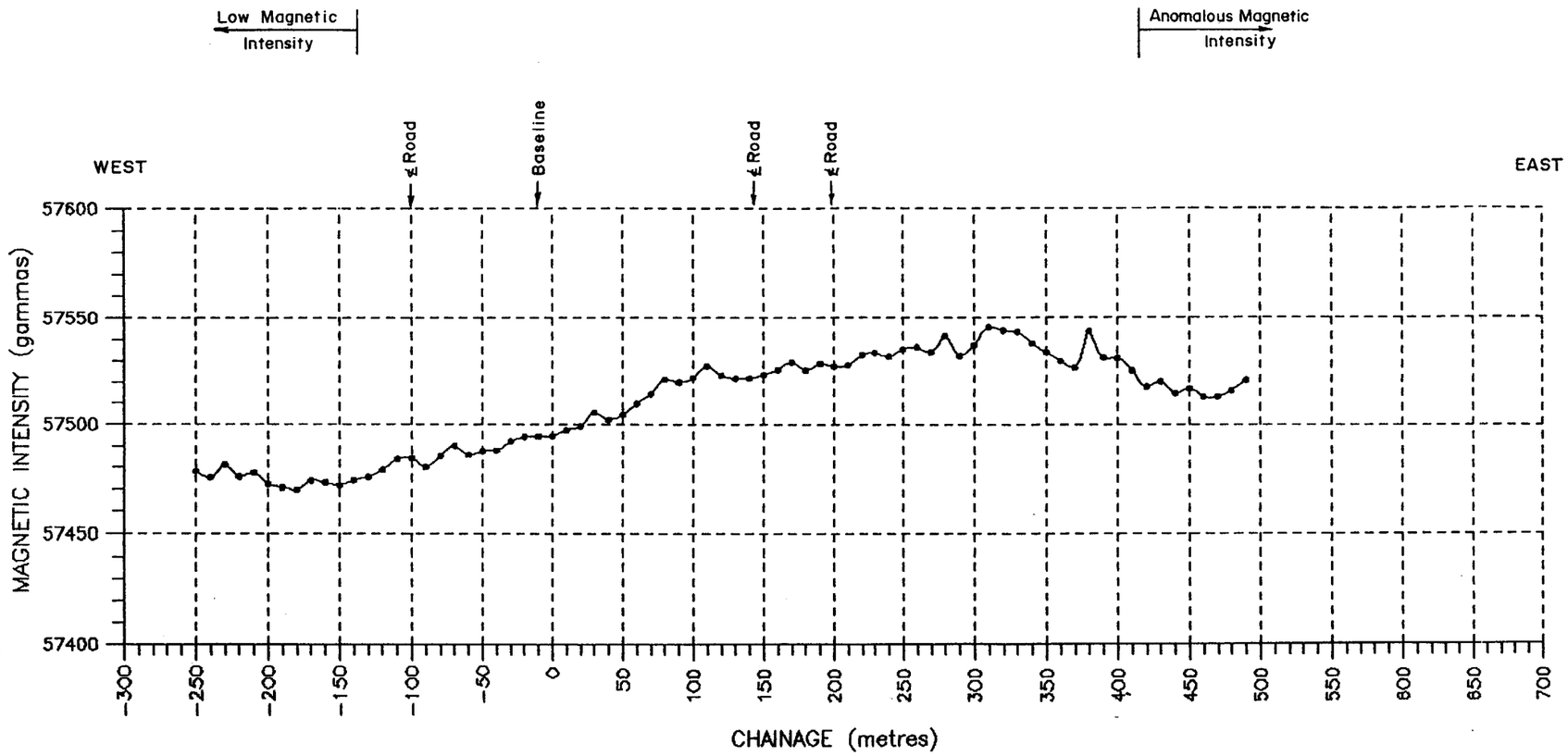
GEO-PHYSICON	SCALE N.T.S.	DRAWN BY	DATE Sept., 1992
		PROJECT C92-55	FIGURE 11



MANALTA COAL LTD.
TELKWA , B.C.

TOTAL FIELD MAGNETOMETER SURVEY
LINE I SOUTH - PROFILE

GEO-PHYSI-CON	SCALE	DRAWN BY	DATE: Sept., 1992
	N.T.S.	PROJECT: C92-55	FIGURE: 12

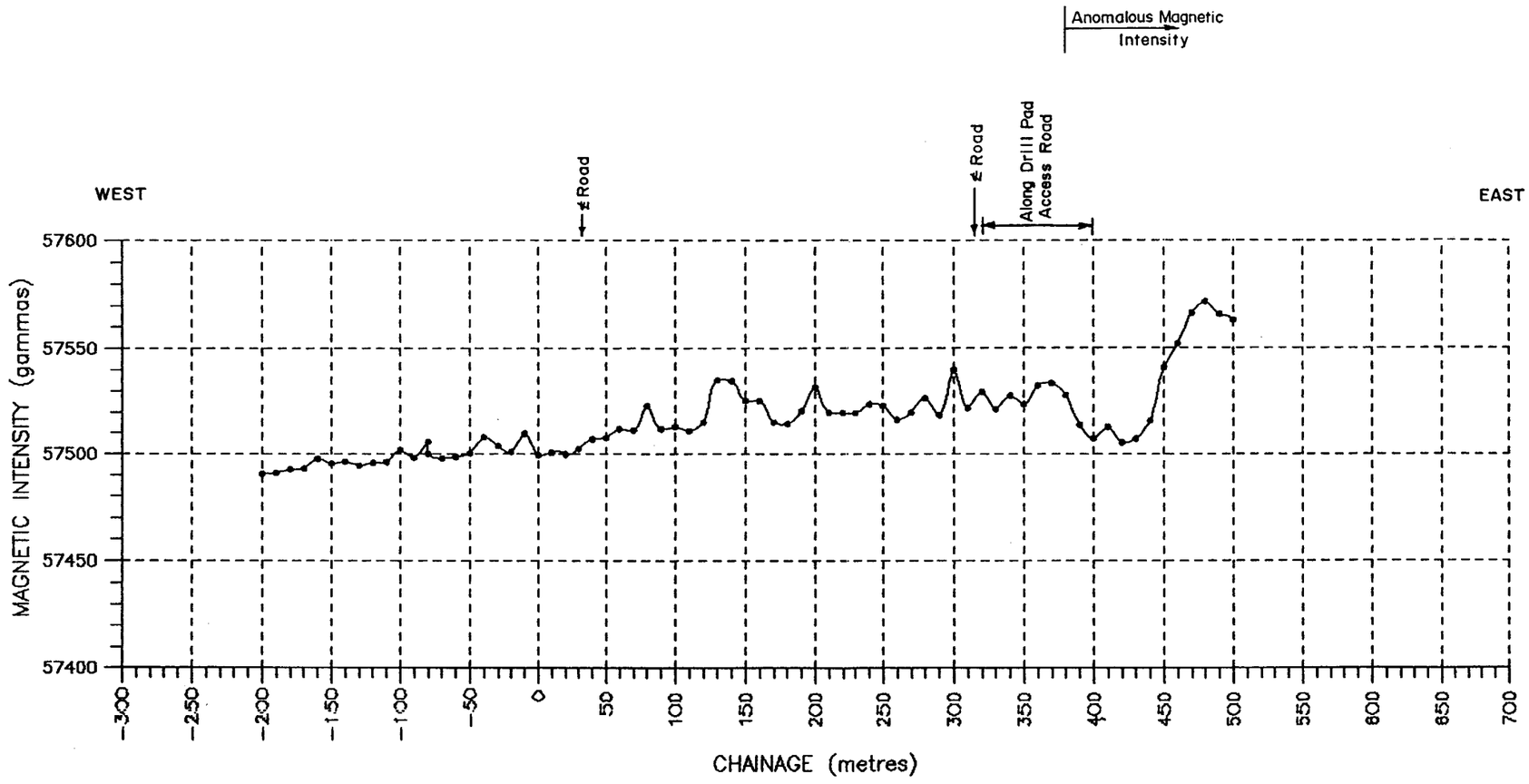


MANALTA COAL LTD.
TELKWA , B.C.

TOTAL FIELD MAGNETOMETER SURVEY
LINE 2 SOUTH - PROFILE

GEOPHYSICON	SCALE	DRAWN BY	DATE
	N.T.S.	PROJECT	FIGURE
		C92-55	13

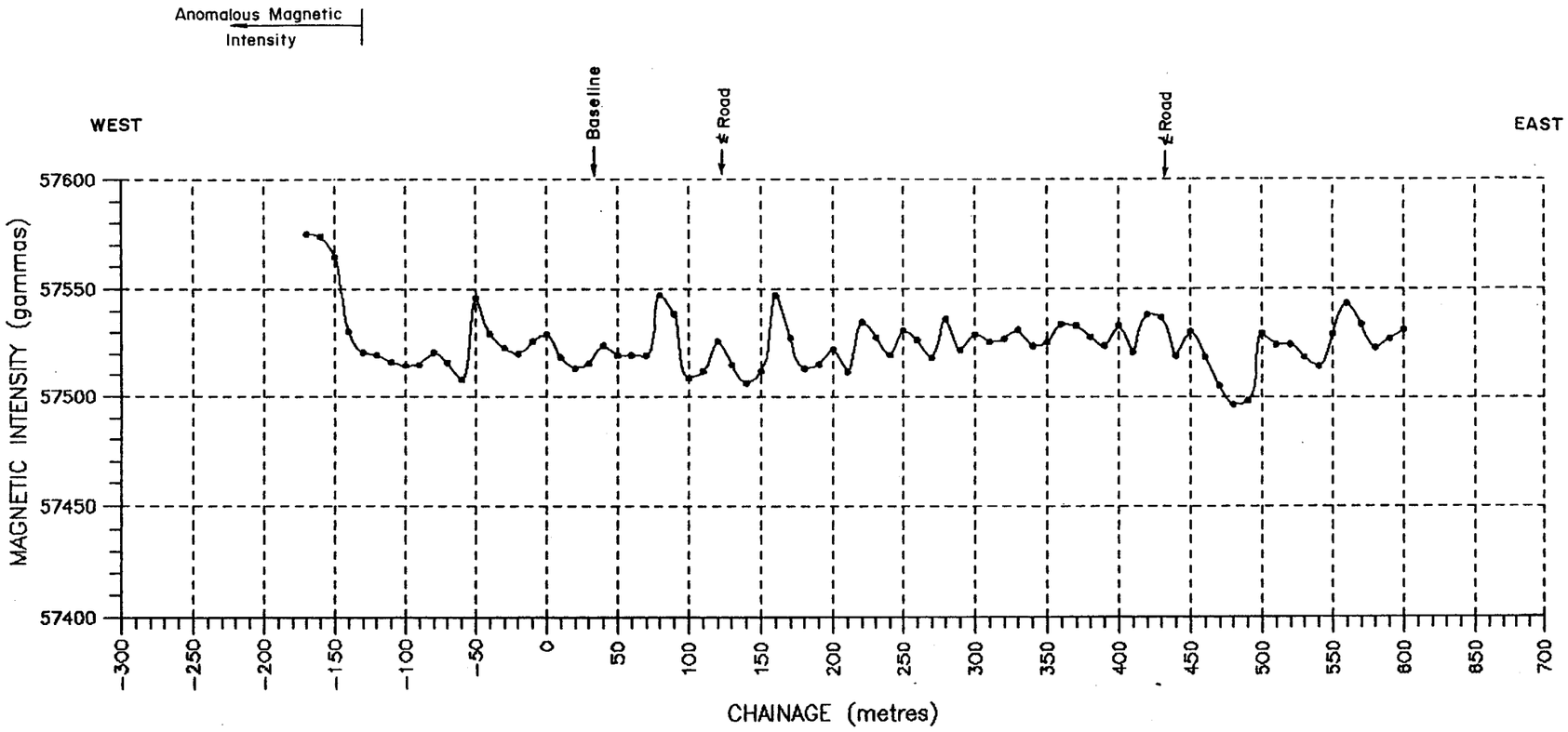
DATE: Sept., 1992



MANALTA COAL LTD.
TELKWA , B.C.

TOTAL FIELD MAGNETOMETER SURVEY
LINE 3 SOUTH - PROFILE

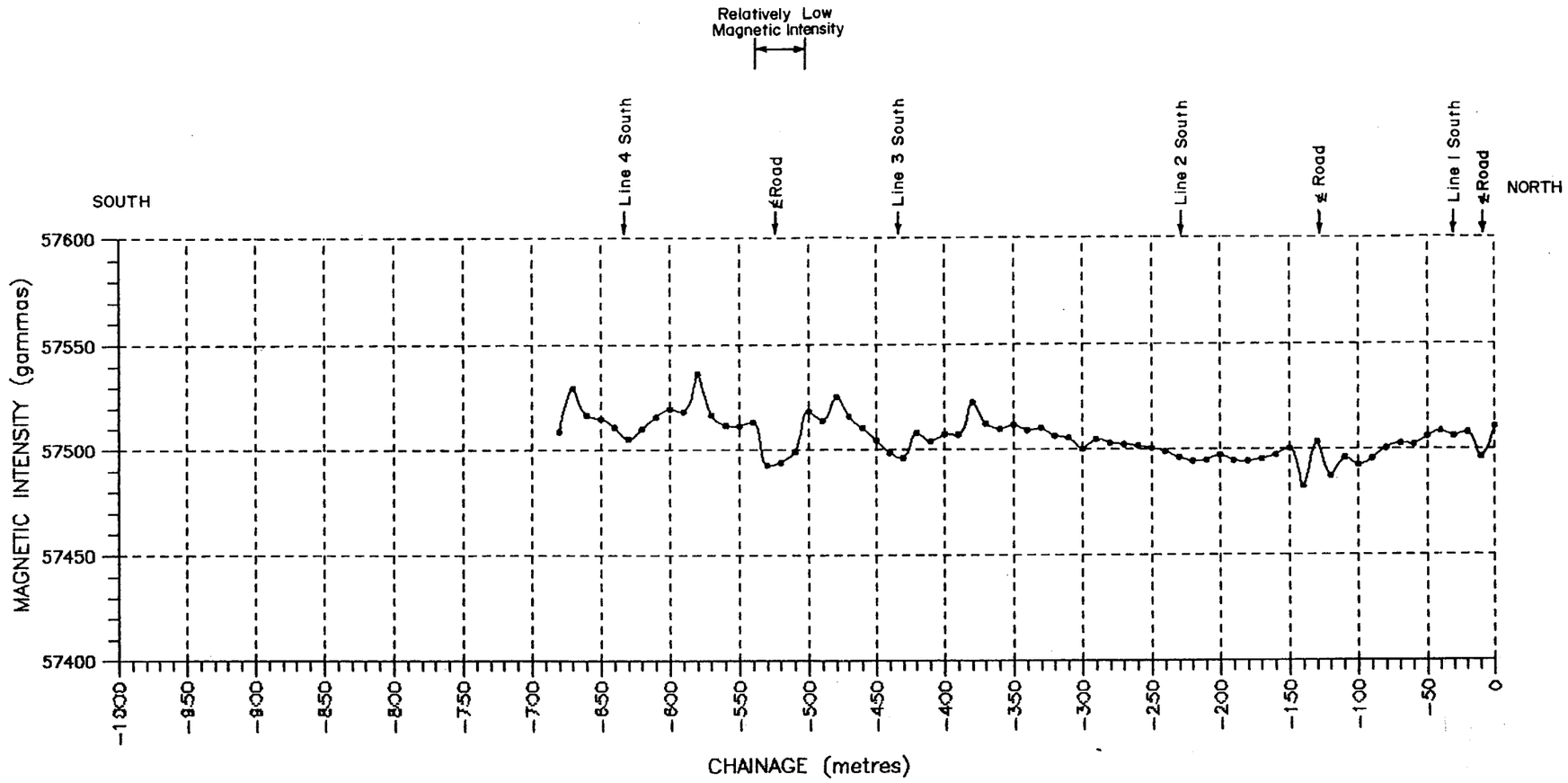
GEO-PHYSI-CON	SCALE: N.T.S.	DRAWN BY:	DATE: Sept., 1992
		PROJECT: C92-55	FIGURE: 14



MANALTA COAL LTD.
TELKWA , B.C.

TOTAL FIELD MAGNETOMETER SURVEY
LINE 4 SOUTH - PROFILE

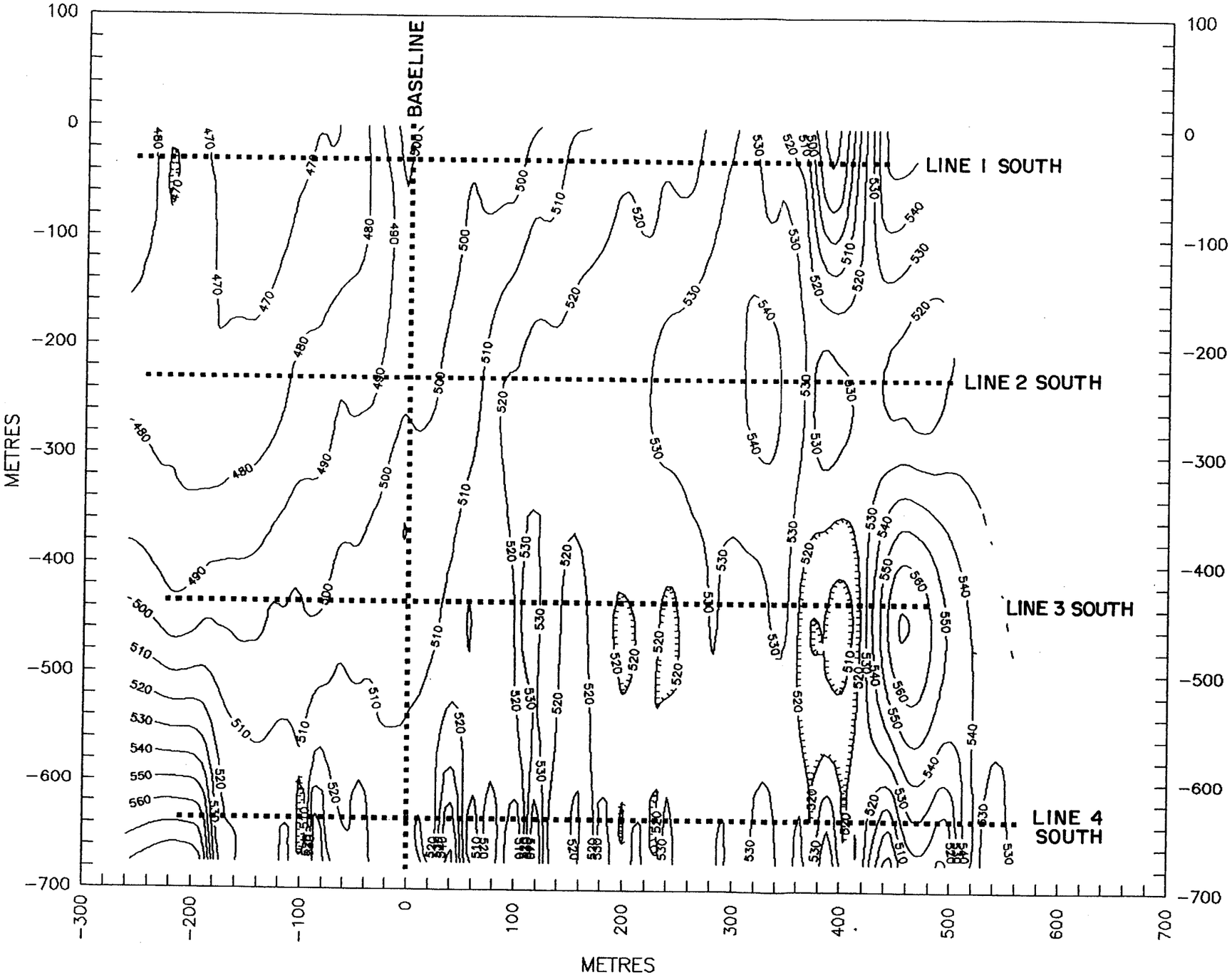
GEO-PHYSICON	SCALE N.T.S.	DRAWN BY	DATE Sept., 1992
		PROJECT C92-55	FIGURE 15



MANALTA COAL LTD.
TELKWA , B.C.

TOTAL FIELD MAGNETOMETER SURVEY
BASELINE - PROFILE

GEO-PHYSI-CON	SCALE N.T.S.	DRAWN BY	DATE Sept., 1992
		PROJECT C92-55	FIGURE 16



▪ Magnetometer Measurement Station

NOTE : Contours illustrate lateral distribution of magnetic intensity (gammas). 57000 gammas has been subtracted from the field data.

MANALTA COAL LTD.
TELKWA , B.C.

TOTAL FIELD MAGNETOMETER SURVEY CONTOUR MAP

GEO-PHYSI-CON	SCALE 1 : 4000	DRAWN BY	DATE Sept., 1992
	N.T.S.	PROJECT C92-55	FIGURE 17

APPENDIX A

GEOPHYSICAL METHODS

A.1 HORIZONTAL LOOP ELECTROMAGNETIC INDUCTION (HLEM) METHOD

In the HLEM (Max-Min) method, eddy current flow is induced in the ground by the time varying magnetic dipole transmitter. The eddy current flow, in turn, induces a secondary magnetic field which is sensed by a similar receiver dipole.

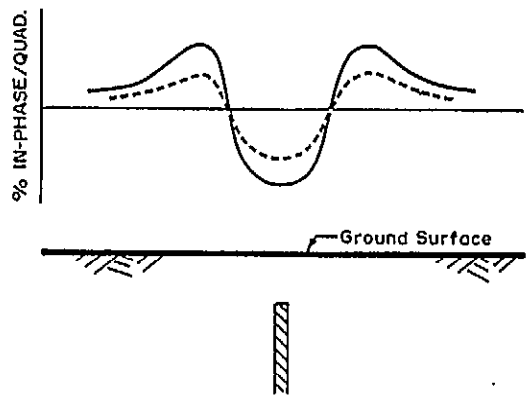
In the HLEM method eddy currents in adjacent layers can be mutually interacting. Thus there is no simple relationship between apparent conductivity and the conductivity thickness characteristics of the ground. Further, calibrations to compensate for the primary field are usually undertaken over ground of finite conductivity so that absolute calibration of the measurement equipment is impossible. The HLEM measurements are suited for locating zones of anomalously high conductivity rather than measurement of absolute conductivity levels.

The Max-Min (HLEM) instrumentation allows measurement using differing intercoil spacings (usually 30 to 100 metres) and different operating frequencies (400 hertz to 56 kilohertz). Exploration depth is generally in the order of 50 to 80 percent of the intercoil spacing. The uses of a range in frequencies generally allows observed anomalies to be quantatively placed at either shallow or larger depth.

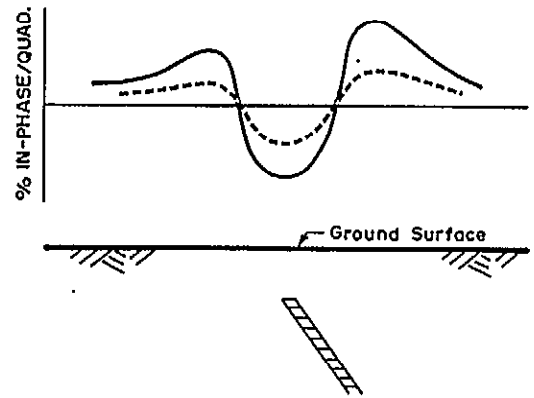
HLEM measurements will observe negative (phase reversed) and large anomalies in both the in-phase and quadrature components over subsurface conductive bodies. Figure A shows examples of HLEM response across conductive bodies of various geometrics. Over dipping bodies the maximum gradient in HLEM data generally lies to the down dip side. However, other factors such as the depth to the conductor, frequency of operation, and ratio of intercoil spacing to conductor width also affect the relative geometry of the observed in-phase and quadrature phase anomalies.

HLEM survey are usually oriented so that measurements are obtained along a line perpendicular to the anticipated strike of the conductive target. In areas of uneven terrain, small spacing errors and loop tilt discrepancies can cause noticeable measurement errors, especially for the in-phase component of the field. Measured data are plotted versus intercoil mid point along survey lines.

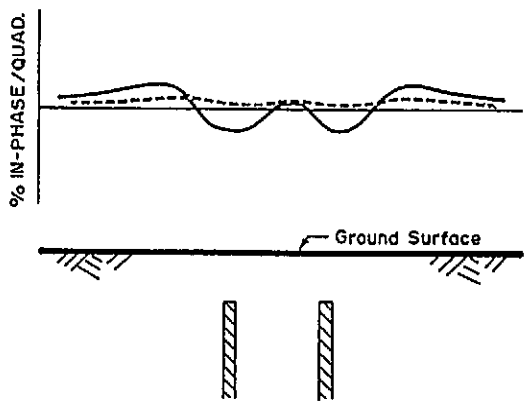
The HLEM has greatest application for locating steeply dipping and relatively conductive structures such as faults or shales bounding coal subcrop. It is generally not useful for determining the conductivity-thickness characteristics of a layered earth.



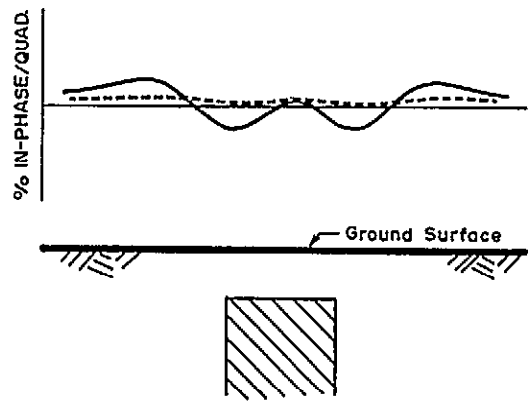
VERTICAL SHEET CONDUCTOR



DIPPING SHEET CONDUCTOR



TWO VERTICAL SHEET CONDUCTORS



VERTICAL PRISM CONDUCTOR

LEGEND

——— In-Phase Component

- - - - - - - - - Quadrature Component

Subsurface Conductor

NOTE: The exact geometry of the HLEM response is dependant upon factors which include depth of conductor, frequency of operation, and the ratio of intercoil spacing to conductor width.

GEO-PHYSI-CON

HLEM RESPONSE OVER TYPICAL SUBSURFACE CONDUCTOR GEOMETRIES (conductors shown in cross-section)

Figure A

A.2 DIRECT CURRENT PROFILING METHOD

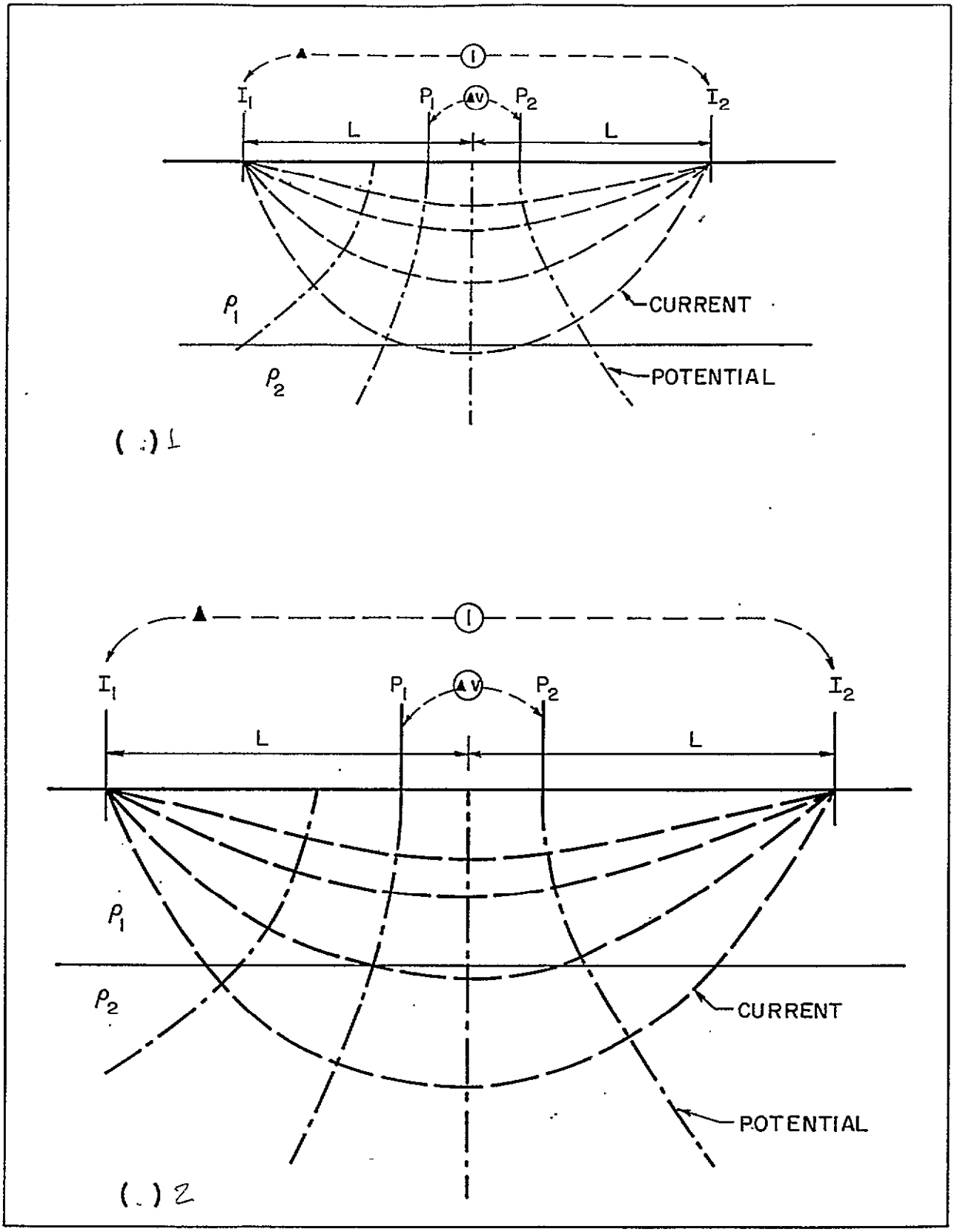
Both coal and igneous rocks are generally characterized by relatively high resistivity. This resistivity contrast, in comparison to surrounding rock, enhances the ability to directly detect the presence and depth to the coal or igneous intrusion within the upper 30 metres of the subsurface using surface based direct current techniques. Direct current profiling is used to delineate the lateral boundaries between near surface materials of contrasting resistivity.

In the example of the present survey, coal and igneous rock is expected to be considerably more resistive than the surrounding material.

Operation of the system in the Schlumberger configuration is illustrated in Figure B. Current is driven into the ground through one pair of electrodes (I_1 and I_2). The potential difference established in the earth by this current is measured with a second pair of electrodes (P_1 and P_2). To study the variation in resistivity with depth, the spacing between the current electrodes is varied. Figure B shows schematically the distribution of current flow at two electrode spacings. At close electrode spacing (Figure B2), the currents dominantly flow near the surface and the potential field is virtually not influenced by deeper strata. With increase spacing, part of the current flow is located in deeper layers, and the potential measured is influenced by the resistivities of these layers.

The potentials measured are converted to apparent resistivity using geometric characteristics of the measurement array. The apparent resistivity is the resistivity monitored at ground surface

due to the combined effect of subsurface layers of various thickness and resistivity within the exploration depth of the measurements used. For a subsurface exhibiting homogeneous resistivity, the apparent resistivity derived from resistance measurements for any array configuration would be identical and equal to the resistivity of the subsurface. Variation of apparent resistivity with depth or exploration (current electrode separation) indicates the presence of subsurface strata characterized by contrasting electrical resistivities.



GEO-PHYSI-CON

SCHEMATIC OF CURRENT AND POTENTIAL DISTRIBUTION FOR THE D.C.S. METHOD

Figure B

A.3 TOTAL FIELD MAGNETOMETER METHOD

Portable total field magnetometers are used to measure the strength of the ambient magnetic field at each station along a survey line. The magnetic field includes a component due to the earth's main magnetic field, a time-varying component due to magnetic storms and daily variations in ionsphere currents, and a variable due to local subsurface magnetism.

Compensation of diurnal variations in the earth's magnetic field is achieved by utilizing a continuous reading base station magnetometer, or by re-establishing a predetermined location at regular intervals throughout the survey.

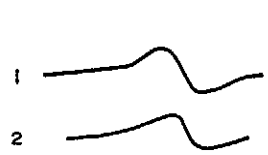
Subsurface magnetic sources include magnetic rocks and any buried ferrous metallic objects. In general, basic igneous rocks have the highest magnetic susceptibility. Coal generally has a very low magnetic susceptibility.

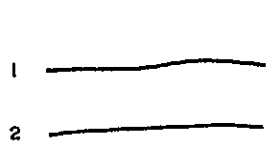
The proton (or nuclear precession) magnetometer utilized the precession of spinning protons in a sample of hydrocarbon liquid to measure total magnetic intensity. The protons, or hydrocarbon nuclei, within the sample are polarized normal to the terrestrial field by means of a current through a surrounding coil. Upon sudden removal of the polarizing field, the protons precess about the direction of the earth's magnetic field at an angular velocity (the Larmar precession frequency) proportional to the magnetic field strength. The precessing protons, being

moving charges, induce a voltage in the same coil used to polarize them. The total magnetic field is then determined from a relation between the Larmar precession frequency and the gyrometric ratio of the proton.

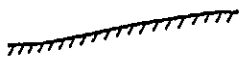
The advantages of the proton magnetometer over the other types include its high sensitivity, its lack of mechanical parts in its detector element, and the fact that it has no orientation or levelling requirements. Depth of exploration is limited only by the size of the magnetic source.

Typical magnetic anomalies for a variety of geologic bodies are illustrated in Figure C.



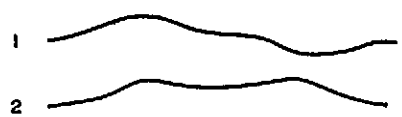


DIPPING DIKE

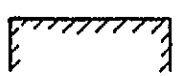


GRADUALLY SLOPING

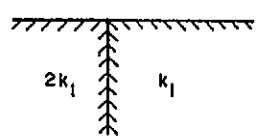
SPHERE



DIKE
(VERTICAL SHEET)



WIDE DIKE



FAULT
(INVOLVING TWO
ROCK UNITS)

1 N-S Traverse

2 E-W Traverse

GEO-PHYSI-CON

TOTAL FIELD MAGNETIC ANOMALIES FOR GEOLOGIC BODIES (measured at mid latitudes)

Figure C

APEX MAXMIN I PORTABLE EM

The MaxMin I ground EM System is designed for mineral and water exploration and for geoengineering applications. It is an expansion of the highly popular MaxMin II and III EM System concepts. The frequency range is extended to seven octaves from four. The ranges and numbers of coil separations are increased and new operating modes are added. The receiver can also be used independently for measurements with powerline sources. The advanced spheric and powerline noise rejection is further improved, resulting in faster and more accurate surveys, particularly at larger coil separations. Several receivers may be operated along a single reference cable.

Mating plug in data acquisition computer and cassette unit are available for use with the MaxMin I for automatic digital data acquisition and processing. These units are covered in separate data sheet.

MAXMIN I SPECIFICATIONS:

Frequencies: 110, 220, 440, 880, 1760, 3520, 7040 and 14080 Hz, plus 50/60 Hz powerline frequency (receiver only).

Modes: MAX 1: Horizontal loop mode (Transmitter and receiver coil planes horizontal and coplanar).

MAX 2: Vertical coplanar loop mode (Transmitter and receiver coil planes vertical and coplanar).

MAX 3: Vertical coaxial loop mode (Transmitter and receiver coil planes vertical and coaxial).

MIN 1: Perpendicular loop mode 1 (Transmitter coil plane horizontal and receiver coil plane vertical).

MIN 2: Perpendicular loop mode 2 (Transmitter coil plane vertical and receiver coil plane horizontal).

Coil separations: 12.5, 25, 50, 75, 100, 125, 150, 200, 250, 300, & 400 metres (standard).

10, 20, 40, 60, 80, 100, 120, 160, 200, 240 & 320 metres (selected with grid switch inside of receiver).

50, 100, 200, 300, 400, 500, 600, 800, 1000, 1200 & 1600 feet (selected with grid switch inside of receiver).

Parameters measured: In-Phase and quadrature components of the secondary magnetic field, in % of primary (transmitted) field.

Field amplitude and/or tilt of 50/60 Hz powerline field.

Readouts: Analog direct readouts on edgewise panel meters for in-phase, quadrature and tilt, and for 50/60Hz amplitude. (Additional digital LED readouts when using the DAC, for which interfacing and controls are provided for plug-in).

Ranges of readouts: Analog in-phase and quadrature scales: 0±4%, 0±20%, 0±100%, switch activated. Analog tilt scale: 0±75% grade. (Digital in-phase and quad. 0±102.4%).

Readability: Analog in-phase and quadrature 0.05% to 0.5%, analog tilt 1% grade. (Digital in-phase and quadrature 0.1%).

Repeatability: ±0.05% to ±1% normally, depending on frequency, coil separation & conditions.

Signal filtering: Powerline comb filter, continuous spherics noise clipping, autoadjusting time constant and other filtering.

Warning lights: Receiver signal and reference warning lights to indicate potential errors.

Survey depth: From surface down to 1.5 times coil separation used.

Transmitter dipole moments:

110 Hz: 220 Atm²	1760 Hz: 160 Atm²
220 Hz: 215 Atm²	3520 Hz: 80 Atm²
440 Hz: 210 Atm²	7040 Hz: 40 Atm²
880 Hz: 200 Atm²	14080 Hz: 20 Atm²

Reference cable: Light weight unshielded 4/2 conductor teflon cable for maximum temperature range and for minimum friction. Please specify cable lengths required.

Intercom: Voice communication link provided for operators via the reference cable.

Receiver power supply: Four standard 9V batteries (0.5Ah, alkaline). Life 30 hrs continuous duty, less in cold weather. Rechargeable battery and charger option available.

Transmitter power supply: Rechargeable sealed gel type lead acid 12V-13Ah batteries (4x6V-6½Ah) in canvas belt. Optional 12V-8Ah light duty belt pack available.

Transmitter battery charger: For 110-120/220-240VAC, 50/60/400 Hz and 12-15VDC supply operation, automatic float charge mode, three charge status indicator lights. Output 14.4V-1.25A nom.

Operating temp: -40 to +60 deg.C.

Receiver weight: 8 kg, including the two integral ferrite cored antennas (9 kg with data acq. comp.)

Transmitter weight: 16 kg with standard 12V-13Ah battery pack.
14 kg with light duty 12V-8Ah pack.

Shipping weight: 59 kg plus weight of reference cables at 2.5 kg per 100 metres plus other optional items if any.

Standard spares: One spare transmitter battery pack, one spare transmitter battery charger, two spare transmitter retractile connecting cords, one spare set receiver batteries.

Specifications subject to change without notification.

APEX PARAMETRICS LIMITED

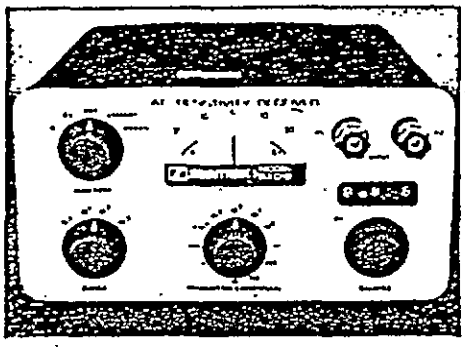
P.O. Box 818, Uxbridge
Ontario, Canada L0C 1K0

Telephones: 416-640-6102
416-852-5875

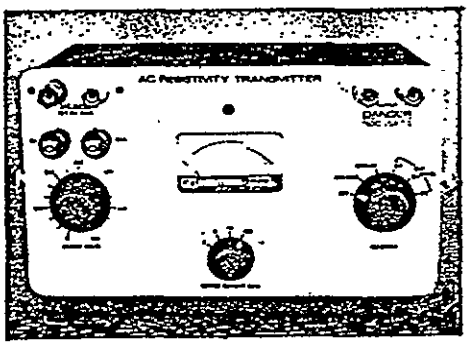
Cables: APEXPARA TORONTO

Telex: 06-966625 APEXPARA UXB

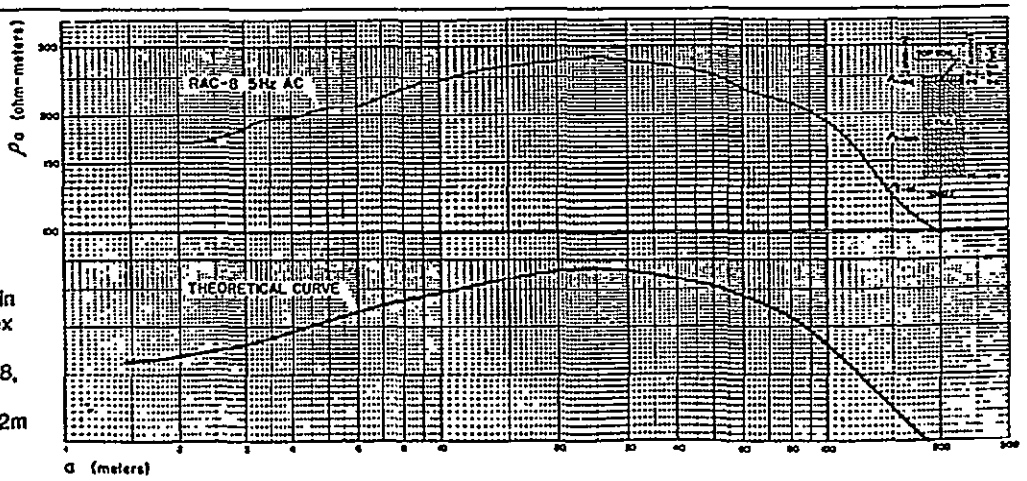
Technical Description of RAC-8 Low Frequency Resistivity System



Complete System	
Measurement Range	.0001 to 10,000 ohms
Accuracy	In range .0001 to .0003 ohms, ±5% In range .0003 to 10,000 ohms, ±2%
Operating Temperature Range	−10° to +50°C
Operating Frequency	5 Hz square-wave
Total Weight	11.8 kg
Receiver	
Range	.0001 to 1.0 volt
Input Impedance	10 Megohms
Instrument Noise	Less than 0.3 microvolt rms (about 1.5 microvolts peak-to-peak) on most sensitive range with input shorted.
Band Width	±0.185 Hz
Powerline Noise Rejection	An applied 50 or 60 Hz disturbance 150 times (43.5 dB) greater than a normal input signal will not affect the reading at any range. Both the signal and disturbance on the input should never exceed 3 V peak to peak in order to maintain accuracy ±2%. When ordering an RAC-8, the purchaser should specify the frequency of powerlines in the proposed survey area. For universal operation, a filter for the other frequency is offered as an option.
Common Mode Noise Rejection	A common mode voltage (applied between case and shorted "INPUT" terminals) of 1 volt peak to peak for a 5 Hz square-wave, or 7 volts peak to peak for a 50-60 Hz sine wave will not affect reading on any range.
Power Supply	Two 6V-1 Ampere-hour Globe GC 610-1 internally mounted, sealed lead acid accumulators. Connector provided for external charger. Batteries provide over 100 hours of operation in field work on a 25% duty cycle.
Dimensions	268 mm x 190 mm x 95 mm
Weight	3.2 kg
Transmitter	
Output Current Levels	0.1, 1, 10, 100, 333 mA, switch selectable
Current Stabilization	0.5%

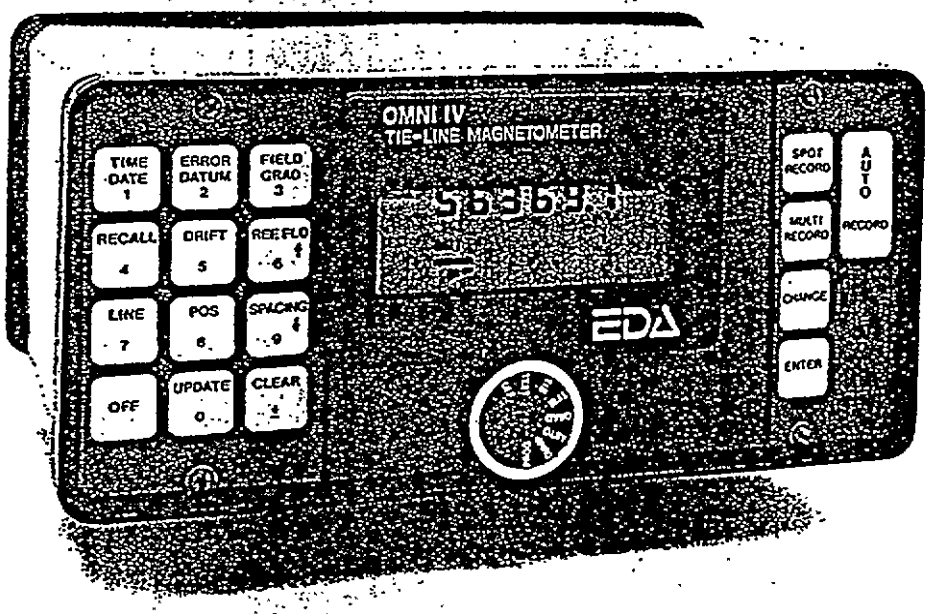


Output Voltage	Maximum 1000 V peak-to-peak. Actual output voltage depends on the current level and load resistance.
Output Power	Maximum 80 W
Operating Frequency	5 Hz square-wave
Operating Position	Transmitter must be operated vertically within ±30° maximum. For transportation this is not required and instrument can be stored in any position.
Protection	Automatic circuit breaker turns off when the load on the "OUTPUT" terminals is interrupted, or if it is shorted while voltage is set over 60 V.
Load Precautions	Not more than one fully wound reel of wire (1000 m, inductance ±0.2 Henry) can be in series with the transmitter load, in order not to affect measuring accuracy. With large electrode separations (several km) no reeled wire should be in the transmitter circuit, particularly if a high current level is required, to prevent inductive surges.
Power Supply	The power supply is composed of two independent battery sets mounted in a common detachable compartment, which is attached to the bottom of the transmitter housing. Set No. 1: Two 6 V—1 Ampere-hour Globe GC610-1 sealed lead-acid accumulators providing a supply for electronic circuits of the constant current regulator. Capacity is sufficient for over 100 hours of operation in the field. Set No. 2: Two 6 V—6 Ampere-hour Globe GC660-1 sealed lead-acid accumulators providing a main power supply with 80 W maximum. This battery set limits actual field work duty of the instrument to maximum 40 hours.



Wenner array depth sounding using RAC-8 in electrically noisy industrial area near Scintrex plant in Concord, Ontario. The section is interpreted as a 3 layer case with $\rho_1 = 158$, $\rho_2 = 290$ and $\rho_3 = 55$ ohm-meters. The upper layer is 2.8 m of topsoil followed by 72m of till overlying shale.

OMNI IV "Tie-Line" Magnetometer



- Four Magnetometers in One
- Self Correcting for Diurnal Variations
- Reduced Instrumentation Requirements
- 25% Weight Reduction
- User Friendly Keypad Operation
- Universal Computer Interface
- Comprehensive Software Packages

OMNI IV "Tie-Line" Magnetometer

The OMNI IV microprocessor-based "Tie-Line" Magnetometer incorporates a number of features designed to facilitate the storage, reduction and presentation of total field magnetic data.

Major Benefits

- **Four Magnetometers in One**

The OMNI IV has been designed to operate in four different operating modes:

1. As a self correcting or tie-line magnetometer (See page 3)
2. As a portable field magnetometer (See page 4)
3. As a recording base station magnetometer (See page 5)
4. As a true simultaneous gradiometer. (See page 6)

The standard OMNI IV incorporates the portable field magnetometer with "tie-line" capability, and the system may be upgraded to include the base station and/or the gradient configuration.

All of the data collected in any one of these four operating modes is stored and protected in a solid state memory.

- **Self Correcting for Diurnal Variations**

When used in the "tie-line" mode, the OMNI IV automatically corrects itself for variations in the earth's magnetic field. By tieing back into one tie-point or tie-line(s) on the grid over the day or over the duration of the survey, the OMNI IV automatically calculates and applies the drift measured to the data stored. Data is corrected using the linear interpolation method.

- **Reduced Instrumentation Requirements**

Only one OMNI IV is needed to measure, store total field and gradient data and automatically correct the total field magnetic data, when in the tie-line mode.

The flexibility of the OMNI IV allows the user to purchase one console and through the use of different sensors or software create their choice of four different magnetometers.

- **25% Weight Reduction**

The OMNI IV has been designed so that it is 25% lighter than EDA's existing PPM-350/375 OMNIMAG units for a total weight of 4 kg. This weight reduction has been achieved by the design of a smaller console and by the use of a lighter rechargeable or disposable power source.

- **User Friendly Keypad Operation**

The OMNI IV incorporates two keypads; one for programming the unit for time and grid co-ordinates and the other for the recording of data. Once the OMNI IV has been programmed for the day's survey, the operator need only use the recording keypad for data storage. Recording of data is accomplished by pressing only 2 recording keys sequentially. A "Clear" data key has been incorporated to edit the previous reading stored in memory.

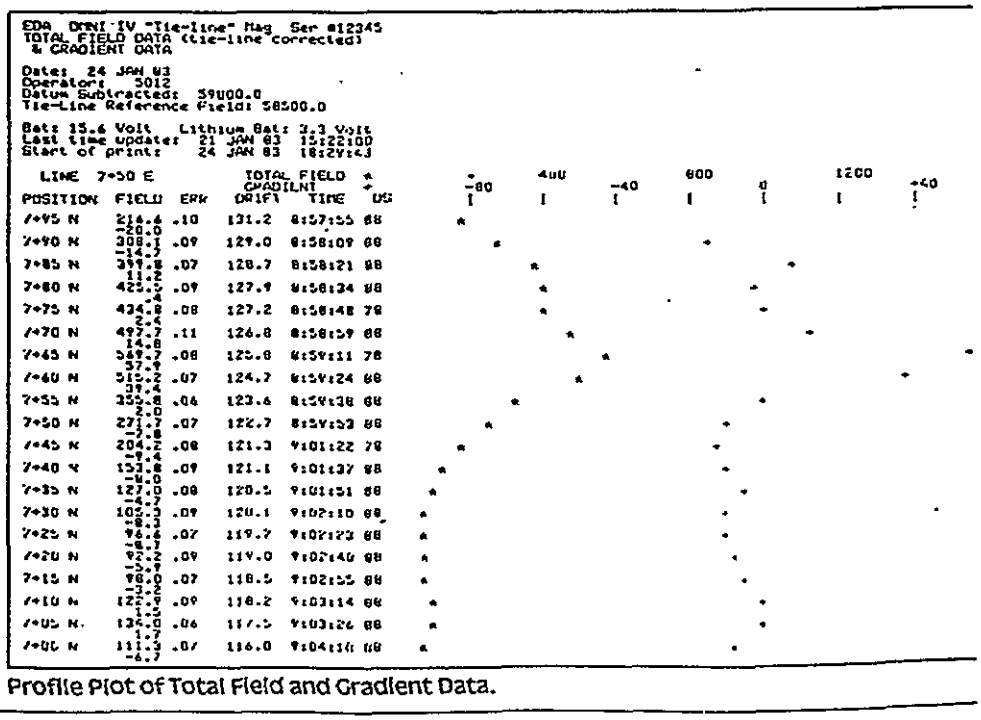
- **Universal Computer Interface**

A simple, low cost, communication interface between the OMNI IV or OMNIMAG Series and any microcomputer is now available. This communication interface provides the necessar handshake requirements for the OMNI IV to dump directly into ar microcomputer with ASCII code, into any standard parallel printe or into many available serial mag netic tape recorders.

- **Comprehensive Software Programs**

HP 85 and CP/M software packages for most computers such a IBM PC, APPLE, KAYPRO, OSBORNE etc. are available to enable the user to edit the data, obtain line profiles and create plot files.

Many filtering programs are offered for further data analysis such as the Fast Fourier Transform, the Frequency Domain Filters or the Upward-Downward Continuation. Additional programs are also available to transfer the data from microcomputers to mainframes.



Profile Plot of Total Field and Gradient Data.

As a Self Correcting, "Tie-Line" Magnetometer...

Any survey can now be run and corrected automatically with only one OMNI IV.

The OMNI IV is able to store "looping" or "tie-line" data. This data is stored in a separate memory at the beginning of each survey. Total field readings are then subsequently stored in a second memory along with the field readings of the tie-point(s). At the end of each survey day, these two memories are merged to automatically correct the total field data for diurnal variations.

Features

The OMNI IV in the "tie-line" mode can:

- Store "looping" or "tie-line" data 3 ways:
  - using one "looping" base point,
  - using one "tie-line" comprised of a number of tie-points, or
  - using multiple "tie-lines".
- Store up to 100 tie-points in one survey area or divide these points into extensions of survey areas as needed.
- Store tie-points or tie-lines for the duration of the survey.
- Calculate the drift between established tie-points, to readily see variations in the earth's magnetic field.

Key Benefits

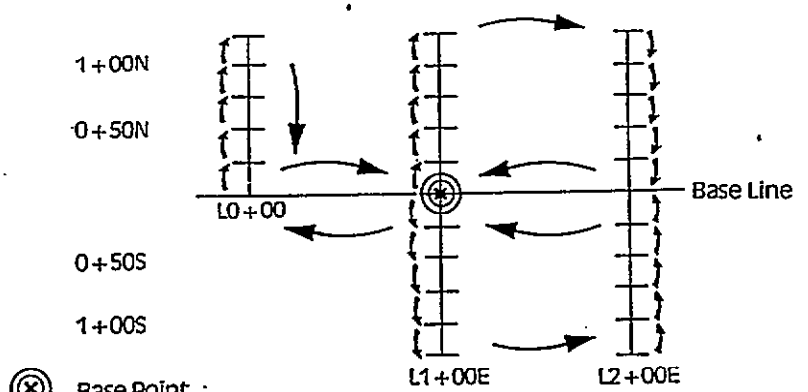
Eliminates Manual Correction of Data

Diurnal corrections, using the tie-line method, can be done automatically by the OMNI IV, eliminating hours of manual and tedious calculations. Corrected data can then be directly transferred to a computer for further data processing.

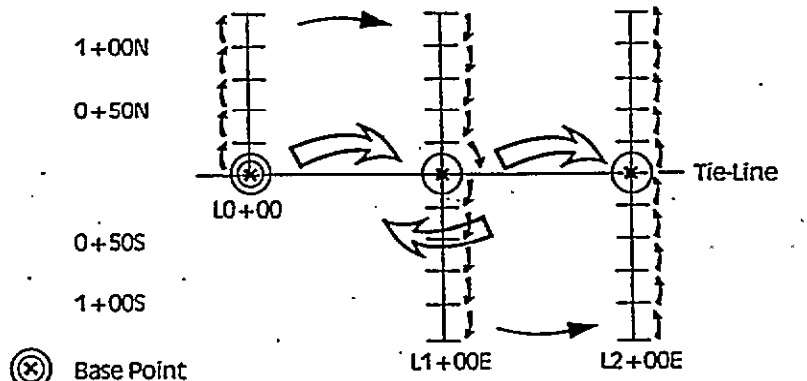
Flexibility of "Tie-Line"

The OMNI IV "tie-line" system offers the operator the flexibility of choosing the most appropriate tie-line method best suited for the survey, depending upon the size and character of the grid. The operator can choose from:
- a single base point,
- a single tie-line,
- multiple tie-lines, or
- a random scattering of tie-points.

"Looping" Method



"Tie-Line" Method



Reduced Instrumentation Requirements

The self-correcting "tie-line" feature of the OMNI IV can remove base station requirements from some surveys.

Tie-Line Capability in Gradient Mode

The "tie line" capability is also applicable when used as a gradiometer. The operator can therefore obtain corrected total field data without requiring a base station magnetometer.

Programmable Datum

The OMNI IV can be programmed to automatically remove a designated datum from field data. Removal of this coarse, background value facilitates plotting and interpretation of data.

Automatic Drift Calculations

The OMNI IV can automatically calculate the desired diurnal drift measured between consecutive tie-point readings.

Data Recall

"Tie-line" data can be recalled, even if stored on different days.

OMNI IV "Tie-Line" Magnetometer

2. As a Portable Field Unit...

The OMNI IV is a portable proton precession magnetometer that measures and stores in memory the earth's magnetic field at the touch of a key. It identifies and stores the location, time of each measurement, computes the statistical error of the reading and stores the decay and strength of the signal being measured.

Features

- Packaged in a compact, lightweight and rugged housing, the OMNI IV measures and stores the following set of information:
  - total field magnitude
  - time of measurement
  - grid co-ordinates
  - direction of travel
  - statistical error of readings
  - signal strength and rate of decay
- Users have a choice of three data storage modes:
  - spot record
  - multi record
  - auto record
- Data stored in memory is completely protected by a lithium battery.
- Each reading is automatically assigned a record number which can also be used to identify readings measured off the grid.
- More than one reading can be taken at one point without updating the current station number.
- Characters shown on the LCD display are highly visible.

Key Benefits

Increased Productivity

Survey productivity is significantly increased with the OMNI IV because:
- a measurement can be read and stored in only 3 seconds.
- data is highly repeatable. A second measurement is usually not required.
- the statistical error is calculated for each measurement providing an indication of whether an additional reading may be required.
- the OMNI IV is up to 25% lighter and smaller.

This permits the operator to cover more ground and gather more data than would be otherwise possible.

Simplified Fieldwork

The OMNI IV makes surveys easier to conduct because:
- the need to write down field data is eliminated. Time, field measurement, grid co-ordinates, etc, are simultaneously stored when any one of the three record keys are pressed.
- the operator has the ability to clear the unwanted last reading
- the difference between the current reading and the previous one is calculated automatically
- the coarse magnetic field value or datum can be removed from the field data to simplify plotting of the field results
- diurnal corrections are automatically calculated.

System flexibility offers the following choices:
- If the OMNI IV is used as a field magnetometer or as a gradiometer, the total field data can be corrected by itself using the "tie-line" or "looping" capability.
- if the OMNI IV is used as a self-recording base station, it will correct the total field data in:

a. another OMNI IV, used as a field magnetometer
b. another OMNI IV, used as a gradiometer
c. an OMNIMAG PPM-350
d. an OMNIMAG PPM-375, used as a field magnetometer
e. an OMNIMAG PPM-500 Vertical Gradiometer

Unparallelled Repeatability of Data

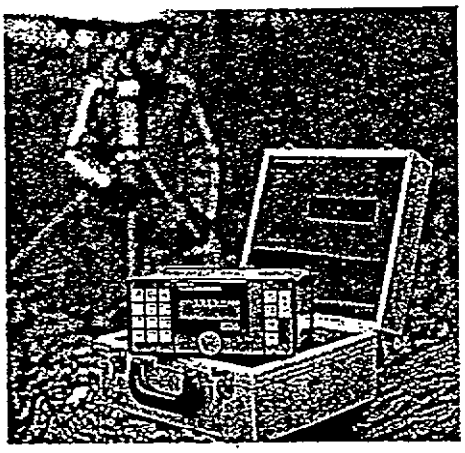
The OMNI IV provides users with unparallelled data repeatability. This is a result of four leading-edge design features that eliminate the need for taking multiple readings:
- Patented Signal Processing Technique
- Constant Energy Polarization that maintains equal energy to the sensor
- Processing sensitivity to ± 0.02 gamma
- Automatic Fine Tuning which uses the previous reading as the base for the next

Other Benefits

- **Error Analysis**
  This unique feature is a great time saver because the calculation of the statistical error of each reading lets the operator make an on-the-spot decision whether that reading should be stored or not.
- **Higher Gradient Tolerance**
  Higher tolerance to local gradient of up to 6000 gammas per meter (field proven), is possible due to a patented signal processing method and to a miniature sensor design utilizing a highly optimized sensor geometry.
- **Complete Data Protection**
  Field data stored in memory is totally protected for a number of years by the lithium backup battery. This battery also provides power to the real-time clock.
- **Data Recall**
  Readings can be recalled either by record number or in sequence.
- **Decimal Spacing**
  A decimal digit is provided for intermediate station intervals of 12.5 meters.
- **Power Supply Versatility**
  Users can choose from:
  - non-magnetic rechargeable sealed lead-acid battery cartridge or belt
  - nickel cadmium (NiCad) battery cartridge or belt
  - disposable alkaline battery cartridge or belt

As a Base Station Magnetometer...

The OMNI IV in the base station mode effectively measures and stores in its memory the daily fluctuations of the earth's magnetic field. The OMNI IV will automatically correct total field data of other OMNI IV or OMNIMAG Series units in just a few minutes.



Features

The OMNI IV in the base station mode can:

- Automatically correct magnetic field data for both diurnal variations and reference field values.
- Record the magnetic field activity in the following format:
  - time of measurement
  - magnitude of total field
  - difference from the reference field value
  - difference from the previous reading
  - sequential record number
- Store up to 5,000 sets of readings, the equivalent to approximately 14 hours of continuous unattended monitoring at a 10 second sampling interval. Cycling time between 5 seconds and 60 minutes in 1 second increments can be programmed by the operator.
- Simultaneously outputs data in a digital or ASCII format to a choice of data collection units at the same time as it is being stored in memory.

Key Benefits

Automatic Diurnal Corrections

The OMNI IV in the base station mode will automatically correct total field data stored in:
- another OMNI IV, used as a field magnetometer or as a gradiometer
- a PPM-350 Total Field Magnetometer
- a PPM-375 Portable/Base Station
- a PPM-500 Vertical Gradiometer

This is ideal where close, detailed monitoring of the earth's magnetic field is required.

Programmable Reference Field

The reference field can be programmed by the operator. The OMNI IV then calculates automatically the drift in the magnetic field for every reading. If at the end of the first survey day the proper reference field has not been entered, the operator can re-select a new one and the drift can be automatically re-calculated.

Automatic Drift Calculation

The OMNI IV calculates automatically the difference between each reading and its programmed reference field. This can be presented in either digital and/or profile plot format. It can also be simultaneously output to a compatible printer for visual verification of the field's activity.

Calculates Differential Field Variations

The OMNI IV also calculates to 0.1 gamma, the difference between the current reading and the previous one. This assists the operator in ascertaining the degree of activity that is occurring i.e. magnetic storm or active conditions.

Programmable Cycling Interval

The OMNI IV can be programmed to cycle at any interval, in one second increments, from 5 seconds to 60 minutes.

Other Benefits

- **Stores & Prints Data Simultaneously**

  The OMNI IV can record and print out data simultaneously. Data is retained in memory.

- **Internal Real Time Clock**

  Real time clocks can be synchronized to the nearest second when using the OMNI IV with any other OMNI IV or OMNIMAG Unit.

```
EDA  OMNI IV "Tie-line" Mag  Ser #14015
TOTAL FIELD DATA (uncorrected)
Date:  4 AUG 83
Operator:  5012
Datum Subtracted:          0.0
Bat: 15.6 Volt    Lithium Bat: 3.3 Volt
Last time update:     1 AUG 83   15:22:00
Start of print:       4 AUG 83   18:29:43

  LINE 54+00 N    DATE   4 AUG 83       #1
POSITION   FIELD   ERR    DRIFT    TIME   DS
 31+00 E 57508.4  .10      0.0  15:00:35  88
 31+50 E 57506.3  .08      0.0  15:00:43  88
 32+00 E 57505.0  .08      0.0  15:00:47  88
 32+50 E 57501.9  .10      0.0  15:00:51  88
 33+00 E 57504.1  .08      0.0  15:00:56  88
 33+50 E 57503.1  .07      0.0  15:01:00  88
 34+00 E 57511.1  .07      0.0  15:01:05  88
 34+50 E 57514.9  .09      0.0  15:01:09  88
 35+00 E 57511.1  .08      0.0  15:01:17  88
```

Total Field Data (Uncorrected)

```
EDA  OMNI IV "Tie-line" Mag  Ser #31005
BASE STATION DATA
Date:  4 AUG 83
Operator:  4007
Reference Field: 57500.0
Line 20+00 N     Position 30+25 E
Bat: 12.1 Volt    Lithium Bat: 3.2 Volt
Last time update:     1 AUG 83   15:22:00
Start of print:       4 AUG 83   18:59:53

   TIME     FIELD    CHANGE    DRIFT   RECORD
15:00:33 57517.8       0.4      17.8        1
15:00:38 57508.6      -9.2       8.6        2
15:00:43 57511.7       3.1      11.7        3
15:00:48 57510.5      -1.2      10.5        4
15:00:53 57518.0       7.5      18.0        5
15:00:58 57525.9       7.9      25.9        6
15:01:02 57514.9     -11.1      14.9        7
15:01:08 57508.4      -6.4       8.4        8
15:01:13 57512.9       4.5      12.9        9
15:01:18 57512.7      -0.2      12.7       10
```

Base Station Data

```
EDA  OMNI IV "Tie-line" Mag  Ser #14015
TOTAL FIELD DATA (base stn. corrected)
Date:  4 AUG 83
Operator:  5012
Datum Subtracted:      57000.0
Bat: 15.6 Volt    Lithium Bat: 3.3 Volt
Last time update:     1 AUG 83   15:22:00
Start of print:       4 AUG 83   18:39:53

BASE STATION  Ser #31005
Date:  4 AUG 84
Operator:  5012
Reference Field: 57500.0
Line 20+00 N     Position 30+25 E
Bat: 12.1 Volt    Lithium Bat: 3.2 Volt
Last time update:     1 AUG 83   15:22:00
Start of print:       4 AUG 83   18:39:53

  LINE 54+00 N    DATE   4 AUG 83       #1
POSITION   FIELD   ERR    DRIFT    TIME   DS
 31+00 E  494.3  .10      14.1  15:00:35  88
 31+50 E  494.6  .08      11.7  15:00:43  88
 32+00 E  494.3  .08      10.7  15:00:47  88
 32+50 E  496.9  .10      15.0  15:00:51  88
 33+00 E  481.4  .08      22.7  15:00:56  88
 33+50 E  481.6  .07      21.5  15:01:00  88
 34+00 E  498.9  .07      12.2  15:01:05  88
 34+50 E  505.6  .09       9.3  15:01:09  88
 35+00 E  498.4  .08      12.7  15:01:17  88
```

Corrected Total Field Data

OMNI IV "Tie-Line" Magnetometer

4. As a True Gradiometer...

The OMNI IV provides the operator with an accurate means of measuring both the total field and the gradient of the total field. It reads and stores the measurements of both sensors simultaneously to calculate the true gradient measurement. The standard 0.5 meter gradient sensor staff, shown here, is made possible by this simultaneous measurement.

Features

The OMNI IV in the gradient mode provides:

- A visual readout and storage of the following information in an absolutely secure memory:
  - the gradient of the total field
  - the total magnetic field magnitude of upper sensor
  - the time of measurement
  - the grid co-ordinates where the measurement is taken
  - the statistical error of total field reading of lower gradient sensor
  - the signal strength and decay rate measurement of lower gradient sensor
- A simultaneous, not sequential, measurement of both sensors
- A choice of sensor lengths and configurations:
  - standard 0.5 meter sensor separation mounted on staff
  - optional one meter sensor separation mounted on staff
  - optional horizontal gradient sensors

  The staff length can be adjusted to achieve desired height of sensors from the ground.
- A choice of three data storage modes:
  - spot record, for readings without grid co-ordinates
  - multi-record, for many readings at one station
  - auto record, for automatic update of station number.

Key Benefits

Reads Both Sensors Simultaneously

The OMNI IV reads both sensors simultaneously and not sequentially. This type of measurement removes the effect of diurnal variations and magnetic storm interferences from the data. This is a true gradient measurement.

Improved Productivity

The need to take only one simultaneous gradient measurement instead of two sequential measurements cuts reading time substantially.

Improved Data During Magnetic Storms

Gradient surveys can be conducted during magnetic storms resulting in no lost survey time. This is another benefit of the simultaneous measurement of both sensors.

No Diurnal Corrections of the Gradient Required

The effect of diurnal magnetic variations on the gradient measurement is cancelled due to this simultaneous measuring technique. The total field measurement of the top sensor can be self-corrected by the OMNI IV when used with the "tie-line" mode or with another OMNI IV in the base station mode.

Better Resolution of Total Field Anomalies

The OMNI IV in the gradient mode more sharply defines the magnetic responses determined by total field data. Closely spaced anomalies are individually delineated rather than being identified collectively under one broad magnetic response.

Direct Delineation of Vertical Contacts

The OMNI IV is an ideal contact mapping tool especially in vertical to near-vertical contact or fault zones. These vertical contacts are expressed at the zero line of gradient contour or profile values. Vertical dyke-like bodies can also be mapped effectively.

Enhances Near-Surface Anomalies

Shallow, near-surface sources (high frequency anomalies) are emphasized relative to deeper responses (lower frequency anomalies). This can provide an on-the-spot approximation of the dep of the anomalous source.

Automatically Removes Regional Gradient

The gradient measurements ability differentiate between higher and lower frequency responses effectively removes background regional gradients from anomalous residual responses.

Gradient and Total Field Readings Stored Simultaneously

Data is enhanced by the ability of th OMNI IV to simultaneously record in memory both the gradient and tot field measurements as well as the statistical error. Both types of data offer a unique alternative in the interpretation of magnetic field da i.e. gradient vector diagrams, dip ar strike length of body, etc.

Gradient-Base Station Operation

The OMNI IV can cycle automatically every 5 seconds in the gradient mode. This option can be used in stationary or mobile applications.

Adjustable Sensor Heights

The OMNI IV gradient sensor is mounted onto a sectional aluminun staff in which sections can be addec or subtracted. This enables the operator to adapt the OMNI IV to loc ground noise conditions, terrain effects and survey logistics. In doing so, near surface effects can be selectively emphasized or diminishe depending upon the survey target.

Choice of Sensor Separatio

The use of the 0.5 meter standard and/or 1.0 meter optional sensor separation provides unique interpre tative information especially useful near surface anomalous conditions i.e. determining if the field has curvature or is linear.

Data Output Options

The OMNI IV universal communications interface enables the user to output and analyze data through a number of options and formats.

Any Computer with RS 232C

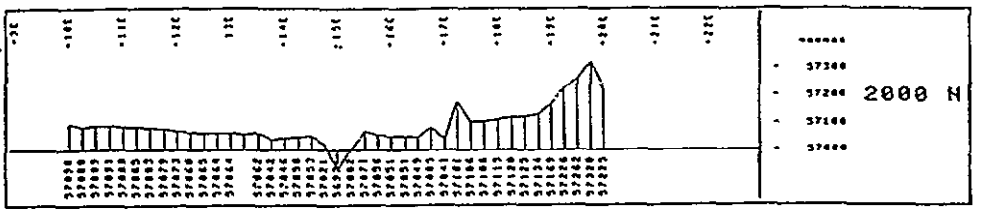
The OMNI IV can transfer uncorrected or corrected field data into any computer with an RS 232C port through the EDA universal communications interface. Computers with collection packages including either "X-ON, X-OFF" or "ENQ/ACK" communication protocol formats are also compatible.

Data transfer from the field to the office is also possible through the use of an optional modem interface.

Comprehensive Software Packages

Once the OMNI IV data has been transferred to a microcomputer, it can be further analyzed through a number of available software packages:

1. a CP/M software package adaptable to many microcomputers such as the IBM PC, APPLE, KAYPRO, TRS, OSBORNE, etc... This package enables the user to edit the data, obtain true line profiles and create plot files.
2. The above CP/M software package is also available plus the added capability of merging the base station data of GEOMETRICS G856 with the OMNI IV to calculate diurnal variations. This enables users to increase the flexibility of their existing magnetometers.
3. An HP 85 software package that edits the OMNI IV data, provides true line profiles and creates plot files. The package also permits the use of the G856 together with the OMNI IV to calculate for diurnal variations.
4. A Fast Fourier Transform program is available where space or time domain data is transformed to the frequency domain. From the examination of a power spectrum, filters may be customized to each data set.



Line Profile From HP-85

5. A Frequency Domain Filter program is also available. The multi pass filter program allows user control of the turn on/off frequencies and filter decay rates. These filters are useful for performing regional/residual separation or filtering of noise from data.
6. The Upward-Downward Continuation program computes a 2-dimensional upward or downward continuation transfer function and applies the operator to the input array in the wave-number domain.
7. A Micro-to-Mainframe Computer program enables the user to transfer the data from his field computer to a main frame where additional computation will be done.

Profile Plot Outputs

The OMNI IV can plot data as a profile through a printer. The operator can:

- select and program any gamma scale best suited for data presentation
- output the digital or plot formats simultaneously or separately
- choose a 40, 80, or 132 character printer paper width
- plot both the gradient and corrected total field data simultaneously
- transfer data plots to a printer as it is being stored in memory. This is ideal in base station applications.

Many Digital Recorder Options

The OMNI IV is compatible with many digital recorders with serial interface, such as MFE 2500, through its communications interface.

EDA's digital recorder, the DCU-200, can store 21,000 readings and has a "read-after-write" capability.

Variety of Printer Options

The OMNI IV can transfer data into any printer with a standard parallel (Centronics) interface, such as the Epson printer, through its communications interface.

The OMNI IV data can also be transmitted through two EDA printers:

- the DCU-040, which is a small 40 character AC only thermal printer.
- the DCU-400, which is a ruggedized 40 character thermal printer that is used either with its internal rechargeable batteries, a 12 volt DC power supply option or an AC power source.

With the external 12 volt DC power supply option linked directly to the DCU-400, data transfer and charging of internal batteries can be done simultaneously. There is now no dependence on a generator or AC power source for data transfer or battery charging. This is ideal where AC power is not available or where a back-up power source is required.

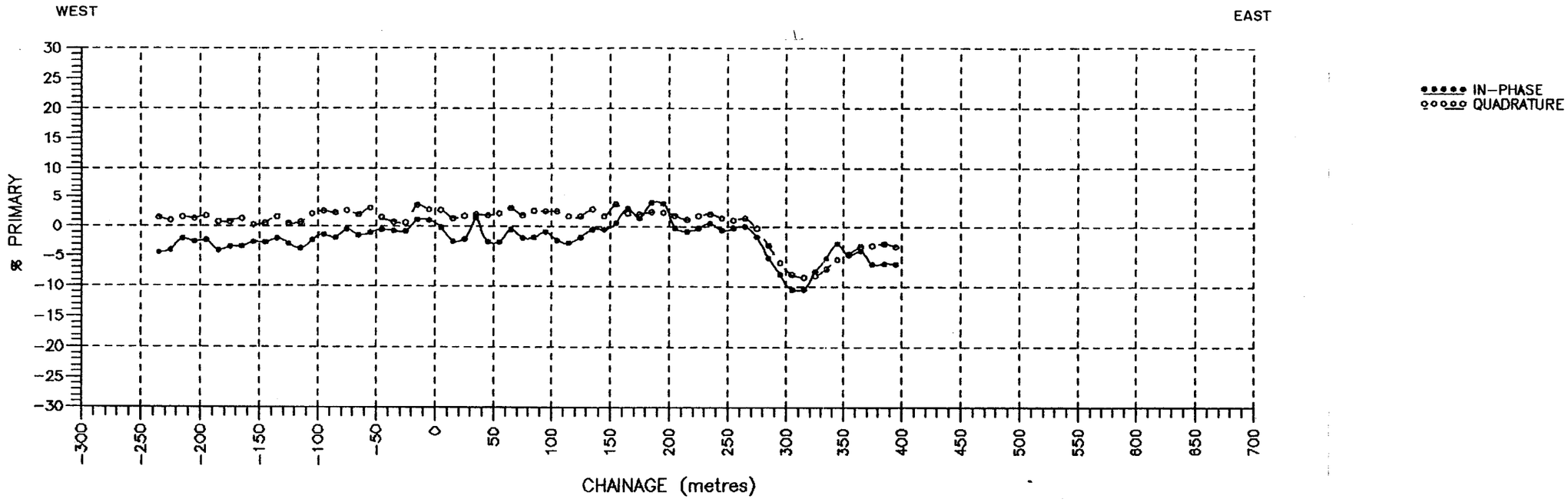
Data Output Capabilities

The OMNI IV outputs data in a choice of formats, depending upon the operating mode:

- corrected total field data
- uncorrected total field data
- base station data
- gradient field data
- corrected tie-line data
- tie-line data

Grid co-ordinates of the data can be output with their designated compass bearing, using N, S, E, W descriptors.

Direction of travel along each grid line is programmable and will be reflected with or without a minus sign (–). I.e. travelling south or west is negative (–), travelling north or east is positive.



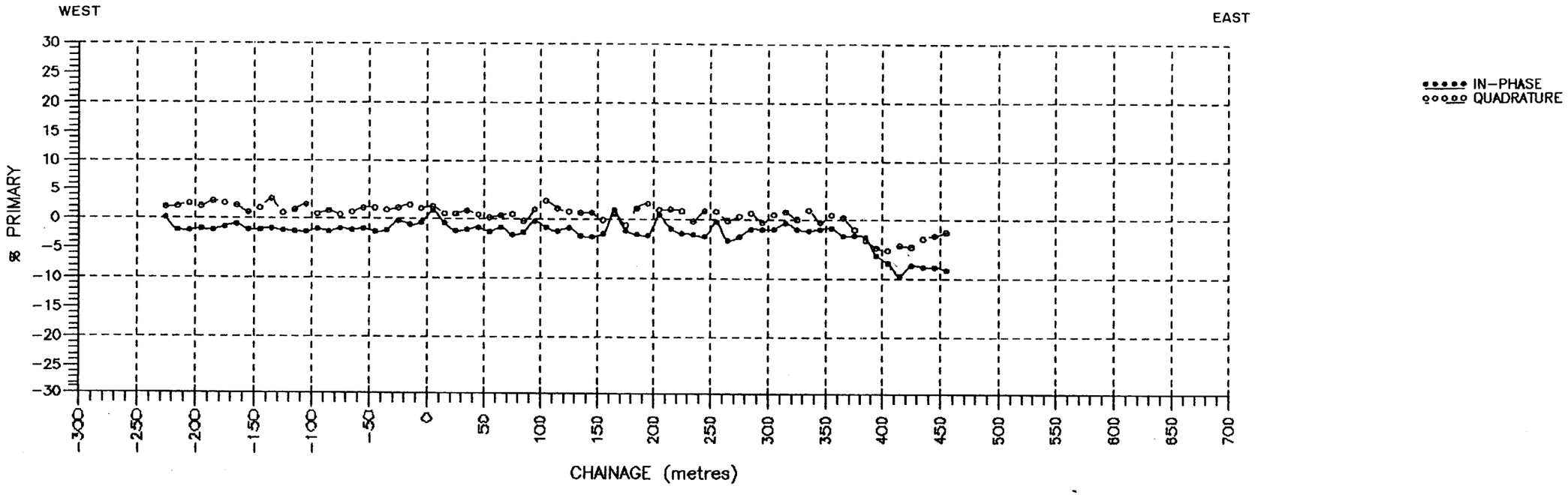
MANALTA COAL LTD.

TELKWA , B.C.

MAX-MIN I - 10 HLEM PROFILE

LINE 1 SOUTH - 1760 Hz

	SCALE	DRAWN BY	DATE
GEO-PHYSI-CON	N.T.S.	PROJECT C92-55	Sept., 1992
			FIGURE C-1



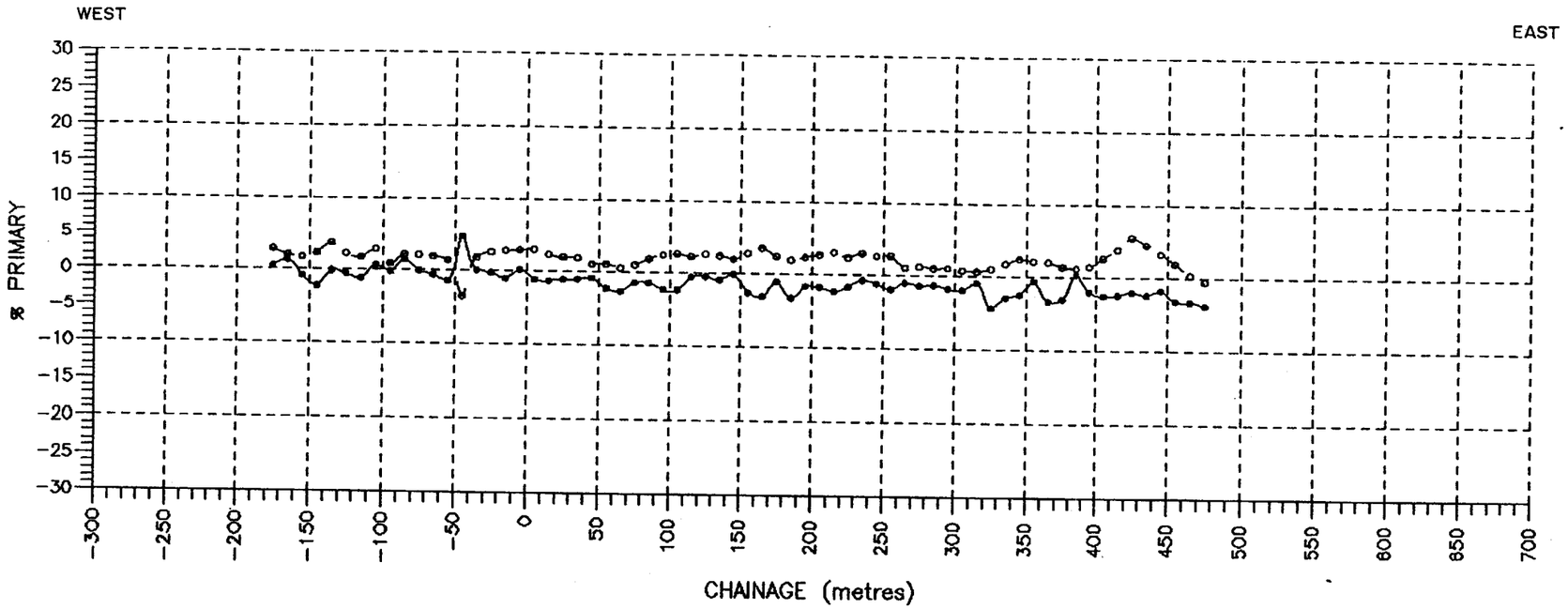
MANALTA COAL LTD.

TELKWA , B.C.

MAX-MIN I – 10 HLEM PROFILE

LINE 2 SOUTH – 1760 Hz

GEO-PHYSICON	SCALE	DRAWN BY	DATE
	N.T.S.		Sept., 1992
		PROJECT	FIGURE
		C92-55	C-2



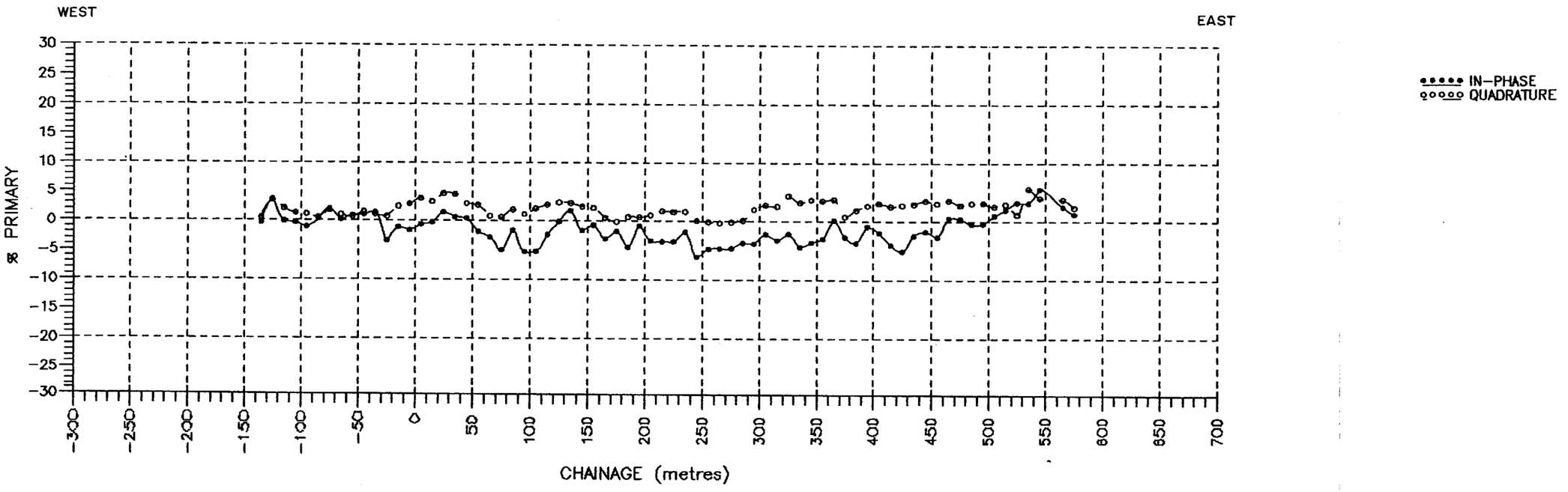
MANALTA COAL LTD.

TELKWA , B.C.

MAX-MIN I – 10 HLEM PROFILE

LINE 3 SOUTH – 1760 Hz

	SCALE	DRAWN BY	DATE
GEOPHYSICON	N.T.S.		Sept., 1992
		PROJECT C92-55	FIGURE C-3



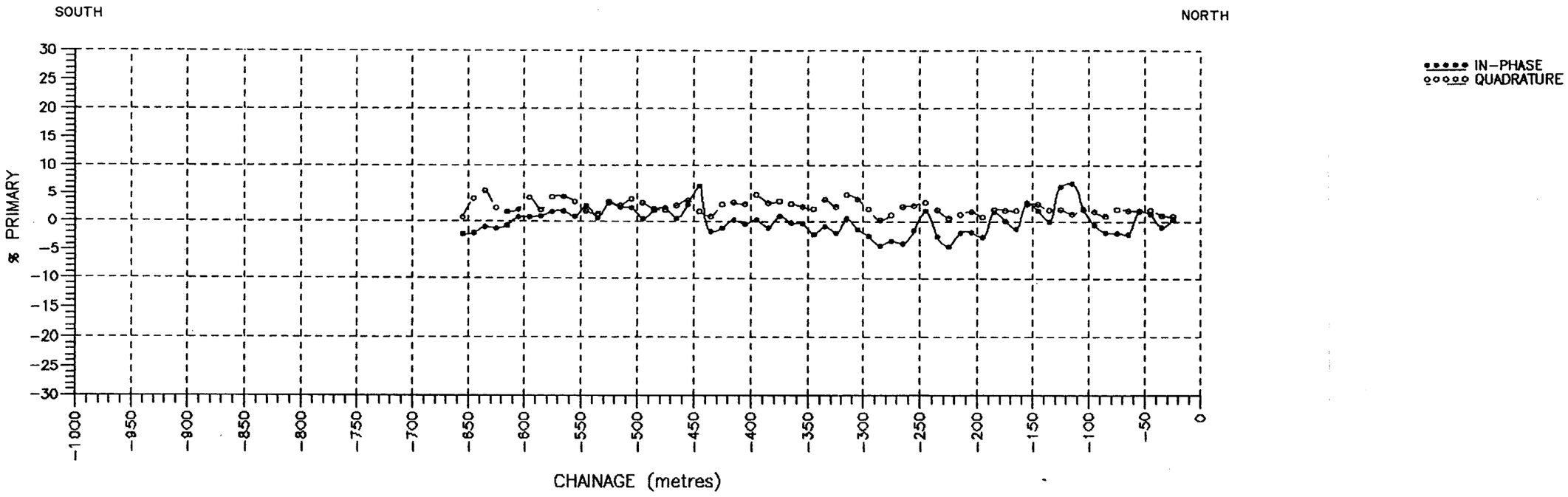
MANALTA COAL LTD.

TELKWA , B.C.

MAX-MIN I – 10 HLEM PROFILE

LINE 4 SOUTH – 1760 Hz

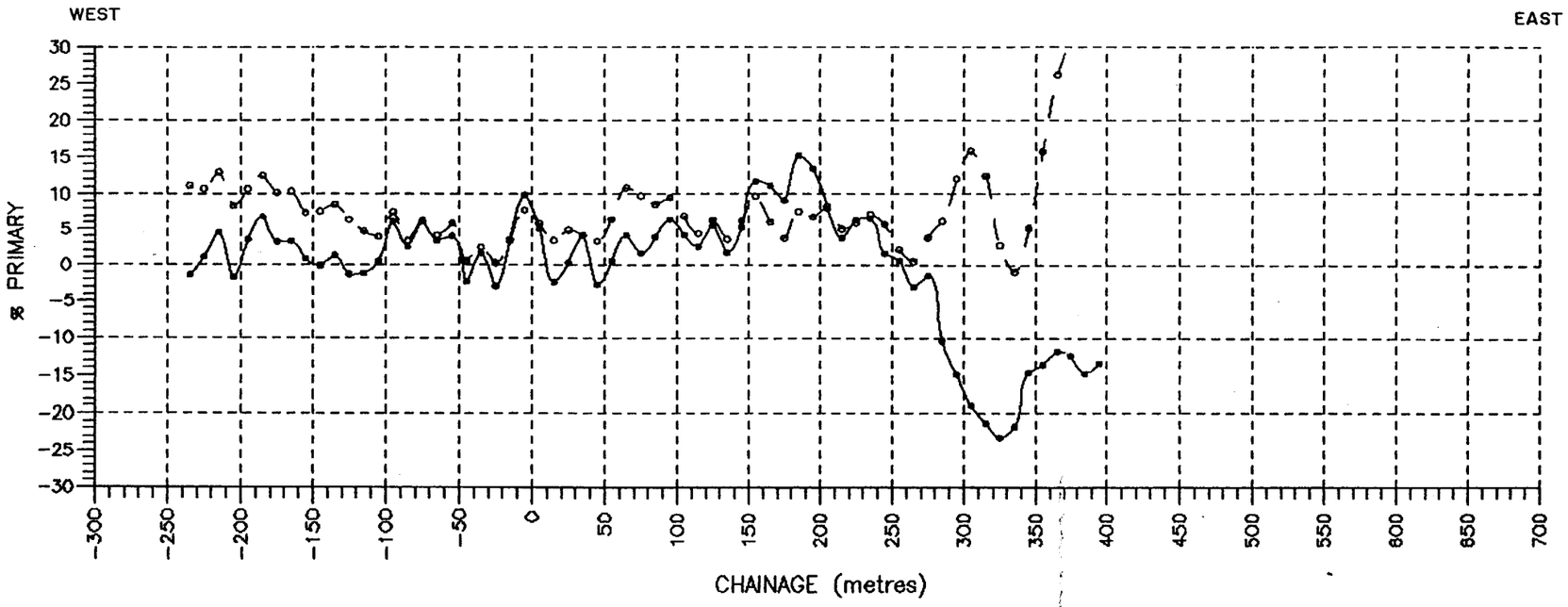
GEO-PHYSI-CON	SCALE N.T.S.	DRAWN BY	DATE Sept., 1992
		PROJECT C92-55	FIGURE C-4



MANALTA COAL LTD.
TELKWA , B.C.

MAX-MIN I – 10 HLEM PROFILE
BASELINE – 1760 Hz

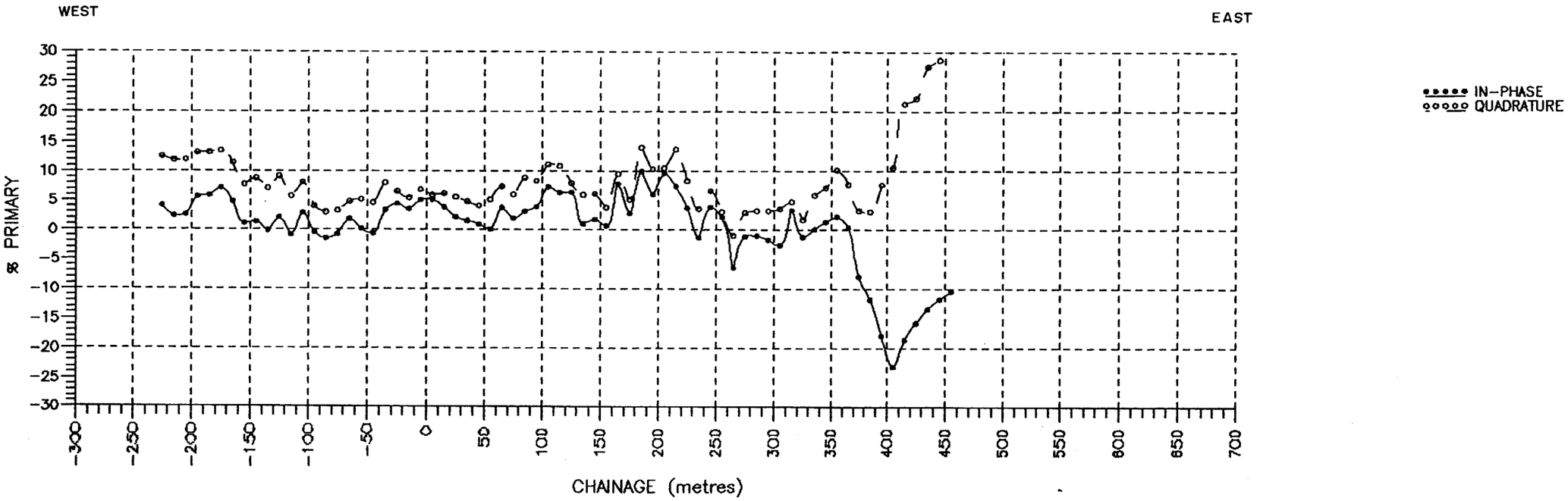
GEOPHYSICON	SCALE N.T.S.	DRAWN BY	DATE Sept., 1992
		PROJECT C92-55	FIGURE C-5



MANALTA COAL LTD.
TELKWA , B.C.

MAX-MIN I - 10 HLEM PROFILE
LINE 1 SOUTH - 14080 Hz

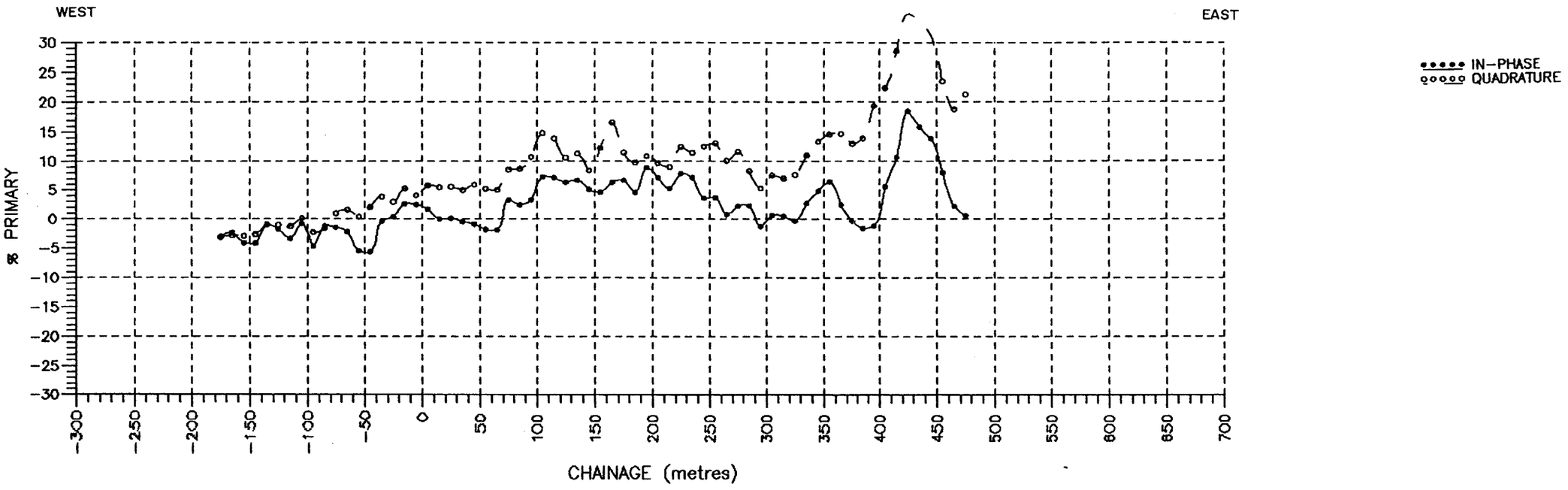
GEOPHYSICON	SCALE: N.T.S.	DRAWN BY:	DATE: Sept., 1992
		PROJECT: C92-55	FIGURE: C-6



MANALTA COAL LTD.
TELKWA , B.C.

MAX-MIN I - 10 HLEM PROFILE
LINE 2 SOUTH - 14080 Hz

GEO-PHYSI-CON	SCALE	DRAWN BY	DATE
	N.T.S.		Sept., 1992
		PROJECT	FIGURE
		C92-55	C-7



MANALTA COAL LTD.

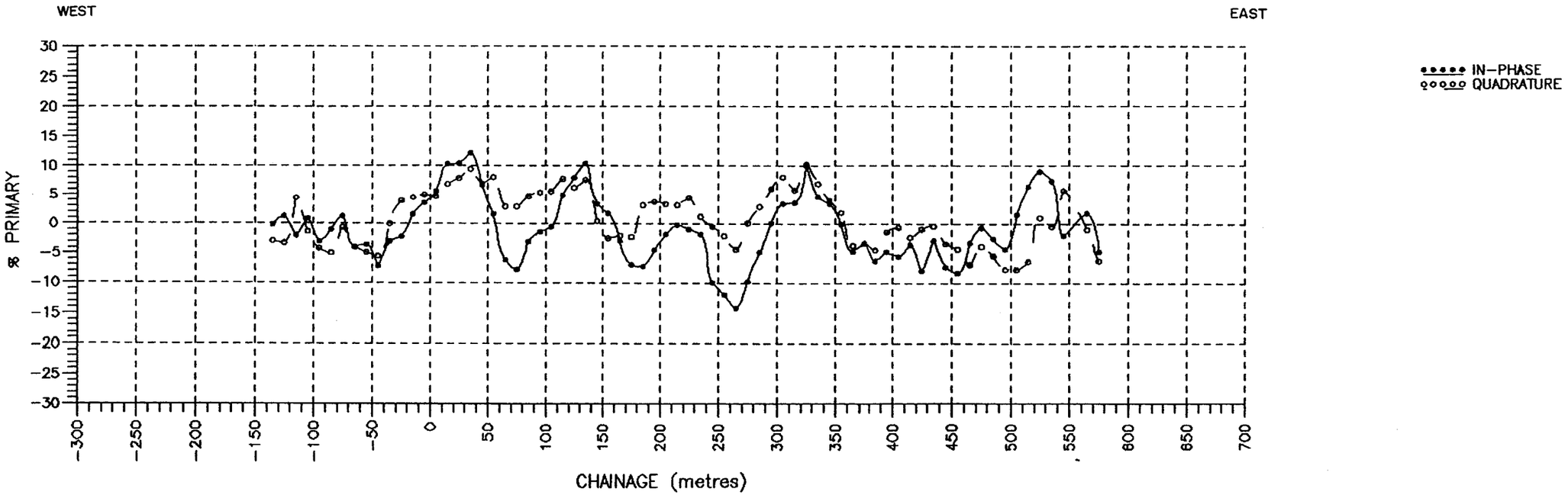
TELKWA , B.C.

MAX-MIN I – 10 HLEM PROFILE

LINE 3 SOUTH – 14080 Hz

GEOPHYSICON	SCALE	DRAWN BY	DATE
	N.T.S.	PROJECT	FIGURE
		C92-55	C-8

Sept., 1992



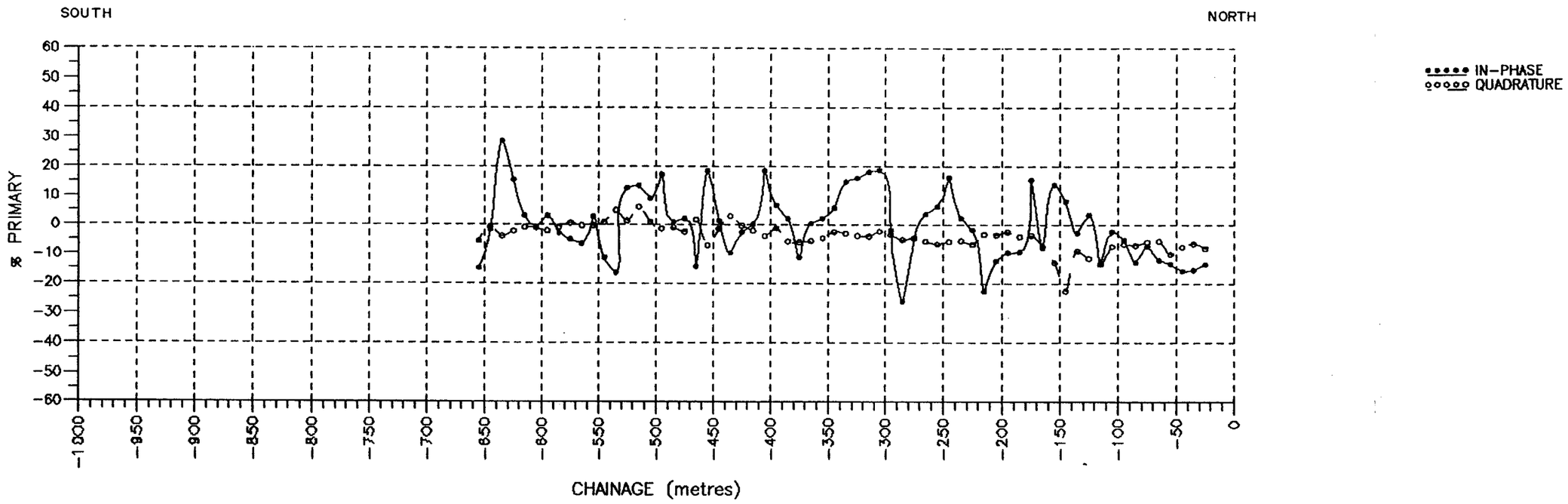
MANALTA COAL LTD.

TELKWA , B.C.

MAX-MIN I - 10 HLEM PROFILE

LINE 4 SOUTH - 14080 Hz

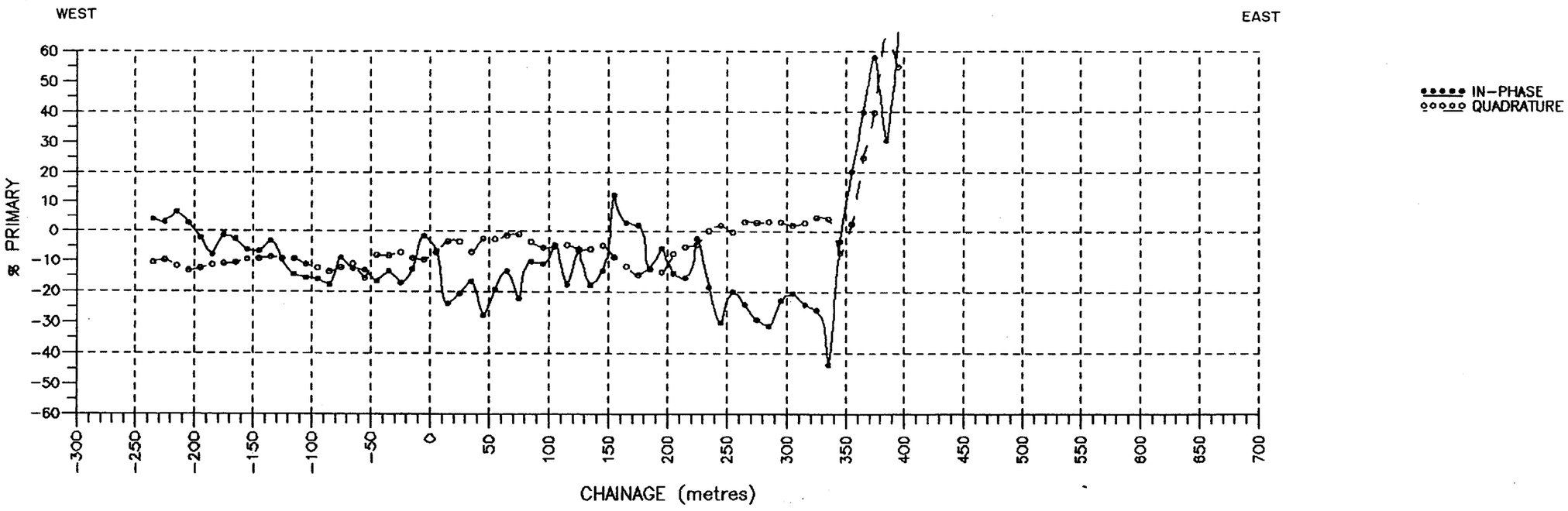
GEO-PHYSI-CON	SCALE: N.T.S.	DRAWN BY:	DATE: Sept., 1992
		PROJECT: C92-55	FIGURE: C-9



MANALTA COAL LTD.
TELKWA , B.C.

MAX-MIN I – 10 HLEM PROFILE
BASELINE – 14080 Hz

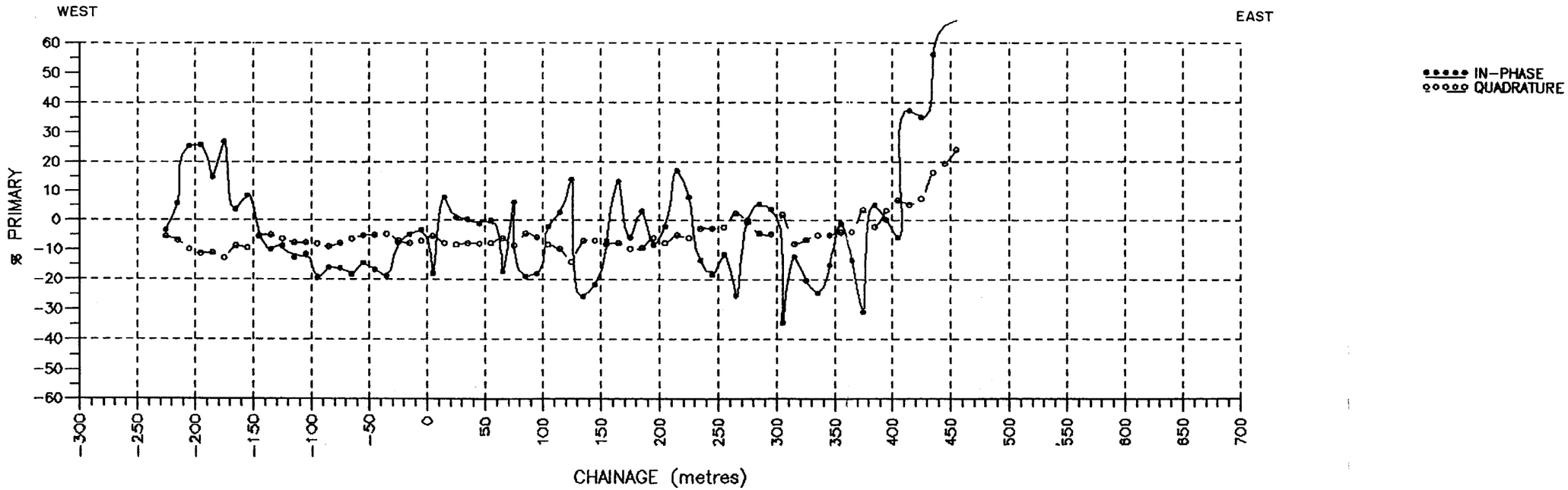
GEOPHYSICON	SCALE: N.T.S.	DRAWN BY:	DATE: Sept., 1992
		PROJECT: C92-55	FIGURE: C-10



MANALTA COAL LTD.
TELKWA , B.C.

MAX-MIN I - 10 HLEM PROFILE
LINE 1 SOUTH - 56320 Hz

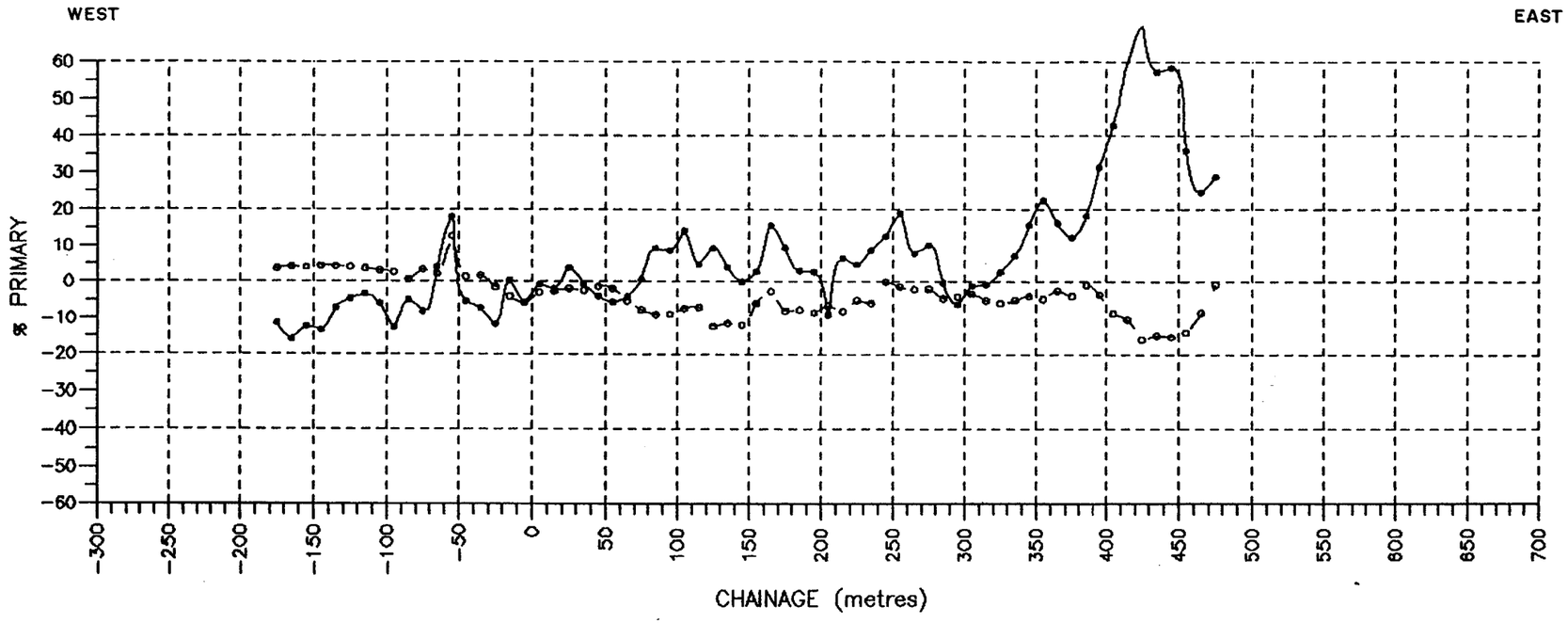
GEO-PHYSICON	SCALE N.T.S.	DRAWN BY	DATE Sept., 1992
		PROJECT C92-55	FIGURE C-11



MANALTA COAL LTD.
TELKWA , B.C.

MAX-MIN I – 10 HLEM PROFILE
LINE 2 SOUTH – 56320 Hz

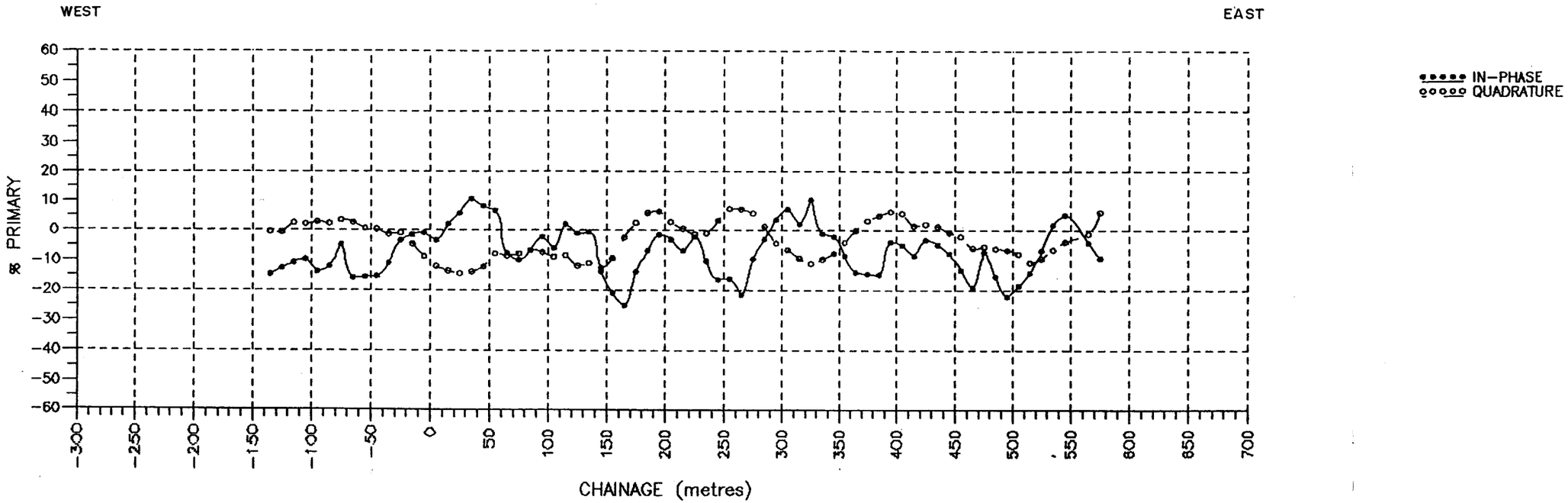
GEO-PHYSI-CON	SCALE N.T.S.	DRAWN BY	DATE Sept., 1992
		PROJECT C92-55	FIGURE C-12



MANALTA COAL LTD.
TELKWA , B.C.

MAX-MIN I - 10 HLEM PROFILE
LINE 3 SOUTH - 56320 Hz

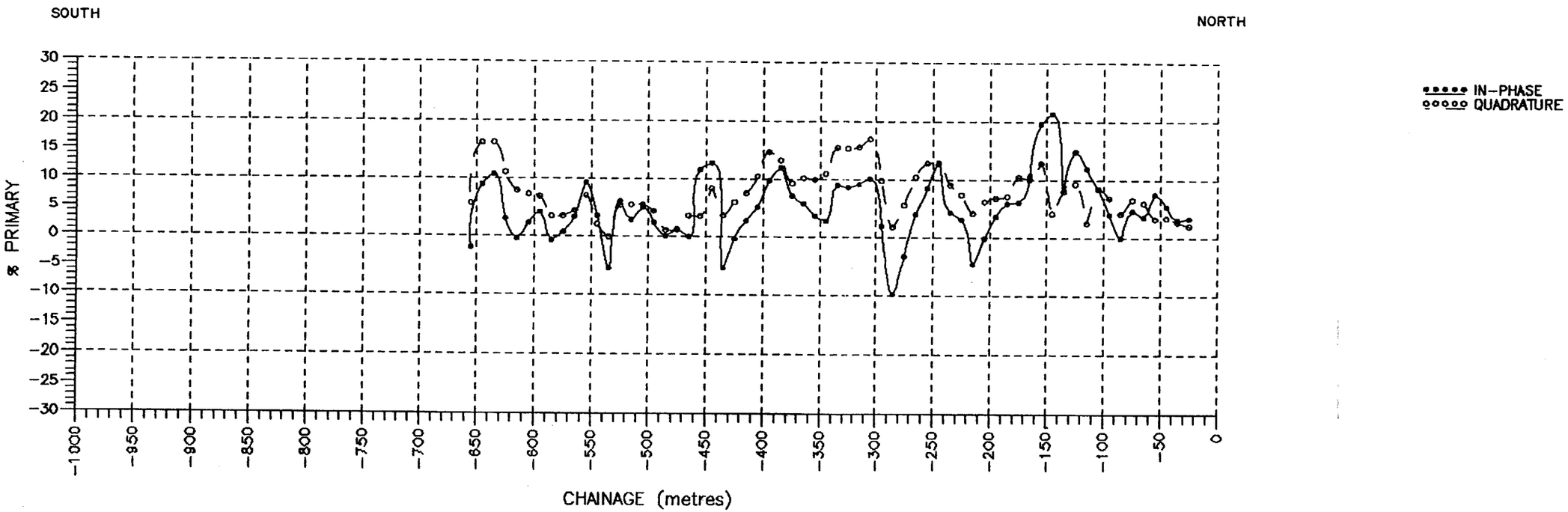
GEO-PHYSI-CON	SCALE N.T.S.	DRAWN BY	DATE Sept., 1992
		PROJECT C92-55	FIGURE C-13



MANALTA COAL LTD.
TELKWA , B.C.

MAX-MIN I - 10 HLEM PROFILE
LINE 4 SOUTH - 56320 Hz

GEO-PHYSICON	SCALE	DRAWN BY	DATE
	N.T.S.		Sept., 1992
		PROJECT	FIGURE
		C92-55	C-14



MANALTA COAL LTD.
TELKWA , B.C.

MAX-MIN I – 10 HLEM PROFILE
BASELINE – 56320 Hz

GEO-PHYSI-CON	SCALE: N.T.S.	DRAWN BY:	DATE: Sept., 1992
		PROJECT: C92-55	FIGURE: C-15

GEO-PHYSI-CON

AIRBORNE MAGNETIC SURVEY REVIEW
TELKWA, BRITISH COLUMBIA

Prepared For

MANALTA COAL LIMITED
CALGARY, ALBERTA

Prepared By

GEO-PHYSI-CON CO. LTD.
CALGARY, ALBERTA

DECEMBER 1992
92-55

TABLE OF CONTENTS

GEO-PHY-SI-CON
GEOPHYSICAL CONSULTANTS
6939 Farrell Road S.E., Calgary, Alberta T2H 0T3
Telephone: (403) 253-7621
Fax: (403) 259-6185

January 6, 1993

Manalta Coal Ltd.
700 - 9 Ave. S.W.
Calgary, AB
T2P 3V4

Attention: Mr. M. Angelo Ledda

Dear Mr. Ledda:

Enclosed please find two (2) copies of the report entitled "Airborne Magnetic Survey Review Telkwa, British Columbia".

If you have any questions or require any additional information, please do not hesitate to contact our office.

Yours truly,

GEO-PHYSI-CON CO. LTD.

per:

Mark Bowman, P.Geoph.
Project Geophysicist

MB:pda

encl.

1.0 INTRODUCTION

Results of airborne magnetometer surveys over the Telkwa, British Columbia area have been reviewed to determine if this data provides a cost effective method of evaluating the extent of Hazelton Group volcanics in the region of the Manalta Coal Ltd. licences. Those licences which contain only Hazelton Group volcanics present limited economic potential for Manalta Coal Ltd. in this region.

2.0 SITE GEOLOGY

The Geological Survey of Canada Geological Atlas Map 1424A (Parsnip River, B.C.) indicates that the bedrock in this region consists of the Hazelton Group volcanics and Tertiary intrusives. These rock types generally exhibit high magnetic susceptibility.

3.0 AIRBORNE MAGNETIC METHODS

In the airborne magnetic method, total magnetic field measurements are collected by a magnetic detector mounted within an aircraft, or in a small streamlined cylinder (bird) which is towed some distance behind the aircraft. The aircraft is flown along a series of preselected, parallel

lines, preferably oriented perpendicular to the main geological trend in the area. Flight altitude is kept as constant as possible.

The sensitivity of airborne magnetometers is generally greater than those used in ground exploration in order to obtain valid measurements several hundred metres above ground surface.

In general, the advantage of airborne magnetics results from the great speed of surveying which translates into reduced cost per survey line-mile. Large areas within Canada have been flown by government agencies, the processed results of which are publicly available at a nominal cost. In addition, airborne magnetic measurements can be made over terrain which may be inaccessible for ground geophysical methods.

The disadvantages of airborne geophysical techniques include reduced resolution in comparison to ground methods, and uncertainty of the exact position of the aircraft during the survey which results in some discrepancy as to the exact location of magnetic anomalies.

Although present day navigation equipment virtually eliminates aircraft location inaccuracies, variations in the horizontal positioning of data collected in the past may be up to 50 ft. for flight altitudes of 1000 ft.

4.0 RESULTS OF THE TELKWA AIRBORNE MAGNETOMETER SURVEY

The results of the airborne magnetometer survey performed in 1967 over the Telkwa, B.C. area are presented in the Province of British Columbia Department of Mines and Petroleum Resources/Department of Energy, Mines and Resources Geological Survey of Canada Aeromagnetic Series Map 5310G (Appendix A). Flight lines, oriented east-west, were flown at an altitude of 1000 feet above ground level.

In the immediate vicinity of the Manalta Coal Ltd. licences, several prominent magnetic anomalies have been identified (Figure 1). Anomaly **A** occurs in the vicinity of Manalta Coal Ltd. licences C.L. 8426, C.L. 8423 L250, C.L. 8424 L249, C.L. 8427, C.L. 5839 and C.L. 8428.

Airborne magnetic anomaly **B** occurs in the vicinity of Manalta Coal Ltd. licence C.L. 3880 L331, along the Telkwa River.

Anomalies **C, D** and **E** appear to occur outside the limits of the licences.

An area of slightly lower magnetic intensity, centred within licences C.L. 4262 L627 and C.L. 4282, may be associated with a region devoid of Hazelton Volcanics, as identified by Manalta Coal Ltd. geology maps.

Within the general area, a regional trend shows increased magnetic intensity towards the northeast.

There may be some question as to the exact location of the anomalies due to possible variations in the flight lines during the survey.

5.0 GROUND GEOPHYSICAL PROGRAM

In September, 1992 a ground geophysical program was conducted in an attempt to map the edge of the Hazelton Group volcanics and coal subcrop within Manalta Coal Ltd's coal licence 4271 in the Telkwa, British Columbia area. As summarized in a report submitted by Geo-Physi-Con Co. Ltd. entitled "Ground Geophysical Surveys, Telkwa, British Columbia" (October, 1992), the extent of the Hazelton Group volcanics has likely been defined by the direct current profiling horizontal loop electromagnetic and total field magnetometer methods.

Results of the ground geophysical program have been combined with the airborne magnetic data and presented in Figures 2 to 4. No direct correlation between these two data sets is readily apparent.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Regions of anomalously high magnetic intensity, as identified by the airborne magnetic data map, likely identify the occurrence of Hazelton Group Volcanics. Two of the anomalies appear to occur within the boundaries of the following current Manalta Coal licences:

C.L. 8426

C.L. 8423 L250

C.L. 8424 L249

C.L. 8427

C.L. 5839

C.L. 8428

C.L. 3880 L331

It is suggested that these areas be evaluated further by a drilling program or by a comparatively cost effective ground geophysical program to further determine the need to maintain these licences.

The boundary of the Hazelton Group volcanics, as identified by geological mapping and a ground geophysical program (Geo-Physi-Con C. Ltd., September 1992) within coal licence 4271, has not been clearly defined by the airborne magnetic data. The ground magnetic anomalies which have defined this boundary are generally in the order of 50 gammas. This

magnitude is likely too small to have been detected at altitudes of 1000 ft. above ground with the instruments used in the 1967 airborne survey.

In conclusion. the airborne magnetic method is capable of identifying areas of anomalous magnetic response indicative of the Hazelton Group volcanics. However, without accompanying ground geophysics, regions of this geological structure may be left undetected.

PERMIT TO PRACTICE
GEO-PHYSI-CON CO. LTD.
Signature
Date Jan 6/93
PERMIT NUMBER: P 2803
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

Respectfully submitted,

GEO-PHYSI-CON CO. LTD.

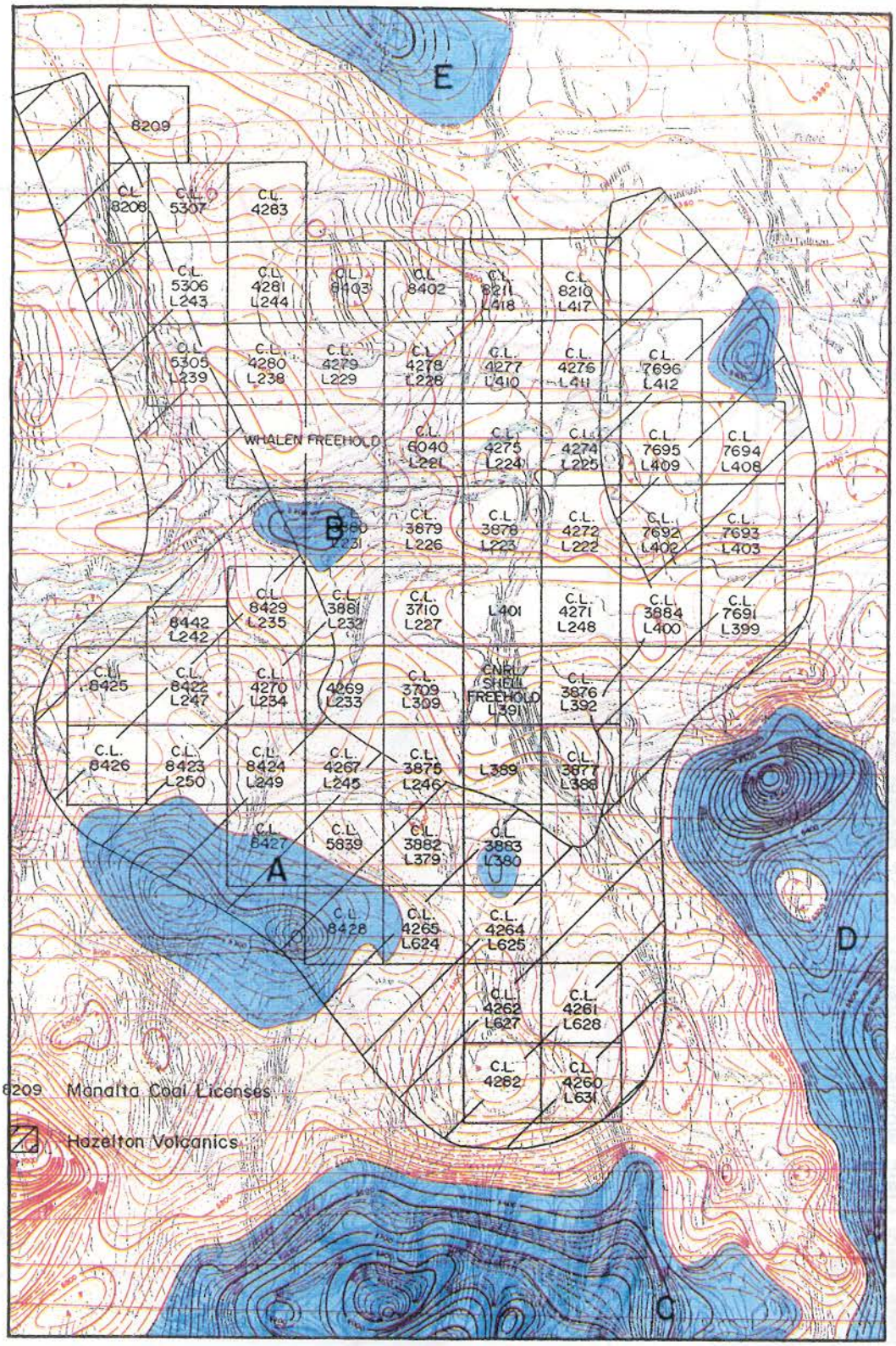
per:

Mark Bowman, P.Geoph.
Project Geophysicist

reviewed by:

Michael Pesowski, P.Geoph.
Senior Geophysicist

Calgary, Alberta
December 1992
92-55



Contour Lines in Gammas

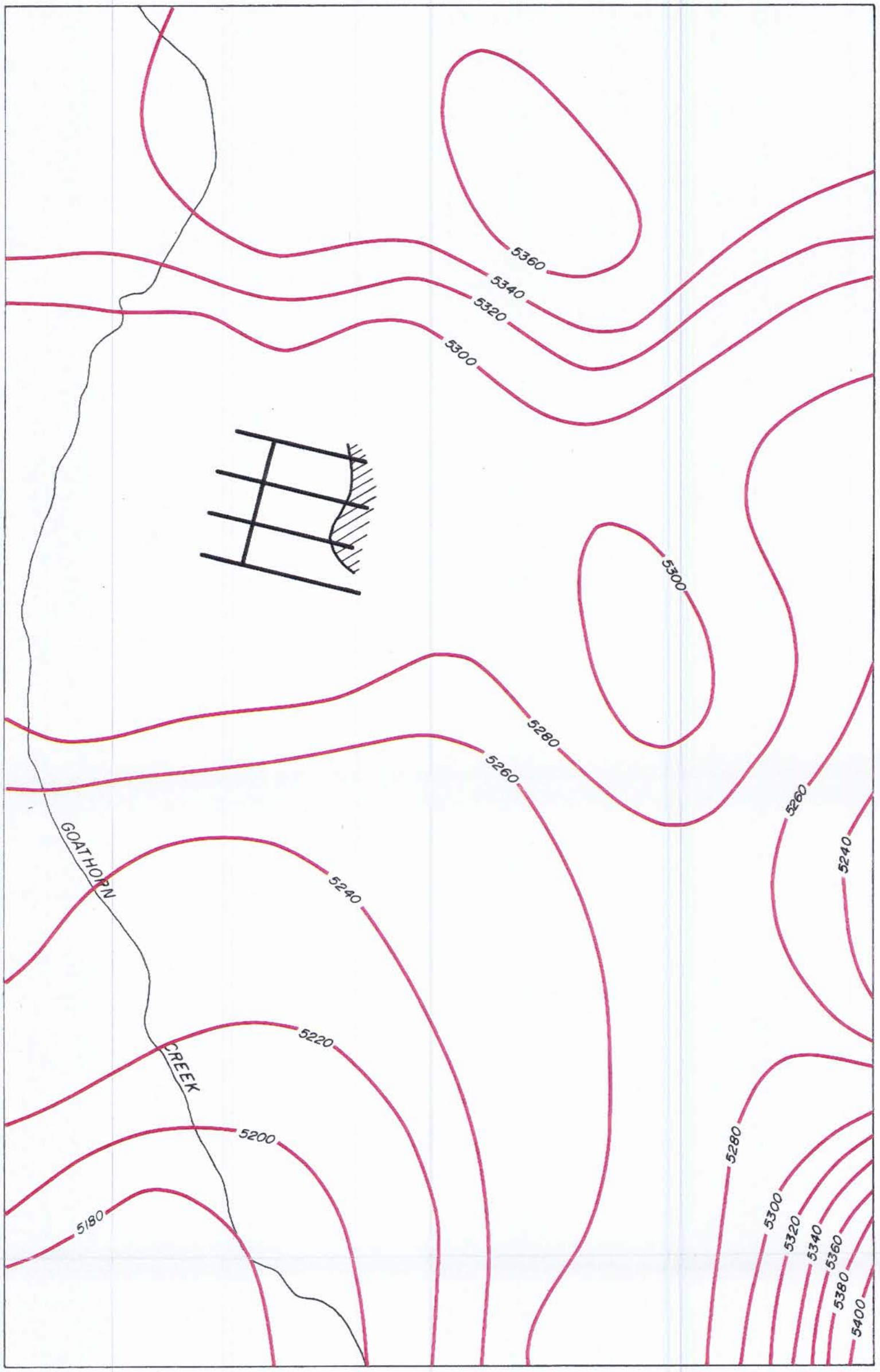
A Areas of Anomalous Magnetic Intensity

Flight altitude 1000 feet above ground level
Isomagnetic Lines (total field) 1967

MANALTA COAL LTD.
TELKWA , B. C.

AIRBORNE MAGNETIC SURVEY

GEO-PHYSI-CON	SCALE 1 inch = 2 mile	DRAWN BY	DATE Dec., 1992
	N.T.S.	PROJECT NO. C 92-55	FIGURE 1



Contour Lines in Gammas

Survey Lines

Anomalous Total Field Magnetic Intensity (1992 Ground Survey)

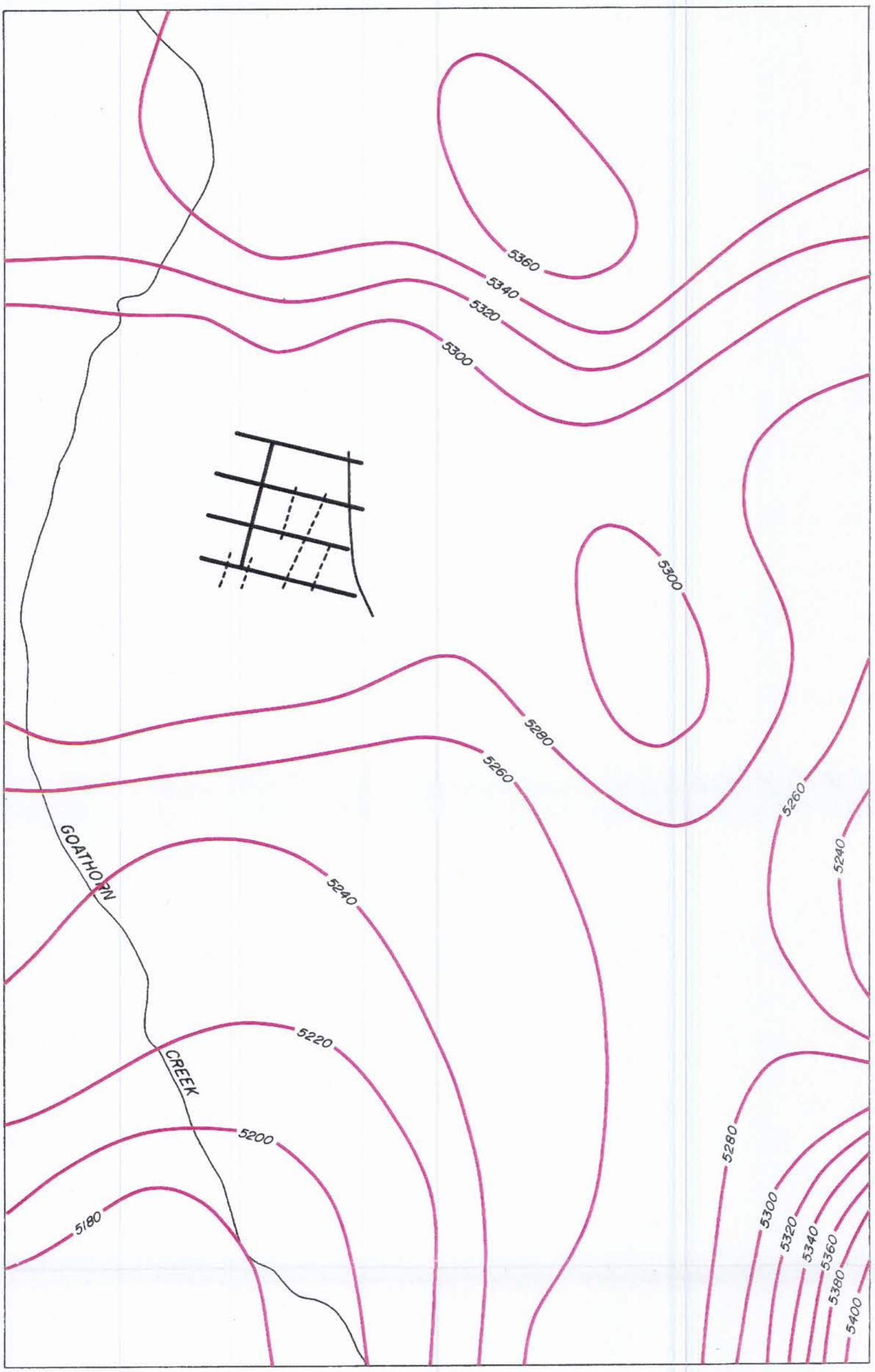
Flight altitude 1000 feet above ground level

Isomagnetic Lines (total field) 1967

MANALTA COAL LTD.
TELKWA, B.C.

AIRBORNE AND GROUND MAGNETIC SURVEYS

GEO-PHYSI-CON	SCALE: Not to Scale	DRAWN BY:	DATE: Dec., 1992
	N.T.S.	PROJECT: C 92-55	FIGURE: 2



Contour Lines in Gammas

Survey Lines

Moderate to Strong HLEM Conductor (1992 Max-Min I Survey)

----- Weak HLEM Conductor (1992 Max-Min I Survey)

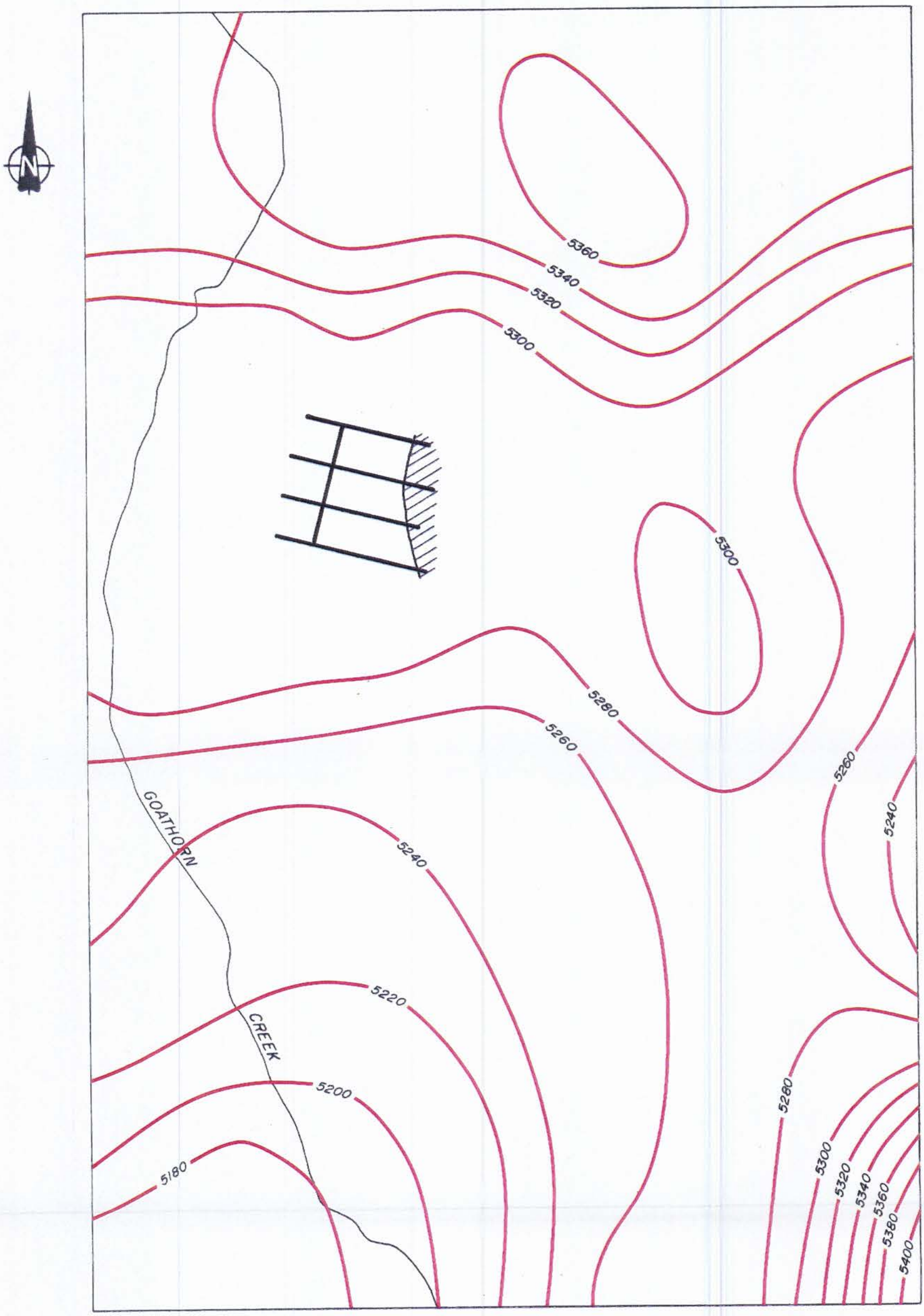
Flight altitude 1000 feet above ground level

Isomagnetic Lines (total field) 1967

MANALTA COAL LTD.
TELKWA, B.C.

GROUND HLEM SURVEY

GEO-PHYSI-CON	SCALE Not to Scale	DRAWN BY	DATE Dec., 1992
	N.T.S.	PROJECT NO C92-55	FIGURE 3



Contour Lines in Gammas

Survey Lines

Anomalous Apparent Resistivity (1992 Direct Current Profiling Survey)

Flight altitude 1000 feet above ground level

Isomagnetic Lines (total field) 1967

MANALTA COAL LTD.

TELKWA, B.C.

GROUND DIRECT CURRENT PROFILING SURVEY

GEOPHYSICON	SCALE: Not to Scale	DRAWN BY:	DATE: Dec., 1992
	N.T.S.	PROJECT NO.: C92-55	FIGURE: 4

PROVINCE
OF
BRITISH COLUMBIA

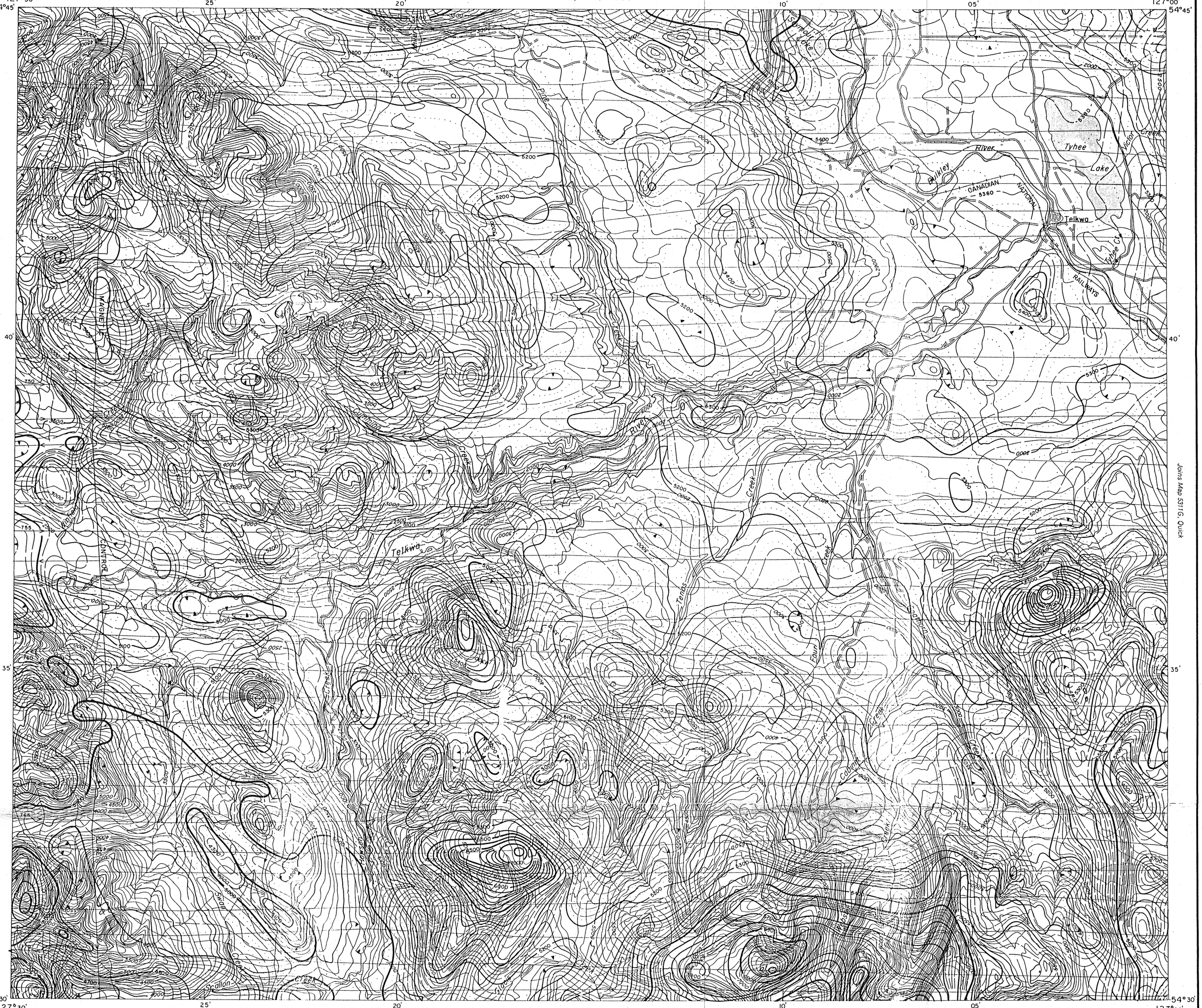
DEPARTMENT OF MINES AND PETROLEUM RESOURCES

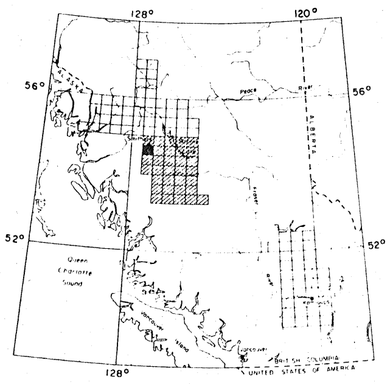
DEPARTMENT
OF
ENERGY MINES AND RESOURCES

GEOLOGICAL SURVEY OF CANADA

AEROMAGNETIC SERIES

SHEET 93 L/11





INDEX MAP

ISOMAGNETIC LINES (total field)

500 gammas
100 gammas
20 gammas
10 gammas
Magnetic depression

Flight lines
Flight altitude 1000 feet above ground level

MAP 5310G

TELKWA

BRITISH COLUMBIA

Scale: One Inch to One Mile = 1/63,360

Miles

1 1/2 0 1 2 3

Airborne Magnetic Survey, September to November 1967
by Lockwood Survey Corporation Ltd

The planimetry for this map was obtained from topographical map sheets published by the Department of Energy, Mines and Resources, Ottawa.

No correction has been made for regional variation.

The magnetic data on this map were compiled from information recorded along the flight lines shown. The anomalies expressed by the magnetic contours are dependent on the variable magnetic intensities of the underlying rocks, and may be due to conditions near, or at unknown depths below the surface. High magnetic anomalies normally indicate the presence of basic rocks, such as diabase, gabbro, or serpentinite, which have a relatively high iron content, but in special instances may be due, or partly due, to concentrations of magnetic minerals. By means of the magnetic anomalies, various rock bodies or structural features, such as faults or folds, may be traced into, or across, areas of few or no outcrops. In many instances, however, no interpretation of particular anomalies may be possible without further geological information.

PUBLISHED 1969

GEOPHYSICS PAPER 5310

TELKWA

BRITISH COLUMBIA

SHEET 93 L/11

LYNX GEOSYSTEMS INC. Wed Aug 18 14:46:41 1993
PROJECT:TKWNOR93 USER:dw
SUBSET: #0 RAW DRILLHOLE DATA

DRILLHOLE INDEX REPORT

	HOLE #	NORTH	EAST	ELVN	LGTH	Sf1	Sf2	RG'N	CG
0001	T79R01	6055880.20	621340.00	670.48	189.00	2.25			A
0002	T79R02	6054415.00	621393.10	744.08	237.80	1.40			A
0003	T79R03	6054639.90	622372.70	727.64	237.74	11.20			A
0004	T79R04	6057508.50	621491.80	604.70	71.30	16.76			A
0005	T79R05	6062359.40	615618.50	888.81	201.20	9.30			A
0006	T79R06	6062996.00	615952.30	875.09	42.70	13.71			A
0007	T79R07	6062569.20	614517.10	895.26	24.40	6.20			A
0008	T79R08	6062877.50	615725.60	879.62	24.70	5.70			A
0009	T79R09	6062590.00	615817.60	891.40	24.70	9.70			A
0010	T79R10	6058538.00	618143.60	754.13	225.90	43.70			A
0011	T79R11	6058688.20	619564.40	658.89	7.60	7.60			A
0012	T79R12	6059818.70	620761.00	596.91	48.80	8.20			A
0013	T79R13	6054761.20	621457.70	719.08	128.01	2.50			A
0014	T81D112	6052883.11	621815.40	889.34	235.00	8.99			
0015	T81R101	6055183.96	622157.27	691.31	252.00	8.40			
0016	T81R102	6056612.00	621600.00	648.00	35.05	35.05			
0017	T81R103	6056552.00	621250.00	652.50	21.60	21.60			
0018	T81R104	6054098.67	621352.98	767.52	152.40	6.10			
0019	T81R105	6052692.25	621675.84	860.33	176.00	5.00			
0020	T81R106	6052050.00	621800.00	852.00	62.48	62.48			
0021	T81R107	6054080.06	619774.42	760.60	198.00	18.49			
0022	T81R108	6052175.00	618040.00	842.00	169.80	25.70			
0023	T81R109	6053855.00	619380.00	778.00	30.48	30.48			
0024	T81R110	6058374.00	617692.00	763.00	61.60	61.60			
0025	T81R111	6057981.03	616496.76	787.36	182.90	29.80			
0026	T82D201	6054644.96	620815.84	717.47	245.67	53.95			
0027	T82D202	6054191.98	621050.24	758.20	300.80	46.35			
0028	T82D204	6054110.73	622244.34	763.10	400.50	85.98			
0029	T82D208	6053664.79	620971.55	785.80	319.00	42.80			
0030	T82D210	6054463.20	620036.61	729.50	258.17	30.90			
0031	T82D213	6059650.04	617149.22	907.30	169.80	12.20			
0032	T82D214	6059806.12	618179.73	866.50	303.30	9.76			
0033	T82D215	6061645.00	615505.00	903.00	209.40	5.60			
0034	T82D216	6059476.90	618656.75	786.30	137.50	15.90			
0035	T82D217	6059048.79	618467.99	766.90	84.40	9.80			
0036	T82D218	6059835.33	618791.87	799.60	102.70	21.10			
0037	T82D219	6054106.28	621616.72	760.70	349.80	30.90			
0038	T82D220	6053785.75	621378.68	785.50	325.50	26.41			
0039	T82D221	6054402.98	620680.55	723.20	273.40	59.00			
0040	T82D222	6054189.20	621049.60	758.30	76.20	3.70			
0041	T82D223	6053833.24	621047.29	777.90	233.70	6.10			
0042	T82D224	6054055.67	620653.00	732.60	249.00	59.64			
0043	T82D225	6053453.50	621252.28	794.00	282.50	7.30			
0044	T82D226	6054287.25	619764.13	762.10	215.50	47.00			
0045	T82D227	6053452.16	621386.73	797.30	255.00	10.35			
0046	T82D228	6054243.75	619938.48	750.60	200.30	49.67			
0047	T82D229	6053457.43	621896.66	806.70	290.00	6.70			
0048	T82D230	6053895.00	619790.00	764.00	142.30	23.65			
0049	T82D231	6054313.42	619511.67	762.20	331.00	51.66			

0050	T82D232	6053798.85	621777.74	779.10	358.50	10.99
0051	T82D233	6054270.42	619255.17	770.20	130.00	130.00
0052	T82D234	6054453.39	619710.37	751.20	209.40	21.31
0053	T82D235	6053794.11	622069.14	782.90	270.30	9.70
0054	T82D236	6054777.58	619821.53	733.10	178.90	15.20
0055	T82D237	6054858.19	619986.87	730.10	151.00	28.11
0056	T82D238	6053803.16	621608.64	783.60	191.00	15.80
0057	T82D239	6055035.62	620020.20	725.60	159.40	13.38
0058	T82D240	6055453.58	620033.61	711.20	85.60	19.50
0059	T82D241	6053154.82	621253.79	816.60	115.00	4.60
0060	T82D242	6055016.50	619768.95	732.50	133.00	24.90
0061	T82D243	6053109.17	621396.46	828.50	148.50	5.30
0062	T82D244	6052607.78	621533.20	838.80	151.40	41.70
0063	T82D245	6053094.32	621649.97	859.10	227.00	9.20
0064	T82D246	6052344.83	621653.55	840.30	163.67	70.12
0065	T82D247	6053110.32	621870.18	860.20	258.60	9.10
0066	T82D248	6052041.16	621840.70	852.20	282.50	92.10
0067	T82D249	6053128.79	622109.17	867.50	264.30	10.40
0068	T82D250	6052083.16	622070.54	867.80	172.50	40.30
0069	T82D251	6052867.54	621583.54	871.90	355.70	8.67
0070	T82D252	6052072.79	622346.72	887.00	373.98	32.41
0071	T82D253	6052593.21	622276.53	903.30	361.40	10.29
0072	T82D254	6053837.00	622466.50	785.30	249.00	28.79
0073	T82D255	6053462.10	621656.66	802.30	200.00	7.04
0074	T82D256	6052584.50	622016.71	890.30	291.60	9.93
0075	T82D257	6054640.00	621141.42	728.50	78.30	12.50
0076	T82D258	6054415.00	621393.10	744.08	121.90	11.20
0077	T82D259	6054413.16	621075.47	747.10	87.17	6.10
0078	T82D260	6055019.04	621019.53	696.50	153.31	6.10
0079	T82D261	6054451.29	619536.20	755.40	221.58	49.22
0080	T82D262	6055043.21	620789.04	689.90	139.29	50.90
0081	T82D263	6055520.00	620745.00	680.00	61.00	61.00
0082	T82D264	6055487.00	621256.86	688.90	200.00	12.20
0083	T82D265	6054627.29	619688.00	737.30	279.10	16.40
0084	T82D266	6055282.00	620670.00	688.00	96.14	62.50
0085	T82D267	6054091.28	619565.22	762.25	250.00	33.83
0086	T82D268	6054396.83	621643.42	745.20	300.60	6.78
0087	T82D269	6052240.00	620775.00	814.00	96.00	96.00
0088	T82D270	6052615.00	620525.00	804.50	120.70	94.50
0089	T82D271	6054751.54	621651.13	721.60	222.00	3.90
0090	T82D272	6055142.00	621633.00	707.50	121.92	6.10
0091	T82R203	6047868.00	620675.00	921.00	231.00	9.37
0092	T82R205	6048358.00	620667.00	955.00	208.00	24.00
0093	T82R206	6048779.00	620279.00	979.00	236.00	11.90
0094	T82R207	6049330.00	620137.00	962.00	207.50	9.00
0095	T82R209	6053886.04	619618.16	765.20	150.00	24.00
0096	T82R211	6062132.00	615560.00	991.00	147.00	6.00
0097	T82R212	6061020.00	615370.00	907.00	264.00	6.00
0098	T83D301	6054146.91	620956.24	756.90	72.23	4.47
0099	T83D302	6054151.04	620895.38	753.40	47.85	4.27
0100	T83D303	6054151.61	620835.13	749.80	50.90	5.18
0101	T83D304	6054148.99	620924.04	754.90	60.05	5.48
0102	T83D305	6054153.50	620775.99	744.00	57.00	14.94
0103	T83D306	6054143.56	621111.70	760.10	87.48	5.49
0104	T83D307	6054130.70	621230.95	763.40	111.56	6.40
0105	T83D308	6054128.22	621353.72	762.00	93.57	8.53

0106	T83D309	6054146.39	621015.91	759.90	69.19	8.84
0107	T83D310	6054136.31	621170.29	762.10	90.52	9.45
0108	T83D311	6054137.65	621140.29	760.70	20.42	3.35
0109	T83D312	6053953.25	620924.49	764.90	59.44	3.96
0110	T83D313	6054260.08	620909.65	750.60	66.14	6.71
0111	T83D314	6054636.91	621010.90	723.90	60.00	9.14
0112	T83D315	6054505.98	621254.00	735.00	81.38	9.45
0113	T83D316	6054904.29	621086.78	712.80	84.43	4.88
0114	T83D317	6054895.25	621290.25	713.70	108.81	3.05
0115	T83D318	6055279.67	621015.92	684.60	114.91	10.97
0116	T83D319	6053932.07	621256.17	772.40	75.29	5.49
0117	T83D320	6053967.33	621517.13	772.00	148.44	5.79
0118	T83D321	6053622.96	621505.13	790.10	124.06	4.57
0119	T83D322	6053965.56	621669.98	768.80	178.90	6.00
0120	T83D323	6053964.75	621903.36	769.70	144.20	6.00
0121	T83D324	6053643.33	621221.92	788.50	60.05	7.50
0122	T83D325	6053299.16	621242.90	803.10	66.14	6.00
0123	T83D326	6053440.50	621075.25	792.80	84.43	7.62
0124	T83D327	6053289.00	621075.12	794.10	100.90	9.75
0125	T83D328	6052893.00	621385.20	832.60	87.40	4.88
0126	T83D329	6052611.75	621778.23	863.50	193.85	1.22
0127	T83D330	6052878.71	622027.34	895.60	175.87	1.22
0128	T83D331	6052334.66	621888.74	858.30	185.01	11.08
0129	T83D332	6053452.43	622160.66	816.50	164.59	20.12
0130	T83D333	6053269.95	621759.41	824.50	184.00	10.60
0131	T83D334	6053612.21	621772.34	790.60	107.00	10.05
0132	T83D335	6053280.35	621502.15	810.60	127.00	4.17
0133	T83D336	6054614.08	621381.66	727.70	111.00	7.80
0134	T83D337	6054499.75	621528.87	733.30	107.00	6.71
0135	T83D338	6054420.45	621894.21	742.30	215.00	7.08
0136	T83D339	6054764.62	621806.99	720.60	114.90	6.00
0137	T83D340	6054269.91	621808.38	753.20	187.40	7.01
0138	T83D341	6054283.10	621517.66	754.50	167.70	9.14
0139	T83D342	6054267.66	621268.28	757.50	130.40	6.10
0140	T83D343	6055301.79	621342.27	698.50	172.80	9.66
0141	T83D344	6055431.58	621624.49	694.30	148.30	2.60
0142	T83D345	6053978.86	619639.05	763.50	134.10	26.10
0143	T83D346	6054201.69	619416.16	766.80	126.40	70.10
0144	T83D347	6054197.87	619647.63	760.10	104.50	21.34
0145	T83D348	6054622.79	619913.93	731.10	132.80	24.72
0146	T83D349	6054660.33	620148.38	717.40	129.20	19.50
0147	T83D350	6054789.78	620931.49	715.10	62.50	9.14
0148	T83D351	6054756.21	621259.18	721.40	111.90	7.62
0149	T83D352	6054110.00	621890.00	762.00	148.40	6.71
0150	T83D353	6054836.00	621108.00	720.30	142.30	6.93
0151	T83D354	6055913.37	622890.41	660.90	162.80	15.20
0152	T83D355	6055411.37	622898.28	685.70	110.00	18.00
0153	T83D356	6055887.17	622453.74	670.40	127.00	10.00
0154	T83D357	6055647.72	621641.53	686.80	112.70	14.90
0155	T83D358	6055463.06	622403.53	684.80	108.50	9.00
0156	T83D359	6055394.79	621855.85	694.40	136.80	10.00
0157	T83D360	6054759.74	622190.14	722.30	165.70	10.00
0158	T83D361	6055643.62	621882.97	684.50	154.50	4.00
0159	T83D362	6054459.18	622094.53	740.90	189.00	9.00
0160	T83D363	6055138.93	621886.45	704.00	150.50	15.00
0161	T83D364	6055145.15	622617.92	692.50	107.00	9.00

0162	T83D365	6054359.96	622395.49	749.40	163.80	10.00
0163	T83D366	6055641.91	622135.11	686.00	151.40	9.10
0164	T83D367	6054422.69	622863.66	752.80	116.90	14.00
0165	T83D368	6055398.25	622088.73	690.00	120.40	9.00
0166	T83D369	6055903.47	621902.38	675.20	108.80	7.00
0167	T84D401	6056405.64	622175.42	648.61	114.90	5.18
0168	T84D402	6053962.32	622004.85	771.30	163.68	10.70
0169	T84D403	6053811.00	621902.14	779.30	157.50	12.32
0170	T84D404	6056393.23	621643.49	649.30	96.62	19.50
0171	T84D405	6053630.65	621893.43	791.30	238.35	8.22
0172	T84D406	6055911.03	621634.53	673.60	84.12	16.10
0173	T84D407	6053644.29	621650.60	790.50	200.20	10.00
0174	T84D408	6055926.22	622165.17	673.10	114.90	6.10
0175	T84D409	6053445.11	621783.12	807.90	136.25	6.10
0176	T84D410	6056154.04	622147.71	662.50	84.40	4.60
0177	T84D411	6052719.04	621482.40	836.60	74.68	6.10
0178	T84D412	6056132.33	621920.09	663.30	50.90	7.54
0179	T84D413	6054402.16	620905.39	737.30	105.70	0.80
0180	T84D414	6056137.00	621650.51	660.20	102.70	12.91
0181	T84D415	6054501.91	620937.59	731.60	72.00	6.90
0182	T84D416	6056136.65	621425.92	654.70	84.12	37.30
0183	T84D417	6054507.39	621104.86	739.80	90.53	9.93
0184	T84D418	6054234.53	621082.41	756.80	117.96	6.71
0185	T84D419	6056329.37	621885.85	654.41	90.00	4.00
0186	T84D420	6054388.91	621253.99	748.40	114.91	6.40
0187	T84D421	6056427.44	622425.55	647.60	96.62	6.70
0188	T84D422	6054630.37	621265.67	726.00	93.57	6.18
0189	T84D423	6056681.83	622447.25	649.10	139.29	21.34
0190	T84D424	6054758.06	620996.28	718.20	178.90	7.00
0191	T84D425	6056684.47	622189.77	638.60	78.33	9.10
0192	T84D426	6053944.95	620803.61	756.60	53.90	4.00
0193	T84D427	6056456.72	622676.67	661.10	41.10	21.34
0194	T84D428	6054500.71	621367.54	735.40	108.80	7.62
0195	T84D429	6056680.32	621925.18	637.70	110.00	49.40
0196	T84D430	6054621.41	621529.05	725.10	133.20	7.68
0197	T84D431	6055268.15	621617.75	702.70	127.10	21.34
0198	T84D432	6054613.64	621667.59	728.40	127.10	4.57
0199	T84D433	6054627.54	621891.29	727.70	102.11	10.30
0200	T84D434	6055488.91	621548.50	688.60	106.00	10.90
0201	T84D435	6054877.00	621881.91	717.80	81.92	7.62
0202	T84D436	6055271.24	621188.91	694.80	102.70	7.00
0203	T84D437	6054897.70	621698.65	715.50	96.20	7.60
0204	T84D438	6055041.73	621238.03	708.20	148.10	6.10
0205	T84D439	6058000.00	622200.00	599.00	50.30	50.30
0206	T84D440	6059637.49	617695.88	891.30	145.00	4.00
0207	T84D441	6059599.87	618291.78	839.40	224.70	3.60
0208	T84D442	6059822.54	618519.92	830.10	139.30	12.80
0209	T84D443	6059544.04	618880.29	770.20	111.86	13.53
0210	T84D444	6059854.28	619102.18	765.50	123.70	9.97
0211	T85D501	6059570.41	617481.35	896.60	59.50	6.83
0212	T85D502	6059436.41	617855.24	863.60	148.25	7.40
0213	T85D503	6059065.37	618780.93	735.70	68.66	7.00
0214	T85D504	6059690.28	618644.04	804.60	74.97	11.45
0215	T86D601	6059815.07	616957.02	923.21	71.49	13.05
0216	T86D602	6059280.32	617799.35	848.44	110.95	6.09
0217	T86D603	6059284.82	618626.00	772.20	60.00	21.13

0218	T86D604	6059944.15	618747.17	812.64	84.43	15.30	
0219	T88D801	6059396.90	617185.42	888.77	84.73	9.60	
0220	T88D802	6060252.33	616192.71	930.22	93.40	6.71	
0221	T88D803	6060341.25	616736.50	973.92	131.10	3.66	
0222	T88D804	6060041.04	616816.03	939.70	76.80	6.10	
0223	T88D805	6059912.69	617304.45	933.83	77.20	6.10	
0224	T88D806	6060713.87	615390.61	899.16	59.00	9.10	
0225	T88D807	6062397.66	615629.27	889.94	118.80	6.70	
0226	T88D808	6062571.18	614525.46	895.82	60.96	6.10	
0227	T88D809	6060976.58	616215.89	976.28	112.78	24.30	
0228	T88D810	6060622.98	616484.67	999.64	150.00	24.38	
0229	T88D811	6060212.91	617102.90	995.31	213.00	18.23	
0230	T88D812	6060396.82	616582.71	975.14	118.87	9.10	
0231	T88D813	6060684.82	616346.01	983.04	137.16	30.48	
0232	T88D814	6059756.62	617604.43	910.13	110.00	6.10	
0233	T89D907	6059490.95	618700.53	782.52	62.81	13.35	
0234	T89D920	6060104.79	617060.66	966.95	48.70	10.00	
0235	T89D921	6060090.04	617202.99	976.29	113.00	16.00	
0236	T89D922	6059966.20	617001.64	938.33	67.00	9.10	
0237	T89D923	6059701.20	617353.04	908.30	64.00	7.36	
0238	T89D924	6059745.62	617505.77	911.77	66.10	5.90	
0239	T89D925	6059807.78	617760.40	906.30	180.00	5.90	
0240	T89D926	6060118.50	618536.21	876.30	21.90	18.30	
0241	T89D927	6059180.29	618699.78	752.58	62.20	2.00	
0242	T89D928	6059599.62	618749.15	786.80	79.00	14.60	
0243	T89D929	6059656.49	618587.09	808.88	57.00	13.90	
0244	T89D930	6060005.37	618698.28	832.68	76.00	23.00	
0245	T89D931	6059836.07	618879.16	789.93	97.00	21.20	
0246	T89R901	6059332.54	618991.67	740.80	100.00	11.60	
0247	T89R902	6059313.15	618804.77	758.53	81.00	17.80	
0248	T89R903	6059679.29	619097.90	749.66	99.00	11.20	
0249	T89R904	6060005.24	618795.73	819.30	98.00	12.00	
0250	T89R905	6059708.99	618667.41	803.15	71.00	10.80	
0251	T89R906	6059829.11	618739.39	805.85	79.00	17.60	
0252	T89R908	6059854.86	617492.63	926.59	102.50	5.50	
0253	T89R909	6060324.71	616912.10	985.46	75.00	6.00	
0254	T89R910	6060227.50	617023.24	989.09	94.00	12.40	
0255	T89R911	6060259.36	616606.42	956.64	94.00	6.00	
0256	T89R912	6060160.75	616737.60	954.00	94.00	6.32	
0257	T89R913	6059793.07	617185.89	922.86	63.50	6.00	
0258	T89R914	6059966.07	618250.86	873.12	78.00	17.30	
0259	T89R915	6059417.58	618116.67	838.26	99.50	5.89	
0260	T89R916	6059740.06	621143.27	589.81	28.00	12.00	
0261	T89R917	6060483.30	621041.50	576.30	72.60		
0262	T89R918	6060240.00	620543.90	590.20	63.30	5.80	
0263	T89R919	6059359.10	620230.10	628.00	85.00	9.40	
0264	T92D01	6061023.33	616413.43	1008.88	143.20	25.00	SC
0265	T92D02	6060495.96	616384.31	970.88	155.40	15.10	SC
0266	T92D03	6061042.90	616101.85	965.13	152.40	19.70	SC
0267	T92D04	6060815.89	616230.92	971.94	191.50	18.30	SC
0268	T92D05	6060309.12	617084.51	1006.39	134.10	8.51	SC
0269	T92D07	6059989.67	617819.25	936.36	234.70	21.30	SC
0270	T92D09	6060042.33	617297.91	969.43	131.10	7.62	SC
0271	T92D12	6060315.44	619119.91	826.22	176.83	10.60	SC
0272	T92D20	6059692.44	618834.80	783.52	84.50	12.20	SC
0273	T92D22	6059980.87	618905.78	799.69	104.61	7.50	SC

0274	T92D24	6061109.98	616313.11	993.85	113.80	22.86	SC
0275	T92D26	6061188.15	616476.90	1023.20	152.40	34.90	SC
0276	T92D31	6061246.96	616323.35	999.00	121.95	22.87	SC
0277	T92D32	6061197.79	616023.92	958.90	146.30	22.90	SC
0278	T92D36	61520.14	616090.86	975.10	70.10	22.90	SC
0279	T92D37	6061570.94	616309.26	993.80	76.80	13.70	SC
0280	T92D38	6061240.71	615395.99	903.80	42.70	12.10	SC
0281	T92D41	6060077.12	616619.90	936.10	53.90	3.75	SC
0282	T92R06	6060815.25	616470.62	1012.95	152.40	23.17	S
0283	T92R08	6060521.82	616633.30	1003.02	134.10	19.82	S
0284	T92R10	6060317.15	616453.88	952.94	97.50	4.88	S
0285	T92R11	6060218.83	616850.00	971.34	121.90	7.01	S
0286	T92R13	6059946.29	616943.42	933.98	76.20	4.88	S
0287	T92R14	6059936.08	617163.15	937.87	73.10	3.05	S
0288	T92R15	6059796.04	617093.67	924.22	85.30	11.28	S
0289	T92R16	6059786.08	617410.50	921.29	85.30	3.96	S
0290	T92R17	6059906.16	617644.78	931.25	127.70	2.13	S
0291	T92R18	6059633.81	617356.65	904.74	48.80	4.27	S
0292	T92R19C	6059515.16	617647.29	885.33	67.10	4.27	SC
0293	T92R21	6059604.58	617810.40	882.39	134.10	2.74	S
0294	T92R23	6059346.79	617961.49	843.19	164.60	3.05	S
0295	T92R25	6059391.60	617741.39	866.18	79.20	3.05	S
0296	T92R27	6059524.25	618544.12	803.30	48.90	9.75	S
0297	T92R28	6059368.25	618748.78	768.40	60.90	8.69	S
0298	T92R29	6059962.82	618559.11	837.50	48.80	12.20	S
0299	T92R30C	6059032.23	617811.42	812.89	84.20	6.70	SC
0300	T92R33	6059014.25	617644.91	824.10	97.50	9.59	SC
0301	T92D34	6061348.79	615882.90	945.60	121.90	20.92	SC
0302	T92R35	6058956.08	617440.97	830.78	152.40	11.28	S
0303	T92R39C	6051475.29	616954.96	919.43	62.50	2.29	SC
0304	T92R40	6051986.19	617031.65	872.31	67.40	12.80	S
0305	T92R42	6051425.86	616728.78	923.11	28.10	7.25	S
0306	T92R43	6050502.79	617702.55	974.51	85.30	1.83	S

7/29/93

PROJECT	Telkwa		
DATE	Sept.2/92		
HOLE #	T92D-01	CONTRACTOR	J. T. Thomas
SITE #	23	LOGGING CO.	BPB
CORE TYPE	Na	CASING	82 (25 m)
GEOLOGIST	Angelo	LOGGER	Al Brellon

BOX MARK	BCA	CORE STATE	INTERV TH	FROM	TO	SAMPLE#	ROCK TYPE	DESCRIPTION	SED STRUCT.	NOTES
1/25.0			25.00	0.00	25.00		Till			Till & broken rock
30.5	60	Broken	4.85	25.00			Mudstn.	dk. grey massive		Poorly consolidated
2		Broken	2.96				Mudstn.	dk. grey massive		Occ. thin silty beds <3 cm
2/36.0		Broken	2.41				Silty Mudstn.	dk. grey massive		Siltier towards base
2		Broken	0.71				Dirty Siltstn.	dk. grey massive		
3		Broken	2.05				Sandy Siltstn.	med. grey massive		Fining up seq. sandier towards base
3	55	Solid	0.30				Silty SS	thin		Intbd. SS/Siltstn. (60/40)
/42.4	60	Broken	3.44				SS vfg	lt. grey		Common thin siltst beds (<2cm) - fst at top. Carb. lams
4	58	Fractured	5.04				Silty SS fvgr.	lt. grey thin	SSD	Intbd. SS/siltstn (85/15) Minor SSD. Sl. carb.
5/48.8	60	Blocky	1.47				SS fgr.	lt. grey thin	SSD	A/A (70/30) Carb lams.
5		Blocky	1.90				SS vfgr.	lt. grey thin	SSD	A/A (70/30) Carb. lams.
5		Blocky	2.39				Sandy Siltstn.	med. grey v.thin	SSD	Ststn. more common SS/siltstn = 40/60
6	63	Broken	0.91			1	Sandy Siltstn.			Intbd SS/siltstn a/a (30/70) Roof
6		Blocky	0.02			1	Carb. Mudstn.	black massive		Gradational contact w/lower coal
6		Blocky	0.08	53.43	53.51	2	Coal	black		Banded bright/sl. dirty coal
		Blocky	0.65	53.51	54.16	3	Coal	black		Banded bright/dull
		Broken	0.07	54.16	54.23	3	Coal	black		Sl. dirty - dull
6/54.9	56	Blocky	0.18			4	Carb. Ststn.	dk. grey		Floor. Abrupt contact with coal
		Broken	2.62				Sandy Siltstn.	dk. grey v.thin	SSD	Turbated SS/Slststn (25/75) V. Carb. - Coaly
6/57.9		Broken	0.36				vfg. SS	med. grey massive	SSD	Occ. thin turbated siltstn. beds
7	50	Broken	2.30				Sandy Siltstn.	dk. grey		Intbd vfgr. SS/siltstn (25/75)
			0.26			5	Carb. Mudstn.	black		Carb. w. plant debris
			0.09			5	Carb. Mudstn.	dk. brown		Coaly. Roof.
7/61.0			0.36	60.04	60.40	6	Coal	black		Sl. dirty dull
	56		0.69	60.40	61.09	7	Coal	black		Dirtier bands throughout
			0.47	61.09	61.56	8	Coal			Bright clean coal
			0.54			9	Muddy Siltstn.	dk. grey massive		Carb. Floor. 25 cm taken
			0.02				Coal			Clean
8			4.07			10	Muddy Siltstn.			Roof. .25m sampled
			0.46	67.19	67.65	11	Coal	blk.		
			0.20	67.65	67.85	12	Coaly Mudstn.	blk.		
8			1.53	67.85	69.38	13	Coal			Clean, Rare thin dirtier bands
9			0.90	69.38	70.28	14	Coal			Clean. Sl. dirtier at base
9			0.04				Coaly Mudstn.			Floor. V. coaly/mudstn
			1.12				Carb. Siltstn.	dk. grey massive		Floor 25 cm taken
			0.05				Coal	blk.		Dirty
			3.39				Sandy Siltstn.	med. grey thin		Intbd SS/siltstn (40/60) Carb.
9			0.13				Coal			Dirty @ base. Pyritic
10/76.2	64		0.49				Carb. Mudstn.	black		Coaly
			5.33				Siltstn.	dk. grey	SSD	Muddy @ top & grad. to intbd. siltstn & SS @ base
11	67		2.68				Silty Sasn vfgr.	lt. grey	SSD	Intbd SS/siltstn. (75/25)
11			3.17				Sandy Siltstn.	med. grey	SSD	Intbd SS/Siltstn (45/55)
12			0.05	86.74	86.79	15	Coal	blk.		Intbd mudstn/coal (35/65) Pyritic
			0.43	86.79	87.22	16	Coal	blk.		Dirtier @ base

BOX MARK	BCA	CORE STATE	INTERV TH	FROM	TO	SAMPLE#	ROCK TYPE	DESCRIPTION	SED STRUCT.	NOTES
			0.07				Coaly Mudstn.	blk.		Coaly
12/91.5			3.57				Silty SS vfgr.	med. grey thin		Intbd. SS/sltstn (55/45)
12			1.29				Sltst.			Occ. SS thin beds
13			0.09		92.30	17	Carb. Mudstn.	blk.		
			0.11	92.30	92.41	18	Coal	blk.		Muddy & pyritic
			0.27	92.41	92.68	19	Coal	blk.		Dirty & pytitic bands throughout
			0.06	92.68	92.74	20	Coal	blk.		Dirty Pyritic (Very)
			0.46	92.74	93.20	21	Coal	blk.		Clean, pyritic
13			1.55			22	Dirty Sltstn.			25 cm of floor taken
			0.07			23	Carb. Mudstn.	blk.		Coaly
			0.20	94.79	94.99	24	Coal	blk.		Clean
			0.07	94.99	95.06	25	Mudstn.			Coaly
			0.52	95.06	95.58	26	Coal	blk.		Clean
	72		0.26			27	Carb. Mudstn.			Floor. Coaly thin beds
			1.53				Carb. Mudstn.			Silty
			0.13				Coal			Sharp contacts
14	65		0.88				Carb. Sltstn.			Muddy
			0.12	98.35	98.47		Coal			Very dirty - Qtz veining
			0.19	98.47	98.66	28	Carb. Mudstn.			
		V. Broken	0.99	98.66	99.65	29	Coal			Bright banded
			0.06	99.65	99.71	29	Coal			Dirty
			0.09	99.71	99.80	29	Mudstn.			
		V. Broken	0.68	99.80	######	30	Coal			Sl. dirty
		V. Broken	0.80			31	Mudstn.			Siltier @ base. Floor
	45		2.09				Sltstn.		SSD	Intbd. mudst./sltst/vfgr. SS (30/30/40)
15	68		1.72				Sandy Sltst.	thin		Intbd. SS/sltst (50/50)
15/109.80			3.96				Sltst.	massive		
16			1.92				vfgr. SS	massive	SSD	Silty & dirty @ top. Cleaner at base
16			0.20				vfgr. SS	massive		Carb. Bivalves present (<3cm)
16			3.30				vfgr. SS	massive	SSD	Faint bedding traces. Dirty
17	48		4.69				vfgr. SS	massive		Sl. Carb. Occ shell frags @ base
17			0.25				fg. SS	massive		Shell frags & bivalves throughout
17			0.66				SS			Clean f-m. gr. SS. Fining up.
18	62		5.63				mg. SS			Clean f-m. gr. SS w. occ. thin sltstn beds (<1 cm) ripup clods Dirty zone @ 4.10-
19	63		5.77				mg. SS			SS A/A. Minor bioturbetion. Occ. shell debris
20	65		5.80				Carb. SS			A/A ss/sltst = (85/15)
21	63		5.05				Carb. SS			A/A ss/sltst - (85/15) Rare thin coaly/carb. lams. Occ. shell debris.

PROJECT	Telkwa	CONTRACTOR	J.T. Thomas	J. T. Thomas
DATE	Sept. 2/92	LOGGING CO.	BPB	BPB
HOLE#	T92D-02	CASING		82' (25m)
SITE #	26	LOGGER	Al Bretton	Al Bretton
CORE TYPE				
GEOLOGIST	Angelo			

BOX MARK	BCA	CORE STATE	INTERVAL THK	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT.	NOTES
			15.5							Casing to 15.50 m
1&2	64	V. broken	10.88				Sandy siltstn	D. grey,massive		Slightly sandy
3		Broken	5.45				Siltstn	D.grey, massive		
4			5.52				Silty ss,v.fine	Md.grey,massive		
	69		14.76				Siltstn	Massive		Occ thin SS beds near base
54.89	69		2.5				Mudstn	Dk. grey		
7/57.9			3.15				Sandy siltstn	M.grey, v.thin		Inbedded SS/siltstn (60/40 @ top & 30/70 @ base)
7	62									
7	46		6.5				Siltstn			A/A but 10/90
8	75		4.14				Sandstn,v.fine	M.grey, massive		Silty @ top minor SSD
12	45		15.6				Sandy sandstn	M.grey,thin		Inbedded SS/siltstn (20/80)
12	58		1.7				Sandstn	M.grey,thin		Inbedded SS/siltstn (60/40)
14/54.51	40		8.69				Siltstn	M.grey		Inbedded SS/siltstn (30/70)
15	60		5.35				Sandy siltstn	M.grey		Inbedded SS/siltstn (35/65)
15			5.02				Siltstn	Massive		
16		Sheared	0.6	104.34	104.94	1	Mudstn	M.grey,massive		Carb @ top,roof
16		Solid	0.01	104.94	104.95	1	Mudstn	Black		Very carb/coaly
16		Broken	0.42	104.95	105.37	2	Coal	Black		Bright, clean dirtier at base
16		Broken	0.3	105.37	105.67	3	Mudstn	White,massive		Bentonitic mudstn
16		Broken	0.13	105.67	105.8	4	Coal	Black		Possible core loss @ base
		V.broken	0.02	105.8	105.82	5	Mudstn	L.grey,massive		Bentonitic band
16/106.71		V.broken	0.26	105.82	106.08	5	Coal	Black		Dirty throughout
	63		2.35	106.08	108.43	6	Mudstn	D.grey,massive		Sl. carb common plant debris
			0.12	108.43	108.55	7	Coal	Black		Dirty
16/109.76		V.broken	0.44	108.55	108.99	8	Coal	Black		Clean
		Broken	0.54	108.99	109.53	9	Coal	Black		Clean,bright
17/112.80	58	V.broken	2.67			10	Mudstn	D.grey,massive		.25m floor sample taken
17	70		4.33			11	Silty mudstn	D.grey,v.thin		Common vthin lenses of vfg ss. Roof 25 cm sampled
18	70		0.02			11	Carb. Mudstn	Black		Very coaly,dull
			0.26	116.72	116.98	12	Coal	Black		Sl.dirty
			0.11	116.98	117.09	13	Coal	Black		Very dirty - dull pyritic
			1.02	117.09	118.11	14	Coal	Black		Clean bright banding
			0.1	118.11	118.21	15	Coal	Black		Sl. dirty coal
			0.08	118.21	118.29	15	Carb. mudstn	D.grey		Coaly @ top
			0.74	118.29	119.03	16	Coal	Black		Clean through most
			0.07	119.03	119.1	17	Mudstn	Grey		
			0.41	119.1	119.51	18	Coal	Black		Clean, bright, concholdal fract.
18	68		0.99	119.51	120.5	19	Mudstn	M.grey		Plant debris common throughout
			0.47	120.5	120.97	20	Coal	Black		Dirty bands @ top. Pyrite @ top
			0.84			21	Silty mudstn	Massive		Fining upwards - 25 cm taken
	72		8.3				Siltstn	D.grey,v.thin		Inbedded SS/siltstn (40/60)
	78		7.78				Silty ss,v.fine	M.grey ,massive		Siltstn @ top grading to vfg ss. Pyrite lenses @ 2.0m from top. Occ. bivalves
22	70		11.66				Sandstn,v.fine	Massive		Shell frags @ bivalves more common - up to 5 cm. Common shell horizons. Fining upwards overall
24			3.26				Sandstn,mgr.	Massive		Fining upwards overall to c gr. at times. Common rip-up clasts and occ. siltstn beds
24	73		1.67				Sandstn,v.fine			Occ. carb lens T.D.

PROJECT	Telkwa	CONTRACTOR	J.T. Thomas
DATE	Sept. 2/92	LOGGING CO.	BPB
HOLE #	T92D-03	CASING	19.82
SITE #	24.	LOGGER	Al Bretton
CORE TYPE	NQ		
GEOLOGIST	Angelo		

BOX MARK	BCA	CORE STATE	INTERVAL THK	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT.	NOTES
			19.81							Overburden
3/36.59	73	V.broken	15.27				Sandy siltstn	M.grey,massive		Siltstn-v.fine ss,dirty
6/48.78	73	Broken	11.80				Siltstn	D.grey,massive		A/A w. occ thin ss bends @ top
8	75	Blocky	12.74				Slitstn			A/A
9/67.07			3.67				Mudstn.	D.grey,massive		Occ silty
9			1.55				Siltstn	D.grey,massive		
10		Broken	1.87				Silty ss,v.fine	M.grey,massive		
10	72	Blocker	1.76				Silty ss	M.grey,thin		Intbd vfgr ss/sltstn (70/30). Dirtier toward base. Carb lens
11	70	V.broken	1.94			1	Silty mudstn			Intbd vfgr ss/sltstn/mudstn (20/30/50). Overall coarsening up
11		V.broken	0.03			1	Carb.mudstn	Black		
11		V.broken	0.58	75.83	76.41	2	Coal	Black		Clean,occ.dirty band
			0.01	76.41	76.42	3	Carb.mudstn	Black		Transition from coal to mudstn
		Blocky	0.74	76.42	77.16	3	Slitstn	M.grey		
11		Blocky	0.02	77.16	77.18	3	Carb.mudstn	Black		Transition to coal
			0.07	77.18	77.25	4	Coal	Black		Clean, bright
			0.10	77.25	77.35	5	Carb.mudstn	Black		
			0.29	77.35	77.64	6	Coal	Black		Clean
			0.11	77.64	77.75	7	Mudstn	D.grey		
			0.53	77.75	78.28	8	Coal	Black		Clean. Occ. pyrite and thin dirt bands. Possible coal loss @ base
11		Broken	2.92			9	Silty mudstn			Carb. Plant debris throughout 25 cm taken. Grad @ base to slstn
12		Broken	1.43				Siltstn	D.grey		
			0.05					Carb. mudstn		
			0.08							
12	66	Broken	0.90			10	Silty mudstn			Carb @top & base
			0.01			10	Mudstn			Pyrite and mudstn banding in coal
		Broken	0.40	84.03	84.43	11	Coal	Black		Bright,clean
		Broken	0.55	84.43	84.98	12	Coal	Black		Dirty bandings
		Crushed	0.39	84.98	85.37	13	Coal	Black		
		Broken	0.52	85.37	85.89	14	Coal	Black		Clean
		Blocky	0.39	85.89	86.28	15	Coal	Black		Clean
		Blocky	0.02	86.28	86.30	16	Mudstn	Black		
		Blocky	0.58	86.30	86.88	16	Coal	Black		Clean,sl.dirty@ top
			0.03	86.88	86.91	16	Coal	Black		Common pyrite
			0.66	86.91	87.57	17	Coal			Clean
			0.23	87.57	87.80	18	Coal			
			0.61			19	Mudstn	D. grey		Grad. down to slitstn. Floor
	70		1.31				Sandy siltstn	Grey,massive		Grades down to vfgr ss. Carb.
			0.61				Carb mudstn			Plant debris
			0.15				Coal			
			0.86				Carb mudstn			Plant debris. Silty down
	71		10.40				Siltstn	Very thin		Intbd ss/sltstn (25/75) Occ. mdstn. Coaly @ base
16/103.66			0.53				Carb mudstn			Coaly
			1.91				Carb mudstn			Silty @ base
			0.12			20	Mudstn			Coaly,roof

BOX MARK	BCA	CORE STATE	INTERVAL THK	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT.	NOTES
			0.60	105.39	105.99	21	Coal			
			0.30	105.99	106.29	22	Coal			
			0.20	106.29	106.49	23	Carb mudstn			Floor
			0.11	106.49	106.60	23	Coal			Floor cont. mudstn thin bands
			2.88				Siltstn	M.grey,massive		Carb @ base
			0.10	110.43	110.53	24	Coal			Pyrite and mudstn throughout
		Broken	0.38	110.53	110.91	25	Coal	Black		Clean
		Crushed	0.16	110.91	111.07	25	Coal	Black		
			0.20	111.07	111.27	26	Bent.mudstn			Bentonitic mudstn
			0.03				Carb mudstn			
			0.14				Coal			
	83		1.04				Mudstn	D.grey, massive		Plant debris throughout
			0.21				Carb mudstn	Black		Coal(very)
			3.95			27	Mudstn	D.grey, massive		Plant debris throughout roof
		V.broken	0.88	117.05	117.93	28	Coal	Black		Clean
			0.03	117.93	117.96	29	Carb mudstn	Black		Floor,pyrite
			0.59	117.96	118.55	29	Mudstn	D.grey		
			0.35	118.55	118.90	30	Mudstn	D.grey		
			0.01	118.90	118.91	30	Carb mudstn	Black		
			0.23	118.91	119.14	31	Coal	Black		Sl. dirty
			0.19	119.14	119.33	32	Coal			
			0.06	119.33	119.39	32	Carb mudstn	D.grey		Coaly
			0.63	119.39	120.02	33	Coal	Black		Clean, sl. dirtier @ base
	82		1.27			34	Carb mudstn	D.grey		Carb @ top. 25 cm taken floor.
19	82	Blocky	6.12				Siltstn	D.grey,v.thin	SSD	Intbd. ss/siltstn (10/90) Minor SSD
			0.15				Sandstn	Grey		Log deposit
20	83		3.72				Sandstn	L.grey,massive		Occ. coaly thin beds & lens. Some cgr Abrupt lower contact
			1.10				Mudstn	Massive		Sharp lower contact
			0.86				Sandstn			Common carb lens
			2.86				Mudstn	Massive		Occ plant debris Sl. silty
		Blocky	2.89				Carb mudstn			F to m.gr. carb ss carb lens. Occ. rip-up clasts. Abrupt contact
			0.65	139.31	139.96	35	Coal			Clean
			0.02	139.96	139.98	36	Coal			Very dirty coal
			0.15	139.98	140.13	36	Coal			
			0.03	140.13	140.16	36	Mudstn			Coaly
			0.30	140.16	140.46	37	Coal			Dense dull sl. dirty coal
			0.10	140.46	140.56	37	Coal			Dirty coal
			0.50	140.56	141.06	38	Coal			Clean coal
			0.05	141.06	141.11	39	Coal			Pyritic & dirty
			0.26	141.11	141.37	39	Coal			Clean coal
			0.04	141.37	141.41	40	Carb mudstn			
			1.37	141.41	142.78	40	Mudstn			Floor - 25 cm sampled. Carb @ top. Pyrite banding
		Blocky	0.42	142.78	143.20	41	Coal	Black		Pyrite banding
			0.02				Mudstn	Black		Coaly
			0.75				Silty mudstn			Silty towards base
	80	Blocky	7.93				Siltstn	Thin	SSD	Intbd ss/siltstn (45/55) Minor SSD

PROJECT	Telkwa	CONTRACTOR	J. T. Thomas
DATE	Sept. 2/92	LOGGING CO.	
HOLE #	T92D-04	CASING	21.34 m
SITE #	22	LOGGER	
CORE TYPE	NQ		
GEOLOGIST	Angelo		

BOX MARK	BCA	CORE STATE	INTERVAL THK	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT.	NOTES
			21.34							
3/36.99	81		14.57				Silty ss,v. fine	M.grey,thin		Turbated intbd ss/siltstn (75/25). Bivalve horizon @ 2.3m. Pyrite blebs increase toward base.
3	77	V. broken	0.81				Siltstn	M.grey,massive		Sandier @ base
	79		17.13				Silty ss,v.v.fine	M.grey, thin		Common pyrite bleb banding @ 1 - 3 m. Faintly bedded ss/siltstn (55/45). Beds up to 10 cm.
64.02	77		8.64				Siltstn	D.grey,massive		Occ thin ss beds
			6.30				Siltstn	D.grey, massive		A/A- no ss bedding
			0.04				Mudstn			Pyrite/calcite conerations (< 3 cm)
			0.34				Siltstn	Grey,massive		Siltstn A/A
			0.05				Mudstn			Bentonitic mudstn
10/73.17	85	V.broken	1.95				Siltstn	D.grey,massive		
		Blocky	9.55				Siltstn	M.grrey,massive		Fining upwards
	79	Blocky	8.83				Sandstn	M.grey,thin		Intbd ss/siltstn (80/20). Common bands of calcreous concreations. Burrows from 2.0 - 4.5 m (<1 cm diam. & round)
13/94.51			3.08				Siltstn	D.grey, massive		
			0.75			1	Muddy siltstn			Sl. carb @ base. Roof. Abrupt contact w. coal.
			0.23	94.76	94.99	2	Coal			Clean
			0.15	94.99	95.14	3	Carb mudstn			
			0.25	95.14	95.39	4	Coal			
			0.10	95.39	95.49	5	Carb mudstn			Coaly
			0.26	95.49	95.75	6	Coal			Clean
			0.03	95.75	95.78	6	Coal			Very dirty
			0.26	95.78	96.04	7	Coal			
	82		4.51			8	Sandy siltstn	M.grey, thin		Intbd ss/siltstn (45/55) Floor
			2.59			9	Siltstn			Roof 25 cm taken
			0.02			9	Carb mudstn	Black		Coaly roof
		Crushed	0.11	103.22	103.33	10	Coal	Black		
		Blocky	0.88	103.33	104.21	11	Coal	Black		Clean
		Crushed	0.20	104.21	104.41	12	Coal			
			1.88			13	Siltstn			Floor 25 cm taken. Pyrite conerations near top
			1.05			14	Silty mudstn	D.grey		Siltier @ top
			0.04			14	Mudstn	Black		Coaly. Gradational to coal . Roof
			0.39	107.32	107.71	15	Coal			
			0.64			16	Silty mudstn			25 cm taken floor
			0.25			17	Silty mudstn			25 cm taken roof. Carb @ base
			0.62	108.54	109.16	18	Coal	Black		Sl. dirty; Pyrite lenses common
			0.08	109.16	109.24	18	Coal	Black		Very pyritic
			0.23	109.24	109.47	19	Coal	Black		
			0.11	109.47	109.58	19	Carb mudstn	Black		
			0.73	109.58	110.31	20	Coal			Occ sl. dirty bands
			0.04	110.31	110.35	20	Coal	Black		Sl. dirty
		Crushed	0.37	110.35	110.72	21	Coal	Black		Clean, sl. dirty @ top
			0.07			22	Carb mudstn	Black		
			1.17			22	Silty mudstn	D. grey		Plant debrus common @ top
			0.32				Siltstn	Grey		25 cm floor taken
		Blocky	0.05				Coal			
		Blocky	0.10				Carb mudstn	Black		Coaly
		Blocky	0.21				Coal			Sl. dirty
			0.96				Siltstn			
			0.05				Coal			
		Blocky	7.83				Siltstn	M.grey,thin		Inb. ss/siltstn(35/65)
18	76									
			5.94				Siltstn	M.grey,thin		A/A 25/75
	70		3.40			23	Siltstn	D.grey,v.thin		Inb.ss/siltstn(5/95)
		Crushed	0.29	132.98	133.27	24	Coal	Black		
			0.03	133.27	133.30	25	Mudstn			Coaly
		Crushed	0.22	133.30	133.52	25	Coal			Sl. dirty

BOX MARK	BCA	CORE STATE	INTERVAL THK	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT.	NOTES
		Broken	0.21	133.52	133.73	26	Coal			Clean
		Blocky	0.09				Coal			
			0.81			28	Carb siltstn	M.grey,massive		20 cm taken, roof
			0.06			28	Carb mudstn			Roof,coaly
			0.19	135.11	135.30	29	Coal			Clean
			0.05	135.30	135.35	29	Carb mudstn	Black		
		Crushed	0.55	135.35	135.90	30	Coal	Black		
21/137.2			0.74			31	Silty mudstn			22 cm taken. Floor. Silty @ base
	85		2.33				Silty mudstn	D.grey		Plant debris throughout. Silty lens & very thin beds (occ)
			0.10				Coal			Very dirty
			0.59			32	Carb mudstn	D.grey,massive		Plant debris throughout
		Crushed	0.41	139.74	140.15	33	Coal			
		Crushed	0.38	140.15	140.53	34	Coal			
		Broken	0.01	140.53	140.54	34	Sandstn	L.grey		Abrupt upper/lower contacts
		Broken	0.63	140.54	141.17	35	Coal	Black		
		Broken	0.07	141.17	141.24	36	Coal	Black		Very dirty
		Broken	0.47	141.24	141.71	36	Coal	Black		Occ. dirtier bands
		Broken	0.91	141.71	142.62	37	Coal	Black		Clean. Abrupt lower contact
		Crushed	0.15	142.62	142.77	38	Mudstn	D.grey		
		Broken	1.21	142.77	143.98	39	Coal	Black		Dirty bands esp top
		Broken	0.16	143.98	144.14	40	Carb mudstn			Floor
		Broken	0.10			40	Coal			
		Broken	0.07			40	Mudstn			Very coaly
			1.53				Carb mudstn	D.grey		Occ. coaly bands
	86		0.81				Siltstn			Muddy @ top, grad. @ base
			0.49				Silty mudstn			
			0.27				Carb mudstn			Very carb
			4.56				Siltstn	D.grey, massive		
			1.46				Carb sandstn	L.grey,v.thin		Clean s&p w. common carb. lens
			0.08					Coal		
	80		0.16				Carb mudstn			Coaly
			0.22				Sandstn	L.grey		
			0.04				Coal			
			0.46				Mudstn			Carb @ top
			0.15				Coal			Very dirty
			1.99				Silty mudstn	Massive		Carb
			0.53				Carb mudstn	Black,thin		Common coaly beds & stringers
	81		1.43			41	Siltstn			Brecciated @ base. Roof
			0.24	161.06	161.30	42	Coal	Black		Clean
			0.51	161.30	161.81	43	Coal	Black		Clean
			0.04			44	Carb siltstn	Grey		
			0.10			44	Coal	Black		
			3.45			45	Mudstn	Brown		Poorly consol. bentonitic sl.
			0.16			46	carb mudstn	Black		Coaly, roof
			0.37	164.89	165.26	47	Coal	Black		Sl. dirty
		V.broken	0.33	165.26	165.59	48	Coal	Black		Clean
		Broken	0.37	165.59	165.96	49	Mudstn	L.grey, massive		Beutonite
			0.39				Carb mudstn	Black		Very carb with some coal bands
		V. broken	2.78			50	Silty mudstn	D. grey		Roof 25 cm taken
		Broken	0.19	169.23	169.42	51	Coal	Black		Sl. dirty. Pyrite banding
		Broken	0.55	169.42	169.97	52	Coal	Black		Clean
		Crushed	0.41	169.97	170.38	53	Coal	Black		
		V. broken	0.47	170.38	170.85	54	Mudstn			Parting
			0.06	170.85	170.91	55	Coal	Black		
			0.02			55	Mudstn	Black		
		Crushed	0.62	170.93	171.55	55	Coal	Black		
		V.broken	0.57	171.55	172.12	56	Coal			
		V.broken	4.14			57	Mudstn	Grey,massive		Floor
	86		4.02				Siltstn	D.grey,v. thin		Intbd. ss/siltstn/mudst. (5/70/25)
	87		0.92				Sandstn	L. grey		Carb. lens rip-ups
	85		4.95				Siltstn	D.grey,v.thin		Intbd ss/siltstn/mudstn (5/60/35)
	86		4.35				Siltstn	D.grey, v.thin		Intbd ss/siltstn (10/90). Sharp contacts

PROJECT	Telkwa		
DATE	Sept. 2/92	CONTRACTOR	J.T. Thomas
HOLE #	T92D-05	LOGGING CO.	BPB
SITE #	9	CASING	
CORE TYPE	NQ	LOGGER:	Al Bretton
GEOLOGIST	Angelo		

BOX MARK	BCA	CORE STAT	INTERVAL THK	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	STRUCT	NOTES
			19.82	0	19.82					Casing to 19.82 m
1/21.34		Crushed	0.89	19.82	20.71	A001	Siltstn	M.grey ,massive		Non-calc. Disseminated pyrite w/in
1/24.39		V.broken	2.99	20.71	23.70	A002	Siltstn	M.grey,massive		A/A. Occ. pyritic/calcereous nodules (<2 cm dia)
2/27.44	84	V. broken	2.96	23.70	26.66	A003	Siltstn	M.grey, massive		Dirty. Rare disseminated pyrite. Occ. calc. pyritic nodules (<1 cm). Non-calc. matrix
2/30.48		V.broken	3.18	26.66	29.84	A004	Siltstn	M.grey, v.thin		Faintly bedded non-calc. siltstn - no nodules present
3/33.54	88	Broken	2.97	29.84	32.81	A005	Siltstn	M.grey,v.thin		A/A no pyrites
3/36.56		Blocky	3.05	32.81	35.86	A006	Siltstn	Grey,thin	SSD	Minor bioturbation - burrows (1 cm diamter) intbd vfg ss/siltstn
4/39.63	87	Blocky	3.06	35.86	38.92	A007	Siltstn	M.grey,thin	SSD	Minor SSD. Faintly bdd intbd vfg ss/siltstn (18/85) very rare pyrite (dissem.) sl. calc. ss
4/42.68	88	Broken	2.88	38.92	41.80	A008	Siltstn	M.grey,v.thin		A/A No SSD. Calcite vein filling
		Broken	1.54	41.80	43.34	A009	Siltstn			A/A
5/45.73		Crushed	1.00	43.34	44.34	A010	Mudstn	D.grey, massive		Silty towards base - Non-calc.
6/48.78			2.98	44.34	47.32	A011	Dirty siltstn	D.grey,massive		Non-calc.
6/51.83		V.broken	3.06	47.32	50.38	A012	Dirty siltstn	D.grey,v.thin		Faintly intbd siltstn/mudstn (70/30). Non calcereous
7		V. broken	2.00	50.38	52.38	A013	Siltstn			A/A(60/40) siltstn/ss
		Blocky	0.09	52.38	52.47	A013	Mudstn	L.grey,massive		Dense hard calcareous mudstn. Med. persistent effervesee.
7/54.87		V.broken	0.80	52.47	53.27	A014	Silty mudstn	D.grey, massive		Non-calc.
7		Broken	1.55	53.27	54.82	A014	Mudstn	D.grey, massive		Dissem. cubic pyrite (occ.); vfg pyrite clusters (< 1 cm dia.) also present occ. Non-calc.
7		Blocky	0.17	54.82	54.99	A015	Mudstn	L.grey,massive		Rapid Frvs calc. Mudstn. Calcite veining w/in
		Broken	1.88	54.99	56.87	A016	Silty mudstn	D.grey,massive		Non-calc. Gradational toward contact.
7/57.93	78	Blocky	0.52	56.87	57.39	A017	Siltstn	M.grey,massive		Occ. carb. lens. Non-calc.
		Blocky	0.78	57.39	58.17	A017	Siltstn	M.grey,massive		A/A Rapid grad lower contact
			0.67	58.17	58.84	A018	Sandstn, vfgr	L.grey, massive		Moderate slow Frvs. Calc. ss Common calcite veining. Sl. carb., Rare dissem. pyrite
8/60.98	77		1.66	58.84	60.50	A019	Sandstn,f.gr.	L. grey, v. thin		Clean intbd s&p ss/siltstn (95/5) sharp bedding contacts. Minor SSD. Non calc. sl. carb. dissem. cubic pyrite
8/64.02	77	Blocky	2.97	60.50	63.47	A020	Sandstn	L. grey, thin		A/A ss/siltstn (75/25)
		Blocky	0.84	63.47	64.31	A021	Sandstn,vfgr.	L.grey, thin		A/A grad lower contact. Occ. veining
9		Blocky	1.75	64.31	66.06	A022	Siltstn	D. grey, v. thin		Minor SSD, intbd ss/siltstn/mudstn (20/65/15). Sandy @ top grad to muddy siltstn @ base. Common dissem. pyrite
9/67.03		V. broken	0.46	66.06	66.52	A023	Mudstn	D. grey, massive		Occ. pyrite. Roof coal loss?
9		Crushed	0.59	66.52	67.11	1	Coal	Black		
		Broken	0.16	67.11	67.27	A024	Mudstn	D. grey		Plant debris
		Broken	0.07	67.27	67.34	A024	Coal	Black		Dirty
9/70.12		V. broken	2.16	67.34	69.50	A025	Siltstn	D. grey, v. thin		Intbd vfgr ss/siltstn (15/85)
10		Broken	2.34	69.50	71.84	A026	Siltstn	D. grey, v. thin		A/A (5/95). Abrupt bdg contacts. Non-calc. Carb. Dissem. xl pyrite throughout
10		Broken	0.28	71.84	72.12	2	Coal	Black		Clean
10/73.17		Crushed	0.54	72.12	72.66	3	Coal	Black		
		V. broken	2.64	72.66	75.30	A027	Mudstn	M. grey, massive		Floor,non-calc. Occ. veining
		Blocky	0.06	75.30	75.36	A027	Mudstn	Black		Carb, thin coal stringers
		V. broken	0.12	75.36	75.48	A027	Mudstn	M. grey, massive		Non-calc
11/76.22		Broken	0.20	75.48	75.68	4	Coal	Black		
		V. broken	0.15	75.68	75.83	4	Coal	Black		Occ. pyrite stringers
		V. broken	0.17	75.83	76.00	5	Mudstn	Brown, massive		Pyritic nodules w/in. Non-calc. carb @ top
		Broken	0.42	76.00	76.42	6	coal	Black		Clean
		Blocky	0.01	76.42	76.43	7	Coal	Black		Pyrite banding throughout
		Crushed	0.76	76.43	77.19	7	Coal	Black		Well cleated banding. Occ. dull
		Broken	0.39	77.19	77.58	8	Coal	Black		
		Broken	0.02	77.58	77.60	A028	Carb mudstn			Coaly
11		Broken	0.57	77.60	78.17	A028	Siltstn	M. grey, massive		Intbd vfg ss/siltstn (30/70) Non-calc.
11		Broken	0.18	78.17	78.35	A028	Carb. mudstn			Pyrite banding/nodules
			0.02	78.35	78.37	A028	Coal	Black		
11/79.26			0.04	78.37	78.41	A028	Carb mudstn	Black, massive		

BOX MARK	BCA	CORE STAT	INTERVAL THK	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	STRUCT	NOTES
	73	Broken	1.63	78.41	80.04	A029	Mudstn	M. grey, v. thin		Gradational to siltstn w. occ vthin ss bends @ base ss/siltstn/mudstn = 10/60/40. Non-calc.
		V. broken	0.15	80.04	80.19	A030	coal	Black		Clean bright. Carb mudstn @ top
			0.21	80.19	80.40	A030	Carb mudstn	M. grey, massive		Plant debris throughoutn. Non-calc.
			0.10	80.40	80.50	A030	Coal			Bright
12/82.3	82	Crushed	1.11	80.50	81.61	A031	Mudstn	M, grey, massive		Non-calc
		V. broken	0.80	81.61	82.41	A032	Siltstn	M. grey, v. thin		Intbd siltstn/mudstn (60/40) Occ. pyritic/Fe nodules
12/85.37		V. broken	0.85	82.41	83.26	A033	Mudstn	M. grey,thin		Pyrite mineralization throughout Intbd siltstn/mudstn 30/70 - Non-calc.
		Crushed	2.01	83.26	85.27	A033	Mudstn	D. grey, massive		Pyrite dissem throughout. Occ. calcite veining
13		Blocky	0.26	85.27	85.53	A034	Siltstn	L. grey, massive		Calcite veining. Carb. Non-calc.
13/88.41		Crushed	0.88	85.53	86.41	A035	Mudstn	D. grey, massive		Non-calc
		Crushed	1.93	86.41	88.34	A035	Mudstn	D. grey, massive		A/A occ coal bands w/in (<3 cm).
		V. crushed	0.19	88.34	88.53	A036	Coal	Black		Dirty, dull
		Crushed	0.95	88.53	89.48	A036	Mudstn	Massive		Non-calc. Plant debris throughout
13/91.46		Crushed	1.26	89.48	90.74	A036	Carb mudstn	D.grey, massive		Coaly zones
		V. broken	1.48	90.74	92.22	A037	Mudstn	D. grey, massive		Non-caalc. Occ. plant debris
	79	Blocky	0.06	92.22	92.28	A037	Carb mudstn	Black		Coaly mudstn w. pyrite bands (<.5 cm) w/in
		Broken	0.15	92.28	92.43	9	Coal	Black		Clean, bright
		Broken	0.10	92.43	92.53	10	Coal	Black		Very dirty. Pyrite banding
		Broken	0.66	92.53	93.19	11	Coal	Black		Occ. dirtier bands
		Broken	0.55	93.19	93.74	12	Coal	Black		Clean
		Crushed	0.03	93.74	93.77	13	Mudstn	Black		
		Crushed	0.10	93.77	93.87	13	Coal	Black		
		Crushed	0.13	93.87	94.00	A038	Carb mudstn	D. grey, massive		Carb
14/94.5		Crushed	0.04	94.00	94.04	A038	Coal	Black		
			0.79	94.04	94.83	A038	Carb mudstn	D. grey, massive		Non-calc
			0.05	94.83	94.88	A038	Coal			
	80	V. broken	1.29	94.88	96.17	A038	Silty mudstn	D. grey, massive		Plant debris - Non-calc
			0.17	96.17	96.34	A038	Carb mudstn	D. grey, massive		Coaly. Roof pyrite banding grad. contact into coal
		Blocky	0.20	96.34	96.54	14	Coal	Black		Clean, well cleated, bright
14/97.56		V. broken	0.45	96.54	96.99	15	Coal	Black		Dirty bands @ base
		Crushed	0.56	96.99	97.55	16	Coal	Black		V. dirty @ base
		V. broken	0.51	97.55	98.06	A039	Mudstn	massive		Plant debris - Non-calc
		Broken	0.17	98.06	98.23	A039	Coal			
		V. broken	0.51	98.23	98.74	A039	Carb mudstn	D. grey, massive		Pyrite, 2 mm lens in roof
15/100.61		Crushed	1.11	98.74	99.85	17	Coal	Black		Dirty
15/103.65		V. broken	2.88	99.85	102.73	A040	Mudstn	D. grey, massive		Non-calc
16/106.71		Broken	2.93	102.73	105.66	A041	Siltstn	M. grey, v. thin		Intbd vfgr ss/siltstn (15/85)
16/109.76		V. broken	3.31	105.66	108.97	A042	Siltstn	M. grey, thin		Non-calc A/A Occ. fg. ss @ top. Dirtier towards base
		Broken	0.20	108.97	109.17	A043	Mudstn	D. grey, massive		Non-calc
	82	V. broken	2.53	109.17	111.70	A043	Mudstn	D. grey, massive		A/A roof
			0.02	111.70	111.72	A043	Carb mudstn	Black		Roof
		Broken	0.34	111.72	112.06	18	Coal	Black		
17/112.8		Broken	0.25	112.06	112.31	19	Coal	Black		
		Broken	0.18	112.31	112.49	19	Coal	Black		
		Broken	0.02	112.49	112.51	20	Carb mudstn	Black		Coaly
		Broken	0.07	112.51	112.58	20	Mudstn	Grey, massive		Non-calc,coaly
		Broken	0.62	112.58	113.20	21	Coal	Black		Mostly clean
		V. broken	0.30	113.20	113.50	22	Coal	Black		
		Broken	1.09	113.50	114.59	A044	Mudstn	D. grey, massive		Non-calc
			0.31	114.59	114.90	23	Coal	Black		Clean
			0.03	114.90	114.93	24	Carb mudstn			
18/115.85			0.11	114.93	115.04	24	Coal	Black		Clean
18/118.9	78	Broken	3.05	115.04	118.09	A045	Siltstn	M. grey, thin		Intbd vfg ss/siltstn/mudstn (10/50/40). Non-calc. calcite veining
19/							Siltstn	M. grey		
19/121.95		V. broken	3.05	118.09	121.14	A046	Silty mudstn	M.grey, massive		Mudstn minor breccia near base with common calcite vein filling. Minor intbd siltstn @ top. Non-calcereous
19//125		Broken	3.05	121.14	124.19		Carb siltstn	L.grey, massive		Non-calc. Dissem. pyrite. Occasional pyrite banding. Rare shell frags & calcite veining

BOX MARK	BCA	CORE STAT	INTERVAL THK	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	STRUCT	NOTES
20/128.05		Broken	3.00	124.19	127.19		Sandy siltstn	L. grey, massive		A/A with occ coal frags.
20/131.1		Broken	3.05	127.19	130.24		Silty sandstn,vfg	L. grey,massive		A/A Non-calc
			0.74	130.24	130.98		Sandstn, fgr	L. grey, massive		Fractured and calcite veined ss. Clean s&p. Occ. shell frags.
21/134.15			2.20	130.98	133.18		Sandstn. vfg			A/A T.D.

PROJECT	Telkwa	CONTRACTOR	J. T. Thomas
DATE	Sept. 8/92	LOGGING CO.	BPB
HOLE #	T92D-07	CASING	15.24
SITE #	19	LOGGER	Al Bretton
CORE TYPE	NQ	DRILLER	Derrick & Michelle
GEOLOGIST	Angelo		

BOX MAR	BCA	CORE STAT	INTERVAL TH	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUC	NOTES
			15.24							
1/24.39		Crushed	3.84				Mudstn	D.brown,massive		Weathered, major core loss
		V. broken	3.79				Mudstn	D.grey,massive		Carb zones, sl. coaly
	52	Broken	9.47				Silty Mudstn	D. grey, massive		Silty throughout. Fining up, mdstn often grades to sltstn
			0.91				Carb mudstn	Black		Coaly mudstn
			2.89				Silty mudstn	D. grey, massive		Siltier towards base
			1.00				Siltstn	D. grey, massive		
	53	Blocky	11.20				Sandstn,vfgr.	L.grey,massive		Siltier towards base
	68		11.38				Silty ss, vfgr	L.grey, massive		Grad to siltstn
			9.76				Siltstn	M.grey,massive		Finer grained near base. Mudstn massive beds w. grad contacts w/in
11/79.27	63		3.76				Dirty siltstn	M.grey, massive		Disseminated pyrite w/in
			5.14				Silty ss,vfg	M.grey, massive		Discordant fracture
			11.11				Siltstn	M.grey, massive		Clean featureless sltstn
			1.85				Sandy siltstn	M.grey, massive		Gradational to vfgr ss @ base. Occ. thin coal beds (< 1 cm) & pyrite bands near base
	62		1.61				Sandstn, vfg	L.grey, v. thin	SSD	Intbd vfg ss/sltstn (75/25). Minor SSD
		Blocky	3.68				Sandstn, vfg	L. grey, v. thin		A/A but 55/45 overall. Fining up
			0.02				Coal	Black		
	61		2.99				Siltstn	D.grey, v. thin		Intbd vfg ss/sltstn (20/80)
	61		4.70				Siltstn	D. grey, v. thin		A/A but (45/55)
			0.58				Sandstn, vfg	L.grey,med		Intbd vfgr ss/fg ss/occ sltstn
			2.92				Siltstn	M.grey, thin		
			3.48				Siltstn	M.grey, massive		
18			0.74				Sandstn,vfg	L.grey,massive		Faint bedding traces
18	67	Blocky	2.52				Sandy Siltstn	M.grey,massive		Fe nodules/concretions @ 1.70m
19/131.1	60	Blocky	10.23				Siltstn	M.grey, thin		Faintly bedded almost massive Ca/Fe nodules throughout
20										
23/146.34	62	Broken	15.54				Siltstn	M.grey, med.		Intbd vfg ss/sltstn (35/65) ss interbeds up to 10 cm thick. Ca/Fe nodules. Indiv. beds massive
23		Crushed	1.30				Muddy siltstn	D. grey, massive		Sheared massive sltstn w. occ. vfgr ss interbeds
		V. broken	1.97				SSiltstn	D. grey, massive		Sheared A/A. Grad. lower contact
25/155.49	64	V. broken	5.85				Sandstn, vfg	M.grey, v. thin		Intbd ss/sltstn (60/40). X-bdg & SSD sharp contacts on individual bends. Fining up circles. Carb lens.
26/164.63	70	Broken	9.03				Sandy siltstn,vfg	D. grey,v.thin		A/A but (40/60) At base ss/sltstn = 20/80
	73	Broken	2.78				Carb. siltstn	D. grey, v. thin		Thinly intbd ss/sltstn 10/90. Overall fining up. Carbier @ base.
			0.31			1	Carb. siltstn	D.grey, v. thin		Intbd massive sltstn/coal (65/35). Abrupt contact w. coal below. Common pyr. banding (<1cm)
		Blocky	0.45	167.23	167.68	2	Coal	Black		Clean bright. Good cleat. occ. pyrite @ top
		Blocky	0.08	167.68	167.76	3	Coal	Black		Pyrite blebs & bands throughout
		Broken	0.03	167.76	167.79	3	Coal	Gold		V. Pyritic(70%)
		Blocky	0.03	167.79	167.82	4	Coal	Black		Dull, sl. dirty. Sl. pyritic
		Blocky	0.57	167.82	168.39	4	Coal	Black		Clean, bright
		Blocky	0.06	168.39	168.45	5	Coal	Black		50% mudstn intbd w. coal.
		V. broken	0.06	168.45	168.51	5	Coal	Black		Clean, bright
27	69	Broken	1.50			6	Carb. siltstn	D.grey, massive		Plant debris w/in esp @ top.
		Broken	0.20			7	Siltstn	D. grey, v. thin		Pyritic @ top. Dissem. throughout
		Blocky	0.03	170.21	170.24	7	Coal	Black		Dirty pyritic banding. 30% pyrite

BOX MAR	BCA	CORE STAT	INTERVAL TH	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUC	NOTES
		V. broken	0.48	170.24	170.72	8	Coal	Black		Clean
		V. broken	0.67	170.72	171.40	9	Coal	Black		
28			4.31			10	Carb mudstn	D. grey		Coaly, thin bed in upper 2.5 m. 25 cm sampled. Floor Siltier towards base. Sltsn @ base
29	61		1.28				Sandy siltstn	M.grey, massive		Carb. plant debris defines bedding planes
	60	Broken	1.18				Silty ss, vfg	M.grey, v. thin		Carb vthin beds SSD @ base. Intbd ss/sltstn/carb material (50/20/30)
29		Broken	0.85			11	Siltstn	D. grey, massive		Roof. 25 cm sampled. Pyritic
29		Broken	0.26	179.06	179.32	12	Coal	Black		Clean
		Broken	1.37	179.32	180.69	13	Coal	Black		Clean
			0.03	180.69	180.72	14	Coal	Black		Dirty
		Broken	0.74	180.72	181.46	14	Coal	Black		Dirty bands
		V. broken	0.29	181.46	181.75	15	Coal	Black		V. dirty bands
30		Broken	0.22	181.75	181.97	16	Coal	Black		Clean
		Broken	0.99			17	Carb mudstn	D. grey, massive		25 cm floor taken. Sheared
			0.10				Mudstn	Black		Coal bands
	54	Broken	0.35			18	Carb mudstn	D. grey,massive		Pyrite near coal contact. Roof. Thin bands & blebs (< 1 cm)
		Broken	0.21	183.41	183.62	19	Coal	Black		Thin pyrite bands w/in
		Broken	0.47	183.62	184.09	20	Coal	Black		Dull,sl. dirty bands
		Broken	0.69	184.09	184.78	21	Coal	Black		Clean, occ dirty band
		Crushed	0.26	184.78	185.04	22	Coal	Black		Dirty @ base
30		V. broken	0.20	185.04	185.24	23	Bent. mudstn	L.grey		Bent. mudstn,floor
30			2.30				Mudstn	M.grey		Carb. occ. thin ss beds (< 1 cm) @ top
	47	Broken	0.28				Sandstn, fg	L. grey, med.		Occ. carb siltstn
		Broken	0.84			24	Siltstn	D. grey		Plant debris. Pyritic banding @ base. Roof 25 cm taken.
		V. broken	0.03			24	Carb mudstn	D. grey		Rapid grad to coal contact
		V. broken	0.02	188.76	188.78	25	Coal	Black		
		V. broken	0.02	188.78	188.80	25	Mudstn	Black		
		V. broken	0.03	188.80	188.83	25	Coal	Black		
		V. broken	0.03	188.83	188.86	25	Mudstn	Black		Coaly
		Broken	0.72	188.86	189.58	26	Coal	Black		
		Broken	0.15	189.58	189.73	27	Coal	Black		
		Crushed	0.22	189.73	189.95	28	Mudstn			Possible loss
		Blocky	0.43	189.95	190.38	29	Coal			Dirty
		V. broken	0.46	190.38	190.84	30	Coal			Clean
	71		2.65			31	Mudstn			Floor. Lower 67 cm = sltstn
			1.05				Siltstn	L. grey, massive		Overall fining up
			0.03				Coal	Black		
	60		2.77				Sandstn, vfg	M. grey, v. thin	SSD	Intbd ss/sltstn (55/45). Abrupt bedding contact. Minor SSD
			3.03				Carb ss, mg	L. grey, thin		Intbd ss/sltstn (80/20). Rip-up clasts. Carb lens
33/204.26			3.26				Sandstn, fg	L.grey, thin		A/A lower energy
			2.17				Siltstn			A/A but ss/sltstn = 20/80
	68		0.34			32	Muddy siltstn	V. thin		Carb. Abrupt contact w. coal. Intbd sltstn/silty mudstn (15/85)
		Blocky	0.37	206.13	206.50	33	Coal	Black		Pyrite bands (<1 cm) throughout
		Blocky	0.10	206.50	206.60	34	Mudstn	D. grey		
		Crushed	0.11	206.60	206.71	35	Coal	Black		
		Broken	0.04	206.71	206.75	35	Coal			V. dirty
		Broken	0.02	206.75	206.77	35	Carb sandstn			Coaly lens
		Broken	1.07	206.77	207.84	36	Coal			
		V. Broken	0.13	207.84	207.97	37	Coal			Dirty - rare v. thin sltsn banding
			0.82	207.97	208.79	38	Coal	Black		Clean
			0.02	208.79	208.81	39	Siltstn	Grey, med.		
			0.73	208.81	209.54	39	Coal	Black		Clean- occ. dirty

BOX MAR	BCA	CORE STAT	INTERVAL TH	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUC	NOTES
			0.21	209.54	209.75	40	Coal	Black		Dirtier towards base. Rapid grd. contact w. floor
			0.83			41	Siltstn	D.grey,massive		Carb @ top & mudstn
		Blocky	5.82				Siltstn	M. grey, thin		Intbd vfg ss/sltstn (45/55)
	66	Broken	4.85				Sandy siltstn	M. grey, massive		Occ. vfg ss thin beds
36/222.56		Crushed	0.74				Siltstn	Massive		A/A
			12.37				Sandstn, vfg.	L. grey, massive		Occ. coaly frags. Rare bivalves up to 3 cm. T.D.

PROJECT	**Telkwa**	CONTRACTOR	J.T. Thomas
DATE	Sept. 2/92	LOGGING CO.	BPB
HOLE #	T92D-09	CASING	7.62
SITE #	10	LOGGER	Al Bretton
CORE TYPE	NQ		
GEOLOGIST	Angelo		

BOX MARK	BCA	CORE STATE	INTERVAL THK	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT.	NOTES
1/7.62			7.62	0	7.62		Till			Casing to 7.62
		Crushed	1.44	7.62	9.06	A001	Siltstn	D. grey, massive		Fe stained weathered
		V. broken	0.78	9.06	9.84	A001	Silty ss, vfg	L. grey, thin		Intbd ss/siltstn (70/30). Calc. slow, sustained fizz. Sl. carb
1/12.2		V. broken	1.77	9.84	11.61	A002	siltstn	D. grey, v. thin		Weathered Non-calc. Occ. thin beds of vfg ss
	66	V. broken	0.93	11.61	12.54	A003	Siltstn	D. grey, v. thin		A/A ss/siltstn=25/75
2/15.24		V. broken	2.3	12.54	14.84	A004	Silty ss, vfg	M.grey, thin		Intbd. ss/siltstn=50/50
3/18.29		Broken	3.04	14.84	17.88	A005	Siltstn	M.grey, massive		Occ. thin ss beds. Non-calc. Sparse disseminated pyrite
3/21.34	80		3.05	17.88	20.93	A006	Siltstn	M.grey, massive		A/A massive throughout
4/25.23		V. broken	3.15	20.93	24.08	A007	Siltstn	M. grey, massive		A/A
4/27.44		Broken	2.9	24.08	26.98	A008	Siltstn	M. grey, massive		A/A Non- calc
5/30.49		Broken	2.9	26.98	29.88	A009	Siltsn	M.grey, massive		14 cm rapid/short calc zone @ 1.66, CUS to SS
5/33 .53		Broken	3	29.88	32.88	A010	Siltstn	M. grey, massive		Non-calc, sparse pyrite nodules
6/36.59		Broken	3.2	32.88	36.08	A011	Sandstn, v. fine	M. grey, massive		A/A, Occ siltstn beds near top
		Blocky	2.25	36.08	38.33	A012	Sandstn, fine	L. grey, v. thin		Occ. A/A banding, Intbd ss/siltstn (90/10); Occ. carb bands
		Blocky	0.01	38.33	38.34	A012	Mudstn	D. grey,massive		Very carby, non-calc. Roof
		Blocky	0.19	38.34	38.53	1	Coal	Black		Clean
7/39.63		V. broken	0.6	38.53	39.13	2	Coal	Black		Clean
			0.19	39.13	39.32	3	Coal	Black		Dirty banding esp. @ top
7/42.68	77	Blocky	2.76	39.32	42.08	A013	Sandstn,v.fine	M. grey, v. thin		Floor, Intbd ss/siltstn (40/60); Occ. plant debris, 20cm calc. Rapid/sustained
	75		2.8	42.08	44.88	A014	Sandstn, v. fine	M. grey,v. thin		Roof, Occ. plant debris
		Blocky	0.03	44.88	44.91	A014	Mudstn	Black		Very carby
8/45.72		Crushed	0.13	44.91	45.04	4	Coal	Black		Clean
		Blocky	0.35	45.04	45.39	5	Coal	Black		Blean, banded (1) bright (90) dull
		Blocky	0.2	45.39	45.59	6	Coal	Black		Dirty, dull, hardee
		Broken	0.31	45.59	45.9	7	Coal	black		clean
		Broken	1.2	45.9	47.1	A015	Mudstn	D. grey, massive		Roof & floor, plant debris common, Non-calc
		Broken	0.24	47.1	47.34	8	Coal	Black		Clean,clean bands
		Crushed	0.24	47.34	47.58	9	Coal	Black		Dirty, dull
		Broken	0.39	47.58	47.97	A016	Mudstn	D. grey, massive		Plant debris common, carby
		Blocky	0.03	47.97	48	A017	Pyrite	Gold		
2/48.78		Broken	0.25	48	48.25	10	Coal	Black		Pyrite common, bright bands
		Broken	0.18	48.25	48.43	11	Coal	Black		
		Blocky	0.01	48.43	48.44	12	Pyrite	Gold		
		Blocky	0.09	48.44	48.53	12	Coal	Black		Dirty
		Broken	0.82	48.53	49.35	13	Coal	Black		Clean,bright bands
		Blocky	0.26	49.35	49.61	14	Coal	Black		A/A
		Broken	0.22	49.61	49.83	A018	Mudstn	D. grey,massive		Carby
		Blocky	0.47	49.83	50.3	A019	Sandstn, med.	L.grey, fine		Plant debris; ss/siltstn (60/40)
		Blocky	0.13	50.3	50.43	A021	Coal	Black		Dirty; slow/short calc., pyrite
9/51.82		Broken	0.84	50.43	51.27	A022	Siltstn	M.grey, v. thin		Plant debris ss/siltstn (20/80)
		Broken	0.92	51.27	52.19	A023	Sandstn, f.med.	M. grey, v. thin		Non-calc ss/siltstn (70/30)
		V. broken	0.32	52.19	52.51	15	Coal	Black		Pyrite bands
			2.02	52.51	54.53	A024	Mudstn			
10/57.93	82	Broken	3.05	54.53	57.58	A025	Siltstn	M. grey, v. thin		Intbd siltstn/ss (70/30, 20 cm rapid/sustained @ 1.8m
10/60.97	70	Blocky	3	57.58	60.58	A026	Sandstn, fine	M. grey,v. thin		A/A ss/siltstn (80/20)
10/64.02		Blocky	3.04	60.58	63.62	A027	SS/siltstn	M.grey, v. thin		SS/siltstn(30/70), occ. thin calc. veins

BOX MARK	BCA	CORE STATE	INTERVAL THK	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT.	NOTES
11/67.07	75	Blocky	3.05	63.62	66.67	A028	Siltstn/ss, fine	M. grey, v. thin		SS/siltstn(60/40), Occ. calc. bands, rapid/sustained, occ pyr.
12/70.12	73	Blocky	2.99	66.67	69.66	A029	SS/siltstn	M.grey, v. thin		ss/siltstn 10/90, CUS, Bioturbation non-calc
12/73.17		Broken	2.73	69.66	72.39	A030	Siltstn	M. grey, v. thin		Non-calc, occ ss bands
		Broken	1.04	72.39	73.43	A031	Siltstn	D. grey, v. thin		CUS Gradation contact, non-calc
		Broken	0.15	73.43	73.58	16	Coal	Black		
		Broken	0.58	73.58	74.16	17	Coal	Black		Clean
		Broken	0.15	74.16	74.31	18	Coal	Black		SS bands, dirty
		Crushed	0.49	74.31	74.8	19	Coal	Black		
		V. broken	0.15	74.8	74.95	20	Coal	Black		Dirty, occ pyrite
		Broken	0.25	74.95	75.2	A032	Silty mudstn	M.grey,massive		Large pyrite nodules, non-calc.
		Crushed	0.04	75.2	75.24	A033	Mudstn	D. grey-brown		V. soft, carby
13/76.22		Crushed	0.21	75.24	75.45	A033	Mudstn	M.grey		Roof, soft, gradation with coal
		Broken	0.26	75.45	75.71	21	Coal	131 K		
		V. broken	0.47	75.71	76.18	22	Coal	131 K		Dull
		Broken	0.65	76.18	76.83	23	Coal	Black		Pyrite bands occ, very occ calc.
		Blocky	0.12	76.83	76.95	24	Coal	Black		Dirty,pyrite bands
		Broken	1.07	76.95	78.02	A034	Silty mudstn	Black		Abundant plant debris, coal bands
		V. broken	0.54	78.02	78.56	A035	Mudstn	D. grey		A/A
14/79.27		Crushed	0.15	78.56	78.71	A036	Coal	Black		Very dirty
14/82.31		Broken	2.93	78.71	81.64	A037	Siltstn	M.-D. grey		Calc rapid/short ss layers near middle. Abundant plant debris
		Broken	2.57	81.64	84.21	A038	Silty mudstn	A/A		Abundant plant debris, coal leng. 8 cm rapid/sustained calc. ss @ 50 cm Roof
		V. broken	0.16	84.21	84.37	25	Coal	Black		Wide bright bands
15/85.36		Broken	0.48	84.37	84.85	26	Coal	Black		Clean
		Broken	0.19	84.85	85.04	27	Coal	Black		
		V. broken	0.18	85.04	85.22	28	Coal	Black		Dirty
		Broken	0.48	85.22	85.7	A039	Silty mudstn	D. grey		Carby, non-calc
		Blocky	2.87	85.7	88.57	A040	Sandy siltstn	M. grey, massive		Calc viens rapid/short, abundant carby material. Roof
	75	blocky	0.23	88.57	88.8	A041	Siltstn	D. grey		Very carby, very sharp contact @ 75'
		Blocky	0.29	88.8	89.09	29	Coal	Black		Dirty, occ calc short/rapid
		Broken	0.76	89.09	89.85	A042	Silty mudstn			Very carby, common pyrite viens 2%
		Broken	0.26	89.85	90.11	30	coal	Black		Hard
		Broken	0.42	90.11	90.53	31	Coal	Black		Bright bands,clean
		Blocky	0.14	90.53	90.67	32	Coal	Black		Pyrite bands (12%)
16/91.46		Broken	0.22	90.67	90.89	33	Coal	Black		Clean
		Shattered	0.28	90.89	91.17	34	Coal	Black		Dirty
		Broken	0.58	91.17	91.75	A043	Mudstn	D. grey		Abundant plant debris, pyrite blebs near base, Non-calc.
		Broken	0.13	91.75	91.88	35	coal	Black		Abundant pyrite 40%, Non-calc
		Broken	0.3	91.88	92.18	36	Coal	Black		Sl. dirty
		Broken	0.23	92.18	92.41	37	Coal	Black		
		Blocky	0.26	92.41	92.67	A044	Mudstn	D. grey		Carby
		Blocky	0.17	92.67	92.84	A045	Siltstn	D. grey		Abundant pyrite blebs 10%
		Broken	0.97	92.84	93.81	A046	Siltstn	M. grey		Abundant pyrite at 48-67. Plant debris
16/94.52		Shattered	0.11	93.81	93.92	38	Coal	Black		Dirty
		Blocky	0.36	93.92	94.28	39	Coal	Black		Clean
		Crushed	0.32	94.28	94.6	40	Coal	Black		Clean
		Blocky	0.7	94.6	95.3	41	Coal	Black		Dull throughout
		Crushed	0.2	95.3	95.5	42	Coal	Black		
		Broken	0.4	95.5	95.9	A047	Mudstn	D. grey		V. soft, brownish
		Broken	0.78	95.9	96.68	A047	Siltstn	M. grey		SS layers calc rapid/short 50% plant debris. Roof
17/97.56		Blocky	0.33	96.68	97.01	43	Coal	131 K		Very hard, contact gone
		Blocky	0.57	97.01	97.58	44	Coal	black		Hard, clean
		Broken	0.15	97.58	97.73	45	Coaly mudstn	Black		V. coaly
		Broken	0.64	97.73	98.37	46	Coal	Black		Clean, occ. small calc vients rapid/sustained
		Blocky	0.27	98.37	98.64	47	Coal	Black		No contact, small calc. rapid/sustained

BOX MARK	BCA	CORE STATE	INTERVAL THK	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT.	NOTES
17/100.61	70	Blocky	1.32	98.64	99.96	A048	Siltstn	M. grey		ss/siltstn (10/90), ss calc. rapid/short
18/103.64	70	Blocky	2.9	99.96	102.86	A049	Mudstn/siltstn	M.grey		A/A
		Broken	2.52	102.86	105.38	A050	Silty mudstn	M. grey		Occ. ss lens, some ss lens are calc., rapid/sustained
		V. broken	0.24	105.38	105.62	A051	Coarse sandstn	L. grey		Breccia, very calc. rapid/sustained. Roof
18/106.7		Shattered	0.4	105.62	106.02	48	Mudstn/coal	Black		Very dirty, occ pyrite blebs, occ. small calc. veints rapid/short
		Crushed	0.2	106.02	106.22	49	Coal	Black		Bright
		Blocky	0.34	106.22	106.56	50	Coal	Black		1 dirty zone (ss) 1 cm
		Blocky	0.73	106.56	107.29	51	Coal	Black		A/A
		Blocky	0.73	107.29	108.02	52	Coal	black		Calc. not visible throughout rapid/sustained
		Blocky	0.73	108.02	108.75	53	Coal	Black		Calc webs throughout, rapid/short
		Blocky	0.17	108.75	108.92	54	Coal	Black		Calc webs throughout, rapid/sustained
19/109.75		Broken	0.21	108.92	109.13	A052	Mudstn	M. grey		Abundant plant deb.
20/112.8	75	Broken	3.02	109.13	112.15	A053	SS/siltstn	M. grey		Plant debris, calc in some ss rapid/short ss/siltstn (30/70)
20/115.85	75	Blocky	3.04	112.15	115.19	A054	SS/siltstn	M. grey		Possible bioturbation, calc viens rapid/short ss/siltstn (15/85)
21/118.9	70	Blocky	3.05	115.19	118.24	A055	Silty mudstn	M.- D. grey		Calc. ss bands rapid/short
21/121.9		Blocky	2.96	118.24	121.2	A056	Silty mudstn	M.-D. grey		Abundant pyrite blebs, occ. plant debris, occ. calc. webs rapid/short
		Blocky	2.16	121.2	123.36	A057	Siltstn	M. grey		A/A, (Bivalve x 2), bioturbation
		Blocky	0.27	123.36	123.63	A058	Sandstn, fine	D. grey		Smells of oil
22/125		Blocky	0.5	123.63	124.13	A059	Sandstn, fine	L. grey		
		Broken	0.66	124.13	124.79	A060	A/A, fine	L. grey		
		blocky	0.29	124.79	125.08	A060	Sandstn, fine	D. grey		Plant debris
22/128	70	Broken	2.2	125.08	127.28	A060	Sandstn, fine	M. grey		Occ. bivalve, calc. occ short/rapid
23/131.09		Blocky	3.02	127.28	130.3	A061	Silty ss, fine	L. grey		Bivavles, more abundant, calc. occ. Rapid/short

MANALTA COAL LTD.

PROJECT	Telkwa	CONTRACT	J.T. Thomas
DATE	Sept. 2/92	LOGGING C	BPB
HOLE #	T92D-12	CASING	10.67 m
SITE #	7	LOGGER	Al Bretton
CORE TYPE	NQ		
GEOLOGIST	Angelo		

BOX MARI	BCA	CORE STAT	INTERVAL TH	FROM	TO	SAMPLE	ROCK TYPE	DESCRIPTION	SED STRUC	NOTES
1/10.67			10.67							Casing to 10.67.
3/20.73		Shattered	10.06				Volcanics	L. buff,massive		Tertiary Intrusive. Partially weathered diorite w. 30% fg ground mass, 25% qtz, 25% feldspar & 20% ima (esp. weathered)
		V. broken	6.11				Volcanics	L. buff, massive		A/A XLS of feldspar up to 1 cm. Contact w. sedimentary rx = abrupt & undulated. Some contact matamorphism apparent
										Pyrite xls common @ contact zone
			0.01				Mudstn	Black		Zone mixing with intrusive. Slickensides apparent on sed rx side
		Shattered	0.23				Mudstn	D. grey		No apparent alteration like above
4/27.44		Crushed	0.25				Volcanics	Buff		Fe-stained weathered
4/29.57		Crushed	2.10				Silty mudstn	M. grey, massive		Common pyrite banding @ top
5/33.53		V. broken	1.73				Muddy siltstr	M. grey, massive		A/A occ. nodules/concretions
5/		V.broken	3.37				Sandstn, vfg	M. grey, massive		Silty zones
		Broken	0.31				Siltstn	L. grey, massive		V. hard, calcite vein.
6/39.63			2.28				Sandy siltstn	M. grey, massive		
6/42.68		Broken	3.05				Siltstn	M. grey,massive		
7/45.73		Broken	3.03				Siltstn	M. grey,massive		A/A
8/51.83			6.09				Siltstn	M. grey, massive		A/A
			4.84				Siltstn	M. grey, massive		A/A coarsening up
9/57.93	61	V. broken	1.50				Siltstn	D. grey, massive		Sl. carb
		V. broken	7.49				Siltstn	M. grey, massive		
11/67.07			6.13				Silty ss, vfg.	M. grey, massive		
12/73.17			1.95				Siltstn	M. grey, massive		
14/82.32	62		9.43				Siltstn	M. grey, massive		
15/91.46	60	V. broken	110.09				Siltstn	M. grey, massive		Sl. carb. Ocasionally dirty. Mudstn @ base. Coarse up
		V. broken	1.44				Silty mudstn	D. grey, massive		Occ. sheared
16/97.56		V. broken	4.95				Mudstn	D. grey, massive		Sl. Carb. occ. silty
		Broken	0.32				Siltstn	M. grey, massive		
		Broken	0.13				Siltstn	M. grey, massive		
			1.67				Siltstn	M. grey, thin	SSD	Mottled, turbated intbd. ss/sltsn (20/80)
		Crushed	0.23	27.13	27.36	1	Coal	Black		Poor quality. Sheared dirty bands.
			0.03				Carb mudstr	Black		
17/100.61		V. broken	0.81				Mudstn	Grey		Carb @ top. Fining up
	70		1.74				Siltstn	M. grey, v. thin		Intbd vfg ss/sltstn (45/55)
			0.03				Coal	Black		Hard, clean
		V. broken	0.90				Mudstn			
17/103.66		V. broken	0.07				Coal	Black		
		Crushed	0.70				Mudstn	D. grey, massive		
	72		5.08				Sandy siltstn	M. grey, v. thin		Intbd ss/sltstn (50/50). Minor SSD. Overall
	75	Broken	5.75				Siltstn	M. grey, thin		Turbated intbd ss/sltstn (30/70). Faded bedding contacts
20			1.42				Siltstn	D. grey,massive		
			4.42				Silty ss. vfg	M. grey, massive		
22/134.15	64	Broken	10.59				Snady siltstn	M. grey, massive		Occ. thin SS bands up to 7 cm ss/sltstn = 10/90
24/46.34	81	Broken	12.44				Siltstn	D. grey, massive		Occ. zones of calcite veining
	72	Broken	5.65				Siltstn	D. grey, massive		Occ. vfg ss beds up to 8 cm ss/sltstn = 5/95
26		Broken	1.38				Silty mudstn	D. grey, massive		Silty
26/155.49		V. broken	3.12				Siltstn			Intbd sltstn/mudstn (75/25)
		V. broken	2.11				Mudstn	D. grey, massive		Sl. carb. some minor sltstn

BOX MARI	BCA	CORE STAT	NTERVAL TH	FROM	TO	SAMPLE	ROCK TYPE	DESCRIPTION	SED STRUC	NOTES
27	62	Broken	5.00				Siltstn	D. grey, massive		Occ. vfg ss interbeds up to 5 cm
		V. broken	1.78				Silty mudstn	D. grey, massive		Sl. carb, sheared
		Broken	0.99				Siltstn	D. grey, massive		
		Blocky	0.38				Sandstn,vfg	L. grey,massive		
28/167.68		Broken	2.24				Dirty siltstn	Massive		Muddy sltstn occ. calcite veining
	50		0.51				Siltstn	M. grey, v. thin		Intbd ss/sltstn = 30/70
		Broken	0.44				Carb mudstn			Silty - sheared disturbed intbd sltstn 30%
30/176.83										Intbd vfg ss/sltstn/mudstn (10/65/25). Minor SSD. Some calcite veining
	59	Broken	8.05				Siltstn	M. grey, thin		Inb. vfg ss/sltst/mud

PROJECT	Telkwa	CONTRACTOR	McAuley
DATE	Sept. 2/92	LOGGING CO.	
HOLE #	T92R-19C	CASING	
SITE #	12	LOGGER	
CORE TYPE	NQ		
GEOLOGIST	Angelo		

BOX MARK	BCA	CORE STATE	INTERVAL THK	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT.	NOTES
1		Broken	0.14	29.04	29.18	1	Coal	Black		Pyrite banding 1 cm from base
		Broken	0.07	29.18	29.25	1	Mudstn	Black		V. carb
		Broken	0.10	29.25	29.35	2	Coal			Dirty
		Broken	0.35	29.35	29.70	2	Coal			Clean,dirty zones
		Blocky	0.05	29.70	29.75	3	Mudstn			Pyrite banding throughout
		Blocky	0.18	29.75	29.93	3	Coal			Clean
		Crushed	0.26	29.93	30.19	3	Mudstn	D. grey		V. carb @ top
1		Blocky	1.06	30.19	31.25	4	Coal	Black		Clean
2		Blocky	1.17	31.25	32.42	5	Coal	Black		Clean, bright
		Blocky	0.03	32.42	32.45	6	Mudstn	M. grey		Banded with coal 80% rock
2		Blocky	0.53	32.45	32.98	6	Coal	Black		Clean, sl dirtier towards base
3			0.75	32.98	33.73	7	Coal			Coal, clean
			0.02	33.73	33.75	8	Coal			40 % pyrite
			0.12	33.75	33.87	8	Coal			Clean, bright
		Broken	1.41	33.87	35.28		Mudstn	M. grey, massive		Rock loss
3		Broken	0.14	35.28	35.42	9	Coal	Black		Sl. dirty,coal loss
4	2.5	Blocky	1.10	35.42	36.52	10	Coal	Black		Clean
		Blocky	0.68	36.52	37.20	11	Coal	Black		Lower 10 cm sl. dirty
		Blocky	0.04	37.20	37.24		Carb mudstn	D. brown		Bent.
		Blocky	0.05				Mudstn	L. brown		Bent.
		Blocky	0.15				Coal	Black		Clean
		Blocky	0.13				Carb mudstn	D. grey, massive		
4		Blocky	0.57				Siltstn	M. grey		
5										
			2.14				Siltstn	Blue-grey,mass.		3 cm carby bed @ 1.76, pyrite nodules
6		Blocky	0.43	40.38	40.81	12	Coal	Black		Clean
		Blocky	0.56	40.81	41.37	13	Coal			Hard, clean
			0.02	41.37	41.39		Carby mudstn	Earthy br.,bedd.		
			0.67	41.39	42.06		Mudstn	M. grey		
7		Blocky	0.12	42.06	42.18	14	Coal	Black		H2S pyrite banding < 1 cm
			0.85	42.18	43.03	15	Coal	Black		Hard, clean
7			0.63				Mudstn	M. grey,massive		
			0.32				Mudstn	M. grey,massive		
		Blocky	0.04				Coal	Black		Dirty, pyrite bands
			0.85				Mudstn	D. grey, massive		
		Broken	0.05				Coal	Bright black		Pyrite banding < 1 cm
			0.72				Mudstn	Dull black,mass		Abundant pyr bands
							Carb mudstn	Dull black, mass		Pyrite rosettes
8		Blocky	0.14	49.95	50.09	16	Coal	Semi bright blk.		Pyr & calc, dirty
		Blocky	0.17	50.09	50.26	17	Coal	Black		A/A
9			0.12	50.26	50.38		Mudstn	L. grey,massive		Vegetal matter throughout
			1.96				SS, vfg	M. grey, massive		Core loss,calc vein.
		Blocky	1.20	52.34	53.54	18	Coal	Bright black		Hard, clean

BOX MARK	BCA	CORE STATE	INTERVAL THK	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT.	NOTES
			0.05	53.54	53.59	19	Coal	Dull black		Dirty, bedded
		Blocky	0.95	53.59	54.42	20	Coal			Hard, clean
							Carby mudstn	Earthy br. bedd		
10							Siltstn	M. grey		Hard, core loss

PROJECT	Telkwa	CONTRACTOR	J.T. Thomas
DATE	Sept. 2/92	LOGGING CO.	BPB
HOLE #	T92D-20	CASING	82' (25m)
SITE #	3	LOGGER	Al Bretton
CORE TYPE	NQ		
GEOLOGIST	Angelo		

BOX MARK	BCA	CORE STATE	INTERVAL THK	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUC	NOTES
1			12.40	0	12.4					Casing
			0.20	12.4	12.60	A001				Tertiary intrusive. Probably from till
		V. broken	0.25	12.6	12.85	A001	Mudstn	M. grey		
		V. broken	0.18	12.85	13.03	1	Coal	Black		Possible coal loss. Dirty @ base
			0.67	13.03	13.70	A002	Mudstn	Massive		Silty, sl. carb. Non-calc
1		V. broken	0.28	13.7	13.98	2	Coal	Black		V. dirty @ top
1/15.24		Crushed	0.83	13.98	14.81	3	Coal	Black		Minor pyrite along cleats. Dirty banding
		Broken	0.90	14.81	15.71	A003	Mudstn	Grey,massive		Non-calc
1		Crushed	1.28	15.71	16.99	4	Coal	Black		Possible core loss? Rock bands up to 1 cm w/in
		Crushed	0.15	16.99	17.14	5	Mudstn	Black		V. coaly
		Crushed	0.24	17.14	17.38	5	Coal	Black		
		Broken	0.58	17.38	17.96	A004	Carb mudstn	D. grey,massive		Coaly @ top 10 cm. Pyrite banding near coal contact.
1/18.3		Broken	0.07	17.96	18.03	6	Coal	Black		
1			0.52	18.03	18.55	6	Coal	Black		Clean
1			0.10	18.55	18.65	7	Coal	Black		Sl. dirty
1			0.10	18.65	18.75	7	Coal	Black		Clean
			0.76	18.75	19.51	8/9	Coal			
2			0.74	19.51	20.25	A005	Carb mudstn			Plant debris; sl calc. Rapid short fizz.
2			3.43	20.25	23.68	8	Coal			Poorly consol.
3			1.02	23.68	24.70	A006	Mudstn			Plant debris w/in . Some silty zones upt to 20cm. No visible pyrite
			0.25	24.7	24.95	A006	Coal			
3/27.40	60	Broken	1.77	24.95	26.72	A006	Silty mudstn	D.grey, massive		
3		V. broken	0.03	26.72	26.75	A006	Carb mudstn	Black		Coaly @ base. Non-calc.
3		Broken	0.05	26.75	26.80	A006	Coal	Black		Dirty
3		V. broken	0.71	26.8	27.51	A007	Carb mudstn			Minor pyrite banding @ top
			0.72	27.51	28.23	10	Coal			Dirty @ base. Intbd carb. mudstone
			1.27	28.23	29.50	A008	Carb mudstn	D. grey		Carb @ lower 7 cm
3/30.48			0.80	29.5	30.30	11	Coal			Clean
			1.08	30.3	31.38	A009	Mudstn	M. grey,massive		Clean,sl. dirty bands
4		Broken	0.42	31.38	31.80	12	Coal	Black		Clean, hard
			0.76	31.8	32.56	13	Coal			
4/33.54		Broken	0.54	32.56	33.10	14	Coal	Black		Sl. dirty
			0.70	33.1	33.80	15	Coal	Black		Carb @ top. Silty towards base Poorly consol. Non-calc. Calcite veining upto 1 cm @ base
		Broken	0.36	33.8	34.16	16	Coal	Black		Some vfg ss w/in. Non-calc. Sandier towards bottom
		Broken	1.26	34.16	35.42	A010	Silty midstn	M. grey,massive		Intbd fg. & vfg ss. Non-calc
4/36.58		Broken	0.60	35.42	36.02	A011	Siltstn	M. grey, massive		Intbd vfg ss/siltstn (80/20). Siltier toward base. Carb lens. Non-calc.
4	82	Broken	1.19	36.02	37.21	A011	Sandstn,fg	L. grey, thin		A/A but 65/35
5/39.63	83	Broken	1.86	37.21	39.07	A012	Sandstn,fg	L. grey, v. thin		Intbd siltstn/carb mudstn
		Broken	0.94	39.07	40.01	A012	Sandstn	L.grey,v. thin		Coaly mudstn
		Broken	0.04	40.01	40.05	A013	Mudstn			
		Broken	0.09	40.05	40.14	A013	Carb mudstn	Black,massive		
		Broken	0.44	40.14	40.58	A013	Mudstn	M. grey,massive		Coal loss? Dirtier bands. Occ. pyrite.
		Crushed	0.27	40.58	40.85	17	Coal	Black		Clean
		Crushed	0.29	40.85	41.14	18	Coal	Black		Pyrite bands up to 1/2 cm @ top.
		Blocky	0.30	41.14	41.44	19	Coal	Black		Very coaly.
		Blocky	0.17	41.44	41.61	20	Coal	Black		
		Blocky	0.04	41.61	41.65	21	Mudstn	Black,massive		Dirty @ top. Calcite veining

BOX MARK	BCA	CORE STATE	INTERVAL THK	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUC	NOTES
		Broken	0.10	41.65	41.75	21	Mudstn	M.grey, massive		Non-calc. Disseminated pyrite
		Blocky	0.17	41.75	41.92	21	Coal	Black		A/A. Occ. pyrite blebs (<1 cm). Intbd siltstn
5/42.68		Broken	0.21	41.92	42.13	A014	Mudstn	M. grey, massive		Sl. dirty banding. Based 5 cm are dirtier w. intbd mudstn
		Broken	0.21	42.13	42.34	A014	Silty mudstn	M. grey, v. thin		Intbd ss/siltstn/mudstn (10/40/50) carb. Plant debris throughout. Non-calc.
		Blocky	0.52	42.34	42.86	22	Coal	Black		Coaly @ base
	72		0.86	42.86	43.72	A015	Mudstn	M. grey, thin		Carb mudstn. Plant debris
			0.08	43.72	43.80	A015	Carb mudstn	Black		Intbd non-calc. ss/siltstn/mudstn (25/55/20)
		Broken	1.22	43.8	45.02	A016	Mudstn	M. grey,massive		Non-calc
		Broken	1.57	45.02	46.59	A016	Siltstn	M. grey,v. thin		Intbd ss/siltstn/mudstn (35/45/20). Non-calc. Occ. disseminated pyrite throughout.
		broken	0.52	46.59	47.11	A017	Silty mudstn	M. grey,massive		Plant debris throughout. Non-calc. Common v.thin coal bands < 1 cm.
6/48.78	80		1.04	47.11	48.15	A017	Siltstn	M. grey,v. thin		Coaly throughout. Dissem. pyrite
		Broken	1.82	48.15	49.97	A017	Silty mudstn	D. grey, thin		Pyrite bands throughout up to 3 cm - 60% pyrite
		Broken	0.30	49.97	50.27	A018	Mudstn	D. grey		Mudstn bands up to 2 cm.
		Blocky	0.09	50.27	50.36	A018	Coal	Black		Non-calc. Dissem. pyrite
			0.08	50.36	50.44	A018	Coal	Black		Occ. coal bands. Dissem. pyrite. Occ. pyrite blebs up to 1 cm w/in. Plant debris
7/51.83		Broken	0.80	50.44	51.24	A018	Mudstn	M. grey,massive		Very dirty coal. Common mudstn banding. Possible loss.
		Broken	1.15	51.24	52.39	A018	Silty mudstn	M. grey,massive		Sl. dirty. Dull banding
		Crushed	0.69	52.39	53.08	23	Coal	Black		Clean bright, w. occ. dull bands. Occ. pyrite blebs
		V. broken	0.22	53.08	53.30	24	Coal			Dull
8/54.88		Blocky	1.12	53.3	54.42	25	Coal	Black		Dull bands up to 5 cm.
		Blocky	0.22	54.42	54.64	26	Coal	Black		Clean
		Broken	0.45	54.64	55.09	26	Coal	Black		Clean
		Blocky	0.61	55.09	55.70	27	Coal	Black		Intbd vfg ss/siltstn (30/70)
			0.21	55.7	55.91	28	Coal	Black		Non calc. Floor #2
8		Blocky	1.22	55.91	57.13	A019	Siltstn	M.grey,v. thin		Non-calc. Clean
8/57.93		Blocky	0.28	57.13	57.41	A020	Sandstn,vfg	L. grey, thin		Intbd ss/siltstn. Minor calcite veining. ss/siltstn = 45/55
	78		2.62	57.41	60.03	A020	Siltstn	L. grey, v. thin		A/A Minor SSD. ss/siltstn = 30/70
9/64.02	80		3.44	60.03	63.47	A021	Siltstn	L. grey, v. thin		Sandy siltstn. Occ. calcite veining
10/67.07			3.10	63.47	66.57	A022	Siltstn	M. grey,v. thin		Sl. carb. Common bivalve horizons up to 15 cm bends. Occ. pyrite blebs. T.D.
			7.95	66.57	74.52		Siltstn	L. grey, massive		
13			10.61	74.52	85.13		Silty ss, vfg	L. grey, massive		

PROJECT	**Telkwa**	CONTRACTOR	J. T. Thomas
DATE	Sept. 2/92	LOGGING CO.	BPB
HOLE #	T92D-22	CASING	
SITE #		LOGGER	Al Bretton
CORE TYPE	NQ		
GEOLOGIST	Angelo		

BOX MARK	BCA	CORE STATE	INTERVAL THK	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT	NOTES
1/7.62			7.62	0	7.62					Casing
1/9.15		V. Broken	1.00	7.62	8.62	A001	Sltstn	Medium grey, Massive		Dissemented/xln pyrite throughout; Non-calc.
		V. Broken	1.61	8.62	10.23	A002	Sltstn	Medium grey, Massive		A/A
		Blocky	0.14	10.23	10.37	A002	fgr SS	Medium grey, Massive		Disseminated pyrite A/A., Non-calc.
	83 Deg.	Broken	1.26	10.37	11.63	A002	Sltstn	Medium grey, Vthin		Interbedded ss/sltstn .15/88 v. thin bdd to lenticular ss lenses
1/12.20		Broken	0.68	11.63	12.31	A002	Sltstn	Medium Grey		A/A
		Broken	0.14	12.31	12.45	A002	fgr silty SS	Light Grey		Higher energy, rip-up clasts, etc. Non-calc. Coal and plant debris
			0.29	12.45	12.74	A003	Sltstn	Medium grey, Vthin		Intbd. ss/sltstn 10/90. Carb diss pyrite throughout
1	79	Broken	0.32	12.74	13.06	A003	Carb. SS, fgr	Grey, Vthin		Non-calc., clean
	59	Broken	0.40	13.06	13.46	A003	Sltstn	Medium grey, Vthin		Clean intbd ss/sltstn, 35/65; thin coal bands up to 1 cm
2/15.24		Broken	1.22	13.46	14.68	A003	Sltstn	Medium grey, Vthin		SS/sltstn = 5/95; dirtier at base
2/18.29		Broken	3.05	14.68	17.73	A004	Sltstn	Medium grey, Vthin		A/A
	62	Broken	2.94	17.73	20.67	A005	Carby sltstn	Medium grey, Vthin		Intbd ss/sltstn (10/90 @ top and 50/50 @ base) Disseminated pyrite often associated w. carb lens
3/21.34	81	Broken	0.18	20.67	20.85	A005	Vfgr SS	Light grey, thin		Carb lens Occ. pyrite, non-calc.
3/24.39		Broken	3.05	20.85	23.90	A006	Vfgr SS	Vthin		Massive @ top to v thinly bd @ base, Non-calc Vein filling common. Rapid sustain fizz (FRVs)
		Broken	3.00	23.90	26.90	A007	Silty SS	Medium grey, Vthin		Intbd SS/Sltstn 55/45. Non-calc. Disseminated pyrite throughout
	70	Broken	0.33	26.90	27.23	A008	Sltstn	Light grey		Sandy A/A 45/55. Abrupt contact with coal
		Blocky	0.42	27.23	27.65	1	Blk coal			Clean, bright, Minor sltstn lenses @ top 2 cm.
		Broken	0.05	27.65	27.70	A009	Carb. mudstn	Dark grey, massive		
		Broken	2.36	27.7	30.06	A009	Silty ss, vfgr	Medium grey, vthin		Intbd ss/sltstn 55/45, non-calc.
5/33.53			2.87	30.06	32.93	A010	SS, vfgr	Medium grey, vthin		A/A, Occ. calcite veining
			2.12	32.93	35.05	A011	Sandy sltstn	Medium grey, vthin		A/A, 40/60, V. thin coal banding @ base
		Crushed	0.29	35.05	35.34	2	Coal	Black		Dirty banding w/in. especially @ top, pyrite banding @ base.
		Blocky	0.01	35.34	35.35	2	Sltstn	Medium grey		
		Broken	0.54	35.35	35.89	3	Coal	Black		Clean
		Very broken	0.35	35.89	36.24	4	Coal	Black		Clean
		Broken	0.35	36.24	36.59	5	Coal	Black		Thin pyrite banding esp. @ top. Pyrite along cleat faces
		Broken	0.38	36.59	36.97	A012	Mudstn	Dark grey, massive		Plant debris, Pyrite blebs up to 1.5cm. Non-calc. carb. Disseminated pyrite as well.
	78	Very broken	1.41	36.97	38.38	A012	Silty mudstn	Medium grey, v.thin		Non-calc.
		Broken	0.04	38.38	38.42	A012	Carb. mudstn	Black, massive		Coaly
		Broken	0.12	38.42	38.54	6	Coal	Black		Clean, bright
		Crushed	0.08	38.54	38.62	6	Mdstn	Brown		
		Broken	0.26	38.62	38.88	7	Coal	Black		Clean, bright
		Very broken	0.32	38.88	39.20	8	Coal	Black		Dull banding throughout
		Broken	0.65	39.2	39.85	9	Coal	Black		Bright, duller near base
		Blocky	0.04	39.85	39.89	10	Carb. mdstn	Black		Gradational from coal to unit below. Coaly
	80	Blocky	0.04	39.89	39.93	10	Volcanics	Medium brown		Pyroclastic fallout. Volcanics with carby wisps throughout. Feldspar xls up to 1mm dia.
			0.01	39.93	39.94	10	Carby mdstn	Black		Zone of mixing
		Broken	0.78	39.94	40.72	11	Coal	Black		Clean

BOX MARK	BCA	CORE STATE	INTERVAL THK	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT	NOTES
		Crushed	0.14	40.72	40.86	A013	Mudstn	Black		Very carb. mudstn. Sheared. Thin coal bends up to 1 cm @ top
		Very broken	0.68	40.86	41.54	A013	Mudstn	Dark grey		Very carb. A/A coaly @ base. Pyrite common as thin bands and along fracture planes @ base. Non-Calc. coaly @ base
7		Crushed	0.17	41.54	41.71	12	Coal	Black		Dirty
7/42.68			0.07	41.71	41.78	A014	Silty mudstn	Medium grey		Plant debris throughout. Non-calc.
			1.56	41.78	43.34	A014	Silty mudstn	Dark grey		Sheared black coal mudstn common esp. towards base
		Crushed	0.70	43.34	44.04	13	Coal	Black		Dull banded coal.
7/45.73		Very broken	0.96	44.04	45.00	14	Coal	Black		Bright w. occ dull bands. Dirtier towards base
		Crushed	0.91	45	45.91	15	Coal	Black		
		Crushed	0.02	45.91	45.93	15	Mudstn	Brown		
		Broken	0.62	45.93	46.55	16	Coal	Black		
	65		0.20	46.55	46.75	A015	Mudstn	Dark grey, massive		Non-calc.
8/48.78	50	Broken	1.43	46.75	48.18	A016	Silty ss	Medium grey, vthin	SSD	Intbd ss/sltstn 60/40; non-calc. Dips steepening
	10		1.50	48.18	49.68	A017	Silty ss	Medium grey, vthin	SSD	A/A. Common calcite veining
	58		1.75	49.68	51.43	A017	Silty ss	Medium grey, vthin	SSD	A/A 65/35. R.W. up; siltier towards base
9/54.88		Very broken	2.80	51.43	54.23	A018	Sltstn	Medium grey, vthin		Intbd ss/sltstn 25/75. Mudstn towards base. Non-calc. Common calcite vein filling
9/57.92		Very broken	3.05	54.23	57.28	A019	Sltstn	Medium grey, vthin		A/A Non-calc.
		Very broken	0.98	57.28	58.26	A020	Sltstn	Medium grey, vthin		A/A
		Blocky	0.06	58.26	58.32	A020	Carby mudstn	Dark grey, massive		
	77	Blocky	0.42	58.32	58.74	A020	Sltstn	Medium grey, vthin	SSD	Intbd ss/sltstn 45/55; Minor turbation.
10/60.98		Blocky	1.65	58.74	60.39	A020	SS, fgr	Light grey, thin		Non-calc. sl. carb.
		Blocky	1.70	60.39	62.09	A021	SS, vfgr	Medium grey, thin	SSD	A/A but vfg and some SSD. Calcite veining fg @ base
			0.25	62.09	62.34	A021	Carby mudstn	Dark grey		Coaly thin beds up to 0.5 cm
10/64.02		Very broken	1.09	62.34	63.43	A021	Silty ss, vfgr	Medium grey, thin		Dirty non-calc.
		Very broken	0.34	63.43	63.77	A022	Sltstn	Medium grey, thin		Carb @ base.grad. to coal Non-calc. bone
		Broken	0.25	63.77	64.02	17	Coal	Black		Dirty banding near top. Occ thin pyrite lenses up to .5cm
			0.37	64.02	64.39	18	Coal			Coalbed methane sample #3
		Broken	0.65	64.39	65.04	19	Coal	Black		Clean
		Very Broken	0.12	65.04	65.16	20	Mudstn	Dark grey		Coaly. Pyritic dissem. Non-calc pyrite lens @ base
		Blocky	0.38	65.16	65.54	21	Coal	Black		Clean
			0.04	65.54	65.58	A023	Mudstn	Black		Carb mudstn; Disseminated pyrite w/in.
11/67.02			0.81	65.58	66.39	A023	Sltstn	Medium grey, vthin		Intbd vfg ss/sltstn 30/70
	80	Broken	0.97	66.39	67.36	A023	Sltstn	Medium grey, vthin.		A/A non-calc.
		Crushed	0.34	67.36	67.70	22	Coal	Black		
		Crushed	0.32	67.7	68.02	23	Coal	Black		
		Broken	0.35	68.02	68.37	24	Coal	Black		Clean
			0.02	68.37	68.39	A024	Mudstn	Black		Coaly
12/70.12		Very broken	1.25	68.39	69.64	A024	Mudstn	Dark grey, massive		Non-calc. siltier towards base. Dissem. pyrite
			0.20	69.64	69.84	A025	Mudstn	Dark grey, massive		
			0.04	69.84	69.88	A025		White		Brecciated calcite veining throughout vfg ss/sltstn (10/90) . Non-calc.
12/73.17	72	Very broken	2.87	69.88	72.75	A025	Sltstn	Dark grey, vthin		Intbd vfg ss/sltstn (10/90). Non-calc.
			1.36	72.75	74.11	A026	Sltstn	Dark grey, massive		A/A fining up at base
	65		0.16	74.11	74.27	A026	SS	Light grey, vthin		Intbd ss/sltstn (75/25). Fining up
13/76.2	35		1.53	74.27	75.80	A026	SS, mg	Light grey, massive		Clean, well-sorted S&P.SS. Non-calc. carb lens @ Rip-ups
13/79.27		Blocky	3.05	75.8	78.85	A027	SS, mg	Light grey, massive		A/A
14/82.31		Blocky	3.05	78.85	81.90	A028	SS, mg	Light grey, massive		A/A
		Broken	0.19	81.90	82.09	A029	Sltstn	Dark grey, massive		50% calcite veining
		Very broken	0.78	82.09	82.87	A029	Mudstn	Medium grey, massive		Non-calc.
		Crushed	0.15	82.87	83.02	25	Coal	Black		Clean at top
			0.40	83.02	83.42	26	Coal	Black		Coalbed methane sample #4
		Crushed	0.26	83.42	83.68	27	Coal	Black		Dirty banding
			0.11	83.68	83.79	A030	Mudstn	Light grey		Bentonitic mudstn
	78	Very broken	0.48	83.79	84.27	A030	Sltstn	Medium grey, thin		Non-calc.
14/85.37		Blocky	0.51	84.27	84.78	A030	SS, vfgr.	Light grey, massive		Occ. silty lens. Non-calc.

BOX MARK	BCA	CORE STATE	INTERVAL THK	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT	NOTES
		Blocky	0.07	84.78	84.85	A031	SS, vfg.	Light grey, massive		A/A
		Blocky	0.11	84.85	84.96	A031	SS	Light grey, massive		A/A but calc. rapid short fizz
		Blocky	0.57	84.96	85.53	A031	SS, vfg.	Light grey, massive		A/A Non-calc.
		Blocky	1.68	85.53	87.21	A031	SS, vfg.	Light grey, massive		A/A Carb. lens & sltstn lens; increase towards base
15/88.41	76	Very broken	0.88	87.21	88.09	A031	Silty mdstn	Medium grey, thin		Non-calc.
		Very broken	0.03	88.09	88.12	A031	Carby mudstn	Dark grey		Very thin pyrite banding
		Crushed	0.57	88.12	88.69	28	Coal	Black		Sl. dirty
		Crushed	0.70	88.69	89.39	29	Coal			
		Broken	0.80	89.39	90.19	A032	Sltstn	Med grey, vthin		Intbd ss/sltstn 40/60. Non-calc.
		Broken	0.34	90.19	90.53	A032	Mudstn	Med. grey, massive		Carb @ base
		Broken	0.31	90.53	90.84	30	Coal	Black		Clean
			0.40	90.84	91.24	31	Coal	Black		Coalbed methane Sample #5
		Broken	2.26	91.24	93.50	A033	Mudstn	Med. grey, massive		Silty @ base. Non-calc.
16/94.51			0.52	93.5	94.02	A033	SS	Med. grey, massive		Sltstn to vfg ss @ base
	75	Blocky	2.35	94.02	96.37	A034	SS, Sandy	Med. grey, massive		A/A Non-calc. Calcite. Veining at top. Sandier and sl. carb & base
17/97.56			0.75	96.37	97.12	A034	SS, silty	Med. grey, thin		Faintly bdd ss carb Non-calc. Plant debris
	84	Blocky	1.30	97.12	98.42		SS	Lt. grey, massive		Rip-up clasts and occ. carby lens. Fining upwards
17/100.61		Broken	1.87	98.42	100.29		Sltstn	Med. grey, vthin		Intbd ss/sltstn 15/85. Non-calc.
		Broken	3.10	100.29	103.39		Sltstn	Med. grey, vthin		A/A 5/95. Muddier toward base. T.D.

PROJECT **Telkwa**
DATE Sept. 2/92
HOLE # T92D-24
SITE # 101
CORE TYPE NQ
GEOLOGIST Angelo

CONTRACTOR J. T. Thomas
LOGGING CO. BPB
CASING 22.86m
LOGGER Al Bretton

BOX MARK	BCA	CORE STATE	INTERV TH	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT.	NOTES
1			22.86	0	22.86					Casing
1/24.39	75	Very broken	0.87	22.86	23.73	A001	Sltstn	Medium grey		Weathered, Mixed with till
1/27.44	76	Broken	3.05	23.73	26.78	A002	SS, vfg	Medium grey, vthin		Intbdd ss/sltstn (55/45). Bands up to 6cm but mainly <1 cm. w. sharp contacts. Dissem. xlln pyrite. Non-calc., Carb.
2/30.49		Broken	3.05	26.78	29.83	A003	Silty ss, vfg	Medium grey, vthin		A/A
		Broken	0.79	29.83	30.62	A004	Sltstn	Medium grey, vthin		A/A but 35/65 & bedding contacts less sharp. Carb
			0.08	30.62	30.70	1	Coal	Black		Abrupt contact with upper rock. Sl. dirty coal with occ. bands of up to 5 cm of mudstn within coal. Pyrite lens
		Broken	0.56	30.70	31.26	2	Coal	Black		Cleah
		Blocky	0.20	31.26	31.46	A005	Carb mudstn	Dark grey		Coaly @ base - 3cm - silty
2/33.53		Broken	1.40	31.46	32.86	A005	Silty ss	Medium grey, vthin		Carb non-calc. Faintly intbd to 1 cm ss/sltstn = 55/45. Pyrite blebs @ top and Dissem pyrite throughout.
3/36.59	70	Broken	2.98	32.86	35.84	A006	Sltstn	Medium grey, vthin		A/A but ss/sltstn = 40/60. Dissem pyrite only. Plant debris
		Broken	0.80	35.84	36.64	A007	Sltstn	Medium grey, massive		Non-calc.
		Very broken	0.12	36.64	36.76	A007	Mudstn	Black, massive		Carb mudstn
		Very Broken	0.16	36.76	36.92	3	Coal	Black		Sl. dirty @ top 3 cm.
		Broken	0.52	36.92	37.44	4	Coal	Black		Dirty bands up to 1 cm.
		Very broken	0.28	37.44	37.72	5	Coal			Dirty @ base 2 cm
		Very broken	0.02	37.72	37.74	A008	Carby mudstn			Coaly
		Very broken	0.93	37.74	38.67	A008	Sltstn	Medium grey, thin		Non-calc. Rare calcite veining
			0.13	38.67	38.80	A008	Coal	Black		Intbd coal/rock (50/50)
3/39.63	76		0.21	38.8	39.01	A008	Sltstn	Medium grey, massive		Non-calc.
		Broken	0.49	39.01	39.50	A009	Sltstn	Medium grey, massive		A/A
			0.06	39.5	39.56	A009	Mudstn	Black, massive		Very carb R.
		Broken	0.41	39.56	39.97	6	Coal	Black		Clean
		Broken	0.35	39.97	40.32	7	Coal	Black		Clean, sl. dirty at base
		Broken	1.10	40.32	41.42	A010	Mudstn	Dark grey		Silty @ top. Non-calc.
			0.19	41.42	41.61	A010	Coal	Black		
		Blocky	0.32	41.61	41.93	A010	Carby Mudstn	Dark grey, massive		Carb/coal lens throughout
		Blocky	0.98	41.93	42.91	A011	Silty Mudstn	Massive		Carb. A/A Non-calc. V. carby at base
			0.15	42.91	43.06	A011	Coal	Black		Dirty banding
	72	Broken	1.36	43.06	44.42	A011	Silty mudstn	Dark grey, massive		
		Broken	0.23	44.42	44.65	8	Coal	Black		Bright and clean
4/45.73		Crushed	0.42	44.65	45.07	9	Coal	Black		A/A
		Blocky	0.15	45.07	45.22	10	Coal	Black		Dirty, dull and banded
		Crushed	0.63	45.22	45.85	11	Coal	Black		Occ. dull and dirty bands
		Very broken	0.08	45.85	45.93	12	Coal	Black		Dull
		Very broken	0.04	45.93	45.97	12	Mudstn	Light grey		Bentonitic mudstn
		Broken	0.96	45.97	46.93	13	Coal	Black		Clean
		Very broken	0.71	46.93	47.64	14	Coal	Black		Sl. dirty bands w/in.
5/48.78		Very broken	0.63	47.64	48.27	15	Coal	Black		
		Broken	0.50	48.27	48.77	16	Coal	Black		Sl. dirty and dull @ top
		Broken	0.20	48.77	48.97	17	Coal	Black		Clean
		Broken	0.02	48.97	48.99	A012	Mudstn	Black		Carb. mudstn 40% coal
		Broken	0.85	48.99	49.84	A012	Mudstn	Dark grey, massive		Plant debris
			0.20	49.84	50.04	A012	Coal	Dark grey,		Intbd coal/mudstn 55/45
6/51.83	78	Broken	1.21	50.04	51.25	A012	Mudstn	Dark grey		Plant and material. Non-calc.
		Broken	1.50	51.25	52.75	A013	Mudstn	Dark grey		A/A
			0.59	52.75	53.34	A013	Mudstn	Dark grey, thin		Intbd coal/carb mudstn (30/70)

BOX MARK	BCA	CORE STATE	INTERV TH	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT.	NOTES
6/54.88		Broken	0.92	53.34	54.26	A013	Silty mudstn	Dark grey, massive		Siltier towards base. Non-calc.
			1.16	54.26	55.42	A014	Silty mudstn	Dark grey, massive		Carb A/A
			0.16	55.42	55.58	A014	Coal	Black		Clean, bright
			0.30	55.58	55.88	A014	Carb. Mudstone	Dark grey		Intbd Coal/mudstn (20/80). Beds of coal up to 3 cm.
7/57.93		Broken	1.39	55.88	57.27	A014	Sltstn	Dark grey, massive		Mudstn @ top grading to sltstn @ base. Non-calc.
		Broken	1.37	57.27	58.64	A015	Sltstn	Medium grey, massive		carb muddy sltstn w. common plant debris. Non-calc.
		Broken	0.10	58.64	58.74	A015	Mudstn	Black, massive		Carb
7/60.98		Broken	1.34	58.74	60.08	A015	Sltstn	Dark grey, massive		Non-calc., Sl. carb.
8/64.02		Broken	3.05	60.08	63.13	A016	Sltstn	Dark grey, massive		A/A
8/67.07		Broken	3.05	63.13	66.18	A017	Sltstn	Dark grey, massive		A/A
		Broken	1.48	66.18	67.66	A018	Sltstn	Dark grey, massive		A/A, Dirtier towards base.
9/70.12		Broken	1.52	67.66	69.18	A018	Sltstn	Medium grey, massive		Poorly consolidated. Carb at top. Dirtier at top.
		Very broken	2.00	69.18	71.18	A019	Mudstn	Medium grey, massive		Plant material
		Crushed	0.07	71.18	71.25	A019	Coal	Black		
		Broken	0.62	71.25	71.87	A019	Mudstn	Medium grey, massive		A/A, Non-calc., carb @ base
		Blocky	0.02	71.87	71.89	A019	Mudstn	Light grey		Bentonitic band
		Very broken	0.12	71.89	72.01	A019	Mudstn	Black		Coaly, platy
		Very broken	0.19	72.01	72.20	18	Coal	Black		Dirty
9/73.17		Crushed	0.33	72.2	72.53	19	Coal	Black		
		Crushed	0.53	72.53	73.06	20	Coal	Black		
		Very broken	0.28	73.06	73.34	21	Coal	Black		Intbd. coal/carb mudstn (60/40)
		Very broken	0.95	73.34	74.29	22	Coal	Black		Clean
		Crushed	0.16	74.29	74.45	23	Coal	Black		Dirty
	69	Broken	0.26	74.45	74.71	24	Mudstn	Light grey, massive		Bentonite band. Abrupt contact w. lower coal
		Blocky	0.28	74.71	74.99	25	Coal	Black		Lower 8 cm = 40% mudstn
10/76.22		Blocky	0.70	74.99	75.69	A020	Sltstn	Medium grey, massive		Non-calc.
11/79.26		Blocky	3.03	75.69	78.72	A021	Sltstn	Medium grey, massive		A/A
	64		0.27	78.72	78.99	A022	Sltstn	Medium grey, vthin		Intbd vfg ss/sltstn. Roof. Abrupt contact w. coal
			0.15	78.99	79.14	26	Coal	Black		Clean
			0.70	79.14	79.84	27	Coal	Black		Clean
			0.32	79.84	80.16	28	Coal	Black		Occ. thin pyrite bands
			0.05	80.16	80.21	29	Coal	Black		Very dirty coal 50% rock
			0.19	80.21	80.40	29	Mudstn	Dark grey, massive		Carb. coal lens
			0.07	80.4	80.47	29	Coal	Black		Very dirty platy.
			0.05	80.47	80.52	29	Mudstn	Dark grey, massive		
			0.81	80.52	81.33	30	Coal	Black		Clean. Platy towards base
11/82.32			0.47	81.33	81.80	31	Coal	Black		Platy, sl. dirty
			0.23	81.8	82.03	32a	Coal	Black		Sl. dirty
	69		0.24	82.03	82.27	A023	Mudstn	Dark grey, massive		Sl. carb. floor
11/85.36		Broken	2.40	82.27	84.67	A023	Sltstn	Medium grey, massive		Non-calc. Dissem. pyrite throughout Occ. pyrite blebs top to 1.5 cm.
12/88.41	67	Blocky	3.00	84.67	87.67	A024	Sltstn	Medium grey, vthin		Intbd ss/sltstn (40/60). Fining up. Non-calc.
		Blocky	2.29	87.67	89.96	A025	Sltstn	Medium grey, vthin		A/A
12/91.46	73	Blocky	0.90	89.96	90.86	A025	Silty SS, fg	Medium grey, vthin		A/A, but ss/sltstn = 75/25. Carb lens increase towards base. Non-calc.
13/94.51		Blocky	3.05	90.86	93.91	A026	SS, fg	Medium grey, vthin		A/A
14/97.56		Blocky	3.00	93.91	96.91	A027	Sltstn	Medium grey, massive		Non-calc.
14/100.61			2.97	96.91	99.88	A028	Sltstn	Medium grey, massive		A/A
15	61	Broken	0.57	99.88	100.45	A029	Sltstn	Medium grey, thin		Intbd massive sltstn/ss (97/3). Non-calc.
		Broken	0.18	100.45	100.63	A029	Mudstn	Medium grey, massive		
		Very broken	0.42	100.63	101.05	A030	Mudstn	Black, massive		Coaly 40% coal
		Very broken	0.09	101.05	101.14	A030	Coal	Black		Dirty, 40% mudstn
		Very broken	0.18	101.14	101.32	A030	Mudstn	Black, massive		Very carby
		Very broken	0.53	101.32	101.85	32b	Coal	Black		Sl. dirty
		Crushed	0.66	101.85	102.51	33	Coal	Black		
16/103.66		Very broken	0.40	102.51	102.91	34	Coal	Black		
		Very broken	0.07	102.91	102.98	34	Carby mudstn	Black		
		Very broken	0.17	102.98	103.15	34	Coal	Black		
		Broken	0.10	103.15	103.25	35	Coal			

BOX MARK	BCA	CORE STATE	INTERV TH	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT.	NOTES
		Broken	0.02	103.25	103.27	35	Carby mudstn	Black		
			0.14	103.27	103.41	35	Coal			Dirty zones
		Broken	0.74	103.41	104.15	36	Coal	Black		Clean
		Broken	0.05	104.15	104.20	A031	Mudstn	Black		Very carb
		Broken	1.14	104.2	105.34	A031	Silty mudstn	Medium grey, massive		Non-calc. Dirty. Carb @ base
17/106.71		Broken	0.93	105.34	106.27	A031	Silty mudstn			Dirty carb. Non-calc. A/A
		Broken	0.13	106.27	106.40	A031	Carby mudstn	Black, massive		Coal towards coal contact
		Blocky	0.46	106.4	106.86	37	Coal	Black		Clean. Pyrite at top
			0.02	106.86	106.88	A032	Mudstn	Black		Coaly = 50% mudstn
17/109.76	65		2.51	106.88	109.39	A032	Sltstn	Medium grey, vthin		Intbd vfg ss/sltstn (30/70)
18/112.80	66		3.05	109.39	112.44	A033	Sltstn	Medium grey, vthin		A/A; Non-calc. T.D.

PROJECT	Telkwa	HOLE #	T92D-26	CONTRACTOR	J. T. Thomas
DATE	Sept. 2/92	SITE #		LOGGING CO.	BPB
CORE TYPE	NQ			CASING	
GEOLOGIST	Angelo			LOGGER	Al Bretton

BOX MARK	BCA	CORE STATE	INTERV TH	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT.	NOTES
			35.06	0	35.06					Casing
			0.37				Mudstn	Dark grey, massive		Soft Non-calc.
			0.12				Coal	Bright black		Hard, vitreous blocky
			0.06				Mudstn	Dull black		Earthy; hard; non-calc.
			1.94				Sltstn	Dark grey, massive		Med. hard. Non-calc.
			0.14				Coal	Semi-bright, black		Bedded; dirty, vitreous lenses < 2mm, hard
			0.41				Carby mdsn	Dull black, bedded		Med. hard calcite veining, vitreous
			0.09				Coal	Dull black,		Coaly mudstn base, vitreous lenses <1mm
1/39.63			0.77				Sltstn	Dark grey, massive		Medium hard
			2.58				Sltstn	Dark grey, massive		Medium hard, coal lense pyrite
2/42.68			0.48				Sand	Light grey, massive		Vegetal matter throughout
2/45.73			3.05				Silty sand, fg			Pyrite lenses and bivalves @ 1.15. Non-calc.
			1.10				Silty sand, fg	Light grey, massive		Interbedded vegetal matter & pyrite lamination @ 1.28
3/48.78			1.96				Silty sand, fg	Light grey, bedded		Vegetal matter < 1mm; bivalves @ 1m carby laminating < 1mm; Non-calc.
	70		5.70				Sand, fg	Light grey, bedded		X-bedding, FU sequence
5/60.98			0.30				Silty sand, mg	Massive		Soft sed def. organics, disseminated pyrite, calcite calceous
6/67.02	65		6.00				Sand, fg	Light grey, bedded		Organic lenses < 1mm, Non-calc., calcite lenses
			1.33				Sand, fg	Light grey, massive		Pyrite nodules, disseminated pyrite, bivalves throughout
7/70.12			1.70				Sltstn	Dark grey, massive		Bivalves
							Sltstn	Dark grey, massive		Pyrite/coal < 2 cm @ 88, bivalves @ 1.35, Pyrite/coal 3cm @ 1.80
										Pyrite organics < 1 cm from .17 - .30
8/79.26			9.00				Sandy sltstn,vfg	Dark grey, massive		Pyrite modules, Pyritic coal
16/91.46							Sandy sltstn,vfg	Dark grey, massive		A/A
13/103.66			12.00							A/A, Bivalves
13/106.71			3.05				Silty sandstn	Light grey, bedded		X-bedding, VWS, Pyrite modules
			0.45				Silty sandstn,vfg	Light grey, bedded		Pyrite/vegetal matter
			0.70				Bent. mudstn	Light Grey	SSD	Soft sed def bentonitic mud; calcite blebs
	65		1.70				Silty sand, vfg	Medium grey, bedded		Calcite blebs, vegetal lenses < 1mm
			0.62				Sand, vfg	Medium grey, bedded		1 cm calcite lense @ .09 VWS
			0.34				Bent. mud	Light grey, massive	SSD	Calcareious calcite blebs
15/112.80	72		2.10				Sand, vfg	Light grey, bedded		Bivalves @ 90, vegetal/pyrite
16/125.00	80		12.20				Sand, vfg	Medium grey, bedded		X-bedding, vegetal matter < 1 cm
			0.40				Sand, vfg	Medium grey, bedded		VWS, plant matter
18/134.00			8.60				Sand, fg	Light grey, massive		Salt & Pepper, calcite veining; 6 cm 70 deg. 1.20 - 5cm calcite @2.65,
20/146	75		12.00				Silty sand,vfg	Dark grey, bedded		Organic laminations < 1 cm
21/152.80	75						Sand, fg	Light grey, bedded		Organic

PROJECT	Telkwa	HOLE #	T92R-30C	CONTRACTOR	J. T. Thomas
DATE	Sept. 2/92	SITE #	106.00	LOGGING CO.	BPB
CORE TYPE	NQ			CASING	
GEOLOGIST	Angelo			LOGGER	Al Bretton

RUN	BCA	CORE STATE	INTERV TH	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT.	NOTES
1	1.19	Massive	0.73	29.70			Carby mdstn	Grey, bedded		Interbedded carby lenses < 1 cm, pyrite nodules
		Broken	0.07				Mdsn			
		Massive	0.19				Mdsn			A/A
		Blocky	0.20	30.87	31.03	1	Coal	Bright black, massive		Pyrite throughout, hard, clear
2		Blocky	0.17	31.03	31.24	1	Coal	Bright black, massive		Pyrite on cleats, hard, clean
		Massive	0.02				Carby mdsn	Earthy brown, bedded		VTB, carby lenses < 1 cm
			1.29				Mdsn	Medium grey, bedded		1 cm pyrite lense @ .30, carby lenses < 1 mm throughout,2 cm coal lenses @ .8
		Blocky	0.04	32.48	32.52	2	Coal	Bright black, massive		Pyrite blebs on cleats
3		Broken	0.10	32.52	32.62	3	Coal	Bright black, massive		Calcite blebs
		Blocky	0.28	32.62	32.90	3	Coal	Bright, black, massive		A/A
		Blocky	0.03	32.90	32.93	4	Carby mdsn	Dull black, massive		Dirty pyrite lense
		Blocky	0.84	32.93	33.77	5	Coal	Bright black, massive		Hard, clean, pyrite bleb on cleats
		Blocky	0.40	33.77	34.17	6	Coal	Bright black, VTB		Vitreous lenses < 5mm throughout. Scattered pyrite lenses < 1mm, Calc. blebs
		Massive	0.05	34.17	34.22		Carby mdsn	Earthy brown, VTB		Vitreous lenses < 1mm throughout
		Massive	0.16	34.22	34.38		Carby mdsn	Medium grey, massive		Vegetal matter throughout.
	80	Bedded	0.14	34.38	34.52		Coal/Mdsn(80/20)	Dull black, VTB		Vitreous lenses < 1mm pyrite lenses < 1 cm dirty
		Massive	0.10				Carby mdsn	Medium grey, massive		Vegetal matter throughout
4		Massive	0.19				Mdsn	Dark grey, massive		Vegetal matter
		Massive	0.08				Carby mdsn	Earthy brown		Pyrite lenses < 1 cm
		Blocky	0.44	58.16	58.60	7	Coal	Black		Hard, clean
		Crushed	0.04	58.60	58.64	8	Coal/mdsn	Dull black		Dirty, crushed
		Blocky	0.71	58.64	59.35	9	Coal	Bright, black		Hard, clean
		Massive	0.54	59.35	59.89		Carby mdsn	Massive		Pyrite lenses < 1 cm @ .19, thin coal lenses < 1 cm
		Broken	0.06	59.89	59.95	10	Coal	Semi-bright black, mass.		Pyrite on cleats
5		Blocky	0.51	59.95	60.46	11	Coal	Bright black, massive		Hard, clean
		Broken	0.09	60.46	60.55	12	Coal/mdsn	Dull black, massive		Dirty, bone
		Blocky	0.26	60.55	60.81	13	Coal	Bright black, massive		Clean, hard
		Massive	0.05	60.81	60.86		Coaly mdsn	Dull black, bedded		Very thinly banded
		Massive	0.08				Mdsn	Dark grey, VTB		Carby lenses < 1 mm
		Broken	0.05				Carby mdsn	Dull black		
		Massive	0.44				Carby mdsn	Dark grey		Pyrite lenses < 1 cm, carby lenses < 5mm; 23 cm coaly bed @ 0.07
		Crushed	0.03				Carby mdsn	Dark grey		
		Massive	0.90				Mdsn	Medium grey		Pyrite lenses
6		Massive	0.37	62.43	62.80	14	Mdsn	Medium grey		A/A
		Blocky	0.31	62.80	63.11	15	Coal	Bright black, massive		Hard clean, pyrite on roof
		Broken	0.14	63.11	63.25	16	Coal	Massive		Hard, clean
		Crushed	0.05	63.25	63.30	16	Coal	Crushed		
		Massive	0.14	63.30	63.44	17	Coal	Massive		Hard, clean
		Crushed	0.09	63.44	63.53	18	Coaly mdsn	Crushed		Dirty
		Massive	1.37	63.53	64.90	19	Coal	Massive		Hard, clean
		Massive	0.10	64.90	65.00	20	Coal	Bright black		Hard, clean
7		Blocky	0.94	65.00	65.94	21	Coal	Bright black, crushed		Hard, dirty
		Crushed	0.15	65.94	66.09	22	Coal	Bright black, crushed		Hard, dirty
		Blocky	0.34	66.09	66.43	23	Coal	Bright, black, TB		Vitreous lense < 1 cm throughout
		Crushed	0.06	66.43	66.49	24	Coaly mdsn	Dull black		Dirty
		Blocky	0.30	66.49	66.79	25	Coal	Medium black, VTB		Vegetal matter throughout
		Massive	0.35	66.79	67.14		Mdsn	Medium grey, VTB		A/A Pyrite lenses < 5mm
8	78		1.20				Mdsn	Medium grey, VTB		A/A Pyrite lenses < 5mm

RUN	BCA	CORE STATE	INTERV TH	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT.	NOTES
		Massive	0.20	68.69	68.89	26	Coal	Bright black, massive		Sheared calcite, hard
9		Massive	0.51	68.89	69.40	27	Coal	Bright black massive		Hard, clean, pyrite lenses < 1mm
		Massive	0.24	69.40	69.64	28	Coal	Bright black		Calcite lenses, hard
		Broken	0.43	69.64	70.07		Mdsn	Medium grey		3 cm bent. @ .05. Calcite on shear joints. Calcite veining
		Crushed	0.47	70.07	70.54		Mdsn	Medium grey		Calcite frags, badly broken
10		Broken	0.25	70.54	70.79	29	Coal	Bright black		Hard, clean
		Blocky	0.64	70.79	71.43	30	Coal	Bright black		Hard, clean
		Massive	0.04				Carby mdsn	Earthy brown, massive		
		Broken	0.60				Mdsn	Medium gray, massive		Very
11		Massive	0.91				Mdsn	Medium gray, massive		
		Massive	0.44	76.23	76.67	31	Coal	Dark black, massive		Hard, clean
		Massive	0.46	76.67	77.13		Mdsn	Medium gray, massive		Plant frags.
		Massive	0.22	77.13	77.35	32	Coal	Br/black, massive		Hard, clean
12		Broken	0.25	77.35	77.60	33	Coal	Br/black, massive		Hard, clean
		Massive	0.74	77.60	78.34	34	Coal	Br/black,VTB		1 cm bentonite lense @ 20 cm; Hard, clean, Vitreous lenses < 1 mm
		Massive	0.24	78.34	78.58	35	Coal	Br/black, massive		Hard, clean vitreous lustre throughout
			0.11	78.58	78.69	36	Mdsn/coal(80/20)	Dull black		Hard, earthy
			0.62	78.69	79.31	37	Coal	Bright black		Hard, clean
13										
			1.03	79.31	80.34	38	Coal	Bright black		Hard, clean
			0.09	80.34	80.43		Carby mdsn	Dark grey		
			1.14	80.43	81.57		Mdsn	Light grey		

PROJECT	Telkwa	CONTRACTOR	J. T. Thomas
DATE	Sept. 29	LOGGING CO.	BPB
HOLE #	T92D-31	CASING	22.87
SITE #		LOGGER	Brian
CORE DIA.	NQ		
GEOLOGIST	Angelo		

BOX MARK	BCA	CORE STATE	INTERV TH	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT.	NOTES
			22.87	0	22.87					Casing
			0.30	22.87	23.17	A001	Mudstn	Light grey, massive		Poorly consol. Non-calc.
1/24.39		Broken	1.02	23.17	24.19	A001	SS,vfg	Medium grey, massive		Dissem. pyrite throughout
1/27.44	58	Broken	3.00	24.19	27.19	A002	SS, vfg	Medium grey, thin	SSD	Intbd ss/sltstn 65/35 Non-calc. Some SSD between bdg, Pyrite A/A
		Very broken	1.00	27.19	28.19	A003	SS, vfg	Medium grey, v.thin		A/A siltier towards base. Grad
	56	Very broken	1.25	28.19	29.44	A003	Sltstn	Medium grey, vthin		Intbd ss/sltstn(15/85) Carb at base. Dissem. pyrite. Non-calc.
2/30.48		Broken	0.47	29.44	29.91	1	Coal	Black		Sl. dirtier @ top 12 cm
		Blocky	0.60	29.91	30.51	2	Coal	Black		Clean
		Broken	0.39	30.51	30.90	3	Coal	Black		
		Blocky	0.22	30.9	31.12	A004	Sltstn	Dark grey, massive		Dirty carb. sltstn grad. lower
	52	Broken	3.43	31.12	34.55	A005	Sltstn	Dark grey, vthin		Intbd vfg ss/sltstn (20/80). Dissem pyrite. Non-calc., thin coal banding toward base
		Blocky	0.31	34.55	34.86	A006	Sltstn	Dark grey		A/A but pyrite modules and banding very common. Roof
			0.02	34.86	34.88	A006	Mudstn			
		Broken	0.19	34.88	35.07	4	Coal	Black		Sl. dirty
		Broken	0.96	35.07	36.03	5	Coal	Black		Cleaner toward base
3/36.58		Broken	0.17	36.03	36.20	6	Coal	Black		
			0.42	36.2	36.62	A007	SS	Medium grey, massive		Plant debris. Non-calc.
3/39.63		Broken	2.46	36.62	39.08	A007	Sltstn	Dark grey, vthin		Intbd. ss/sltstn (25/75). Siltier toward base
4/42.68	50		3.05	39.08	42.13	A008	Sltstn	Dark grey, vthin		A/A 5/95, carb. pyrite dissem. throughout
			1.33	42.13	43.46	A009	Sltstn			
		Blocky	0.09	43.46	43.55	A009	Mudstn	Black, massive		Carb. plant debris throughout; pyrite banding
		Broken	0.17	43.55	43.72	7	Coal	Black		Sl. dirty @ top
			0.05	43.72	43.77	A010	Mudstn	Black, massive		Pyrite banding & small nodules
5/45.73		Broken	1.24	43.77	45.01	A010	Sltstn	Dark grey, massive		Dirtier & carb @ top
			0.16	45.01	45.17	A010	Sltstn	Dark grey, massive		A/A
			0.03	45.17	45.20	A010	Carby mudstn	Black		Carby platy
			0.30	45.2	45.50	8	Coal	Black		Bright, banded
			0.01	45.5	45.51	8	Coal	Black		Pyrite = 30%
		Broken	1.04	45.51	46.55	9	Coal	Black		Clean
		Broken	0.39	46.55	46.94	10	Coal	Black		Dirty @ top
		Crushed	0.41	46.94	47.35	11	Coal	Black		Clean
			0.11	47.35	47.46	A011	Mudstn	Dark grey		Intbd coal/mudstn (25/75); pyrite bands up to 1/2 cm
5/48.78	62	Broken	0.66	47.46	48.12	A011	Sltstn	Dark grey, vthin		Carb
6/51.83			3.05	48.12	51.17	A012	Sltstn	Dark grey, vthin		Intbd ss/sltstn (10/90). Fining up Non-calc.
			1.51	51.17	52.68	A013	Sltstn	Dark grey, vthin		A/A
			0.54	52.68	53.22	A013	Sltstn	Light grey, massive		Calc. & slow sustained fizz
6/54.98	61		0.83	53.22	54.05	A013	Sltstn	Medium grey, vthin		Intbd. non-calc. ss/sltstn (10/90)
7/57.93		Broken	3.05	54.05	57.10	A014	Sltstn	Dark grey, vthin		A/A (10/90) SS = fgr & clean s&p w. abrupt contacts. Non-calc.
7		Broken	1.16	57.1	58.26	A015	Sltstn	Dark grey, vthin		A/A ss/sltstn = 5/95
			0.23	58.26	58.49	A015	Mudstn	Black		Coaly
		Broken	0.16	58.49	58.65	12	Coal	Black		Sl. dirty. Pyrite banding
		Blocky	0.58	58.65	59.23	13	Coal	Black		
		Blocky	0.26	59.23	59.49	14	Coal	Black		Mudstn thin bands (5 1/2cm) @ base
7/60.98	59		0.83	59.49	60.32	A016	Sltstn	Dark grey,vthin		Intbd ss/sltstn (5/95)
			1.64	60.32	61.96	A016	Sltstn	Dark grey, massive		Carb. muddy sltstn. Non-calc.. Dissem. pyrite w/in
			0.05	61.96	62.01	A016	Mudstn	Black		Pyrite banding, 30% pyrite
			0.19	62.01	62.20	15	Coal	Black		Clean
			0.05	62.2	62.25	15	Sltstn	Dark grey		
		Very broken	0.61	62.25	62.86	16	Coal	Black		
8/64.02		Broken	0.63	62.86	63.49	A017	Silty mudstn	Dark grey		Carb. Non-calc.
	42		2.57	63.49	66.06	A018	Silty mudstn	Dark grey		A/A, silty lens @ thin beds

BOX MARK	BCA	CORE STATE	INTERV TH	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT.	NOTES
8/67.07	44		0.73	66.06	66.79	A018	Mudstn	Black, thin		Intbd coal/mudstn (45/55)
			0.91	66.79	67.70	A019	Carby mudstn	Dark grey		Carb. Non-calc. sheared
			2.35	67.7	70.05	A019	Sltstn	Dark grey, vthin		Intbd. vfg ss/sltstn (5/95). Non-calc.
			0.67	70.05	70.72	A020	Sltstn	vthin		A/A
			0.50	70.72	71.22	A020	Sltstn	Massive		Slow sustained fizz
9/73.17			1.17	71.22	72.39	A020	Sltstn	V.thin		Intbd ss/sltstn (15/95); Non-calc. Sheared, minor calcite veining'
6/76.22		Broken	3.05	72.39	75.44	A021	Sltstn	Massive		Non-calc. , calcite veining @ top. Possible fault zone
	45		0.51	75.44	75.95	A022	Sltstn	Medium grey, massive		Faintly bdd w vfg ss (<1mm)
			0.23	75.95	76.18	A022	Silty mudstn	Dark grey, massive		Carb. plant debris
			0.06	76.18	76.24	A022	Coal	Black		
	43		0.73	76.24	76.97	A022	Silty mudstn	Dark grey, massive		Carb. pyrite banding @ base to 1 cm
		Broken	0.05	76.97	77.02	17	Coal	Black		Dirty. Pyrite banding up to 1 cm.
		Broken	0.15	77.02	77.17	17	Coal	Black		Sl. dirty
			0.21	77.17	77.38	18	Coal	Black		Clean
			0.19	77.38	77.57	18	Coal	Black		Sl. dirty @ base
		Very broken	0.35	77.57	77.92	A023	Mudstn	Dark grey, massive		
		Blocky	0.51	77.92	78.43	19	Coal	Black		Dirty
12/79.27		Broken	0.22	78.43	78.65	20	Coal	Black		Clean w. occ. thin mudstn @ base
		Broken	0.19	78.65	78.84	A024	Mudstn	Light grey, massive		Bentonitic mudstn,. Poorly cons
			0.06	78.84	78.90	A024	Mudstn	Black, massive		Carb.
	59	Broken	2.50	78.9	81.40	A024	Sltstn	Dark grey, massive		Dirty carb. occ. vfg ss. Non-calc.
12/82.32		Crushed	0.27	81.4	81.67	A024	Sltstn	Medium grey, massive		Breeciated calcite veining throughout. Possible fault zone
		Broken	0.46	81.67	82.13	A025	Silty mudstn	Medium grey		
		Broken	0.18	82.13	82.31	A025	Coal	Black		
		Broken	0.09	82.31	82.40	A025	Mudstn	Dark grey		Carb. sheared; coaly
		Broken	0.16	82.4	82.56	A025	Coal	Black		
12/85.37		Blocky	2.11	82.56	84.67	A025	Sltstn	Medium grey,vthin	SSD	Intbdd vfg. ss/sltstn (45/55). Non-calc. minor SSD
13/88.41		Broken	3.05	84.67	87.72	A026	Sltstn	Medum grey, vthin		A/A
13/91.46	61	Blocky	3.05	87.72	90.77	A027	Sltstn	Medium grey, vthin		Non-calc. Intbd ss/sltstn (45/55). Abrupt bedding
14/94.51		Blocky	3.05	90.77	93.82	A028	Sltstn	Medium grey, vthin		A/A. (40/60)
15/97.56		Blocky	3.05	93.82	96.87	A029	SS, vfg	Medium grey, massive		Non-calc. s&p ss silty. Occ. thin pyrite bands near base assoc. w. coal blebs
15/100.61		Blocky	3.05	96.87	99.92	A030	SS, vfg	Medium grey, massive		Non-calc. occ. pyrite A/A
16/103.66		Blocky	3.05	99.92	102.97	A031	SS, vfg	Medium grey, massive		A/A Pyrite nodules up to 1 cm.
6/106.71		Blocky	3.05	102.97	106.02	A032	SS, vfg	Medium grey massive		A/A No visible pyrite bands; but common bivalve horizon; Occ. gastropods
17/109.76	76	Blocky	3.05	106.02	109.07	A033	SS, fg	Medium grey massive		A/A Common bivalves
17/112.80		Blocky	3.05	109.07	112.12	A034	SS, mg	Light grey, massive		Non-calc. occ. carb lens
18/115.85		Blocky	3.05	112.12	115.17	A035	SS, mg	Light grey, massive		A/A
18/118.90	75		3.05	115.17	118.22	A036	SS, mg	Light grey, massive		A/A
			1.44	118.22	119.66	A037	SS, mg	Light grey, massive		A/A
19/121.95	76		1.61	119.66	121.27	A037	SS, vfg	Medium grey, massive		Silty T.D., Non-calc.

1993/07/27

PROJECT	Telkwa
DATE	Sept. 29/93
HOLE #	T92D-32
SITE #	
CORE TYPE	NQ
GEOLOGIST	Angelo

CONTRACTOR J. T. Thomas
LOGGING CO. BPB
CASING
LOGGER Al Bretton

BOX MARK	BCA	CORE STATE	INTERV TH	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT	NOTES
1/33.54			30.48	0						Casing
			2.8				Silty ss, vfg	Medium grey, massive		Calcite veining, sl. carb
	80		3.05				SS, fg	Medium grey, massive		
			2.83				SS, fg	Medium grey, vthin	SSD	Intbd ss/sltstn (80/20)
	82		0.86				SS, fg	Light grey, vthin		Common calcereous burrows (.5 cm diameter) carb. lens
			1.44				SS, fg	Light grey, vthin		Intbd ss/sltstn (95/15)
			0.37				SS, fg	Light grey, massive		Breeciated SS. Fault zone?
			1.47				SS, fg	Light grey, vthin		Intbd ss/sltstn (80/20). Common small-scale fault movement
3/45.73		Broken	2.22				Sltstn	Medium grey, vthin		Intbd ss/sltstn (40/60)
			1.01				Sltstn	Medium grey, vthin		A/A
			0.05				Carby mudstn	Black, massive		Coaly
		Broken	0.16	46.23	46.39	1	Coal	Black		
		Blocky	0.15	46.39	46.54	2	Sltstn	Medium grey		
		Broken	0.13	46.54	46.67	3	Coal	Black		Sl. dirty @ top
			0.01	46.67	46.68	3	Mudstn	Dark grey		Pyrite/coaly
		Broken	0.46	46.68	47.14	4	Coal	Black		
		Broken	0.16	47.14	47.3	5	Coal	Black		
		Blocky	3.98	47.3	51.28	6	Sltstn	Medium grey, vthin		25 cm of floor sampled. Intbd ss/sltstn (20/80)
		Blocky	0.14	51.28	51.42	7	Mudstn	Dark grey		Roof. Plant debris throughout
		Blocky	0.02	51.42	51.44	7	Mudstn	Black		Coaly mudstn
		Blocky	0.24	51.44	51.68	8	Coal	Black		Thin pyrite banding up to 1 mm. Clean bright
		Crushed	0.57	51.68	52.25	9	Coal	Black		Clean
		Broken	0.33	52.35	52.68	10	Coal	Black		
		Broken	1.63				Sltstn	Medium grey, massive		Dirty sistn carbier & dirtier towards base. Coaly towards base.
		Broken	2.77				Sltstn	Dark grey, massive		
		Crushed	0.03				Sltstn	Black		Carby
5/57.93		Crushed	0.26	56.87	57.13	11	Coal	Black		Dirty @ base
		Broken	1.41				Sltstn	Dark grey, massive		13 cm taken in Sample #12
		Broken	0.1	58.62	58.72	12	Mudstn	Black		Roof coaly. Plant material
		Broken	0.53	58.72	59.25	13	Coal	Black		Clean. Sl. dirty zones
		Broken	0.01	59.25	59.26	14	Coal	Black		Pyrite band w. mudstn
		Broken	0.64	59.26	59.9	14	Coal	Black		Clean
		Broken	0.49	59.9	60.39	15	Coal	Black		
		Broken	0.04	60.39	60.43	16	Mudstn	Black		Coaly 50%
		Broken	0.35	60.43	60.78	16	Coal	Black		Clean
			0.1	60.78	60.88	17	Mudstn	Black		Carb
			0.38	60.88	61.26	17	Sltstn	Dark grey		Dirty carb. 15 cm sampled
6/64.02	85	Broken	2.2				Coal	Black		Dirty
			0.37				Sltstn	Medium grey, massive		Plant debris
			1.45				Sltstn	Medium grey, massive		A/A
			0.1				Sltstn	Medium grey, vthin		Intbd ss/sltstn (30/70). Abrupt lower contact
			0.24				Mudstn	Black		Coaly
			3.9				Mudstn	Black, massive		Carb.
	85		2.97				Sltstn	Medium grey, vthin		Intbd SS/sltstn (30/70). Sandier towards base

BOX MARK	BCA	CORE STATE	INTERV TH	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT	NOTES
8/73.17			0.27				Sltstn	Medium grey, vthin	SSD	A/A (50/50). Sandier & thickest bds towards base. Minor SSD
			1.44				SS, fgr	Light grey, vthin		A/A ss/sltstn = 65/35
			1.2				SS	Light grey, vthin		A/A
		Blocky	2.7	75.21	77.91	18	Sltstn	Medium grey, vthin		Sandy 20% ss lens. Carb. siltier towards base 25 cm sampled
			0.04	77.91	77.95	18	Carby Mudstn			30% pyrite
		Broken	0.47	77.95	78.43	19	Coal	Black		Sl. dirty @ top
		Blocky	3.96	78.43	82.39	20	Sltstn	Medium grey, vthin		Faintly bedded ss/sltstn (15/85). 25 cm floor sampled.
			0.03				Mudstn	Black		Coaly
			0.77	82.42	83.19	21	Coal	Black		Pyrite bands up to 1 cm throughout esp @ top 30cm. Dirty @ top & base
		Broken	1.13	83.19	84.32	22	Carby sltstn	Dark grey, massive		Muddy carb sltstn @ top grading to silty coaly mudstn @ base. 25 cm roof tak
			0.04	84.32	84.36	23	Coal	Black		Dirty
		Crushed	0.43	84.36	84.79	23	Coal	Black		
		Broken	0.39	84.79	85.18	24	Coal	Black		Clean
	88	Very broken	1.65	85.18	86.83	25	Carby sltstn	Medium grey, massive		Dirty @ top
		Broken	2.8	86.83	89.63	25	Sltstn	Medium grey, vthin		Intbd ss/sltstn @ top (15/85) grading to massive sltstn w. coal beds @ base
			0.02	89.63	89.65	25	Mudstn	Black		Coaly pyrite
			0.25	89.65	89.9	26	Coal	Black		Sl. dirty
			0.5	89.9	90.4	27	Coal	Black		Clean
			0.02	90.4	90.42	27	Coal	Black		Pyrite banding
11/91.46		Broken	0.54	90.42	90.96	28	Coal	Black		Clean
		Broken	0.07	90.96	91.03	29	Coal	Black		Dull
		Blocky	0.04	91.03	91.07	29	Mudstn	Medium grey		Pyroclastic ash layer, feldspar xls up to 1mm w/in
		Broken	0.49	91.07	91.56	30	Coal	Black		Clean bright
		Broken	0.01	91.56	91.57	30	Mudstn	Black		
		Broken	0.55	91.57	92.12	31	Coal	Black		
		Broken	0.02	92.12	92.14	32	Mudstn	Black		
		Broken	0.48	92.14	92.62	32	Coal	Black		Pyrite bands
		Blocky	1.01	92.62	92.63	33	Coal	Black		
		Very broken	0.28	93.63	93.91	34	Coal	Black		Dirty bands
		Broken	0.65	93.91	94.56	35	Mudstn	Dark grey		Carb. 25 cm taken @ floor
		Blocky	0.22	94.56	94.78	36	Coal	Black		Dirty
		Broken	1.33	94.78	96.11	37	Mudstn	Dark grey		Silty mudstn w. plant frags. Occ. thin coaly beds up to 3 cm; 25 floor taken
		Blocky	0.25	96.11	96.36	38	Coal	Black		Very dirty @ top. Calcite veined throughout
	82	Blocky	0.13				Mudstn	Dark grey		Coaly 40% coal
12/97.56		Broken	0.53				Mudstn	Medium grey, massive		Carb
			0.86				Sltstn	Light grey, massive		Brecelated throughout. Calcite veining. Fault zone?
13/100.61		Blocky	2.16				Sltstn	Dark grey, massive		Occ. coaly thin bends
			0.61				Sltstn	Dark grey, massive		A/A
			0.49				Mudstn	Black		Very coaly. 45% coal beds
		Broken	1.01				Sily Mudstn	Dark grey		Plant debris throughout. Carb
		Very Broken	0.42	102.3	102.72	39	Coal	Black		Dirty bands
	80	Very Broken	0.67				Carb Mudstn	Dark grey, massive		Silty towards base
			0.87				SS. vfg	Medium grey, massive		Sltstn @ top grad. to dirty ss
			2.49	104	106.49	40	Carb Mudstn	Dark grey, massive		Some sltstn. Coaly @ base. Roof
		Broken	0.44	106.49	106.93	41	Coal	Black		Dirty @ top. Minor pyrite banding
		Blocky	0.04	106.93	106.97	42	Coal	Black		Some pyrite banding.
		Blocky	0.04	106.97	107.01	42	Coal	Black		10% pyrite banding
		Very Broken	0.24	107.01	107.25	42	Coal	Black		Dirty @ base
15/112.80	82	Broken	5.12	107.25	112.37	43	Sltstn	Medium grey, massive		Dirty & carb @ top - 25 cm sampled. Pyr. banding comm.. Plant Debris
		Blocky	0.86	112.37	113.23	44	Sltstn	Medium grey, massive		Pyrite common. Roof sampled
		Blocky	0.07	113.23	113.3	45	Coal	Black		Dirty
		Blocky	0.02	113.3	113.32	45	Coal	Black		Pyrite banding = 20%
		Blocky	0.34	113.32	113.66	46	Coal	Black		Clean - Rare thin dirty bands
		Blocky	0.01	113.66	113.67	47	Mudstn	Black		Coaly

BOX MARK	BCA	CORE STATE	INTERV TH	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT	NOTES
		Blocky	21	113.67	113.88	47	Coal	Black		Bright clean
		Blocky	0.23	113.88	114.01	48	Mudstn	Light grey		Bentonitic mudstn
		Blocky	0.35				Mudstn	Black		Coaly esp. top 19 cm
15/115.85		Broken	0.92				Silty Mudstn	Dark grey, massive		
		Broken	1.67				Sltstn	Dark grey, massive		A/A. Calcite veining, Breeciated. Some mudstn banding
	71	Broken	1.8	117.03	118.83	49	Sltstn	Dark grey, massive		20 cm taken
		Crushed	0.04	118.83	118.87	49	Mudstn			
		Crushed	0.57	118.87	119.44	50	Coal	Black		Dull sl. dirty
		Very Broken	0.34	119.44	119.78	51	Coal	Black		bright
			0.04	119.78	119.82	52	Carb Mudstn	Black, massive		
		Broken	0.28	119.82	120.1	52	Mudstn	Grey		Sl. dirty
		Blocky	0.09	120.1	120.19	53	Coal	Black		
		Blocky	0.01	120.19	120.2	53	Mudstn	Black		Coaly
			0.14	120.2	120.34	53	Coal	Black		Clean
		Broken	0.9	120.34	121.1	54	Coal	Black		Clean
		Broken	0.26	121.1	121.36	55	Coal	Black		
	81		8	121.36	129.36	56	Sltstn	Dark grey, vthin		Massive mainly. Minor thin vfg ss beds up to 1 cm. Occ. mudstn bands. 25 @ top taken. SS more common near base.
	82	Blocky	3.22				SS, fg	Light grey, vthin		Intbd ss/sltstn (85/15)
			0.51				Mudstn	Black		Very carby
			0.84				Mudstn	Dark grey, massive		Sheared
			1.95	133.7	133.65	57	Carb Mudstn	Dark grey, massive		Coal beds up to 3 cm increasing towards base. 25 cm taken. Poor
			0.71	133.65	136.36	58	Coal	Black		Clean
			0.54	136.36	136.9	59	Coal	Black		Clean pyrite banding
			0.53	136.9	137.43	60	Coal	Black		Clean
			0.28	137.43	137.71	61	Coal	Black		
			4.6	137.71	142.31	62	Sltstn	Medium grey, vthin		Intbd vfg ss/sltstn (5/95) - 25 cm taken. Poor
			3.72				Sltstn	Medium grey, vthin		A/A

PROJECT	Telkwa	CONTRACTOR	J.T. Thomas
DATE	Oct. 3/92	LOGGING CO.	BPB
HOLE #	T92D-34	CASING	21.95
SITE #		LOGGER	Al Bretton
CORE TYPE	NQ		
GEOLOGIST	Angelo		

BOX MARK	BCA	CORE STATE	INTERVAL THK	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUC	NOTES
			21.95	0.00	21.95					Casing
1		Broken	0.49	22.01	22.50	1	Coal	Blk		Clean hard
			0.02	22.50	22.52	2	Silty, mudstn			
		V. Broken	0.30	22.52	22.82	2	Coal	Blk		Clean
		Broken	2.15				SS, Vfg			Siltier @ base. Carb lens
			0.06				Coal			Dirty at top
	73	Broken	2.74				Sltstn	Med. grey, vthin		Intbd ss/sltstn 10/90
2/30.48		Broken	2.24				Sltstn	Med. grey, vthin		A/A muddy at base
	83	Broken	2.23				Sltstn	Lt. grey vthin		A/A ss/sltstn 45/55
			0.07				Coal	Blk		
3/36.59	80	Broken	3.71				Sltstn	Med. grey, vthin		Intbd ss/sltstn 50/50
3/39.63	79	Broken	3.05				Sltstn	Med. grey vthin		A/A. 40/60 siltier @ base
		Broken	2.55				SS, vfg	Med. grey vthin		A/A. 55/45 coaly @ base
		Crushed	0.66	41.17	41.83	3	Coal			
		Broken	1.40				Sltstn.	Med. grey massive		
	82	Broken	2.58				Sltstn	Med. grey vthin		Intbd vfg. ss/sltstn 45/55
		Broken	0.74	45.68	46.42	4	Silty mudstn	Dk. grey massive		Carb/coaly @ base. Roof taken
		V. Broken	0.43	46.42	46.85	5	Coal	Blk		Dull. sl. dirty
		V. Broken	0.06	46.85	46.91	5	Coal	Blk		Dirty
		Crushed	0.43	46.91	47.34	6	Coal	Blk		
		Broken	0.16	47.34	47.50	7	Mudstn	Grey		Carb. pyrite blebs up to 1 cm
		V. Broken	0.15	47.50	47.65	8	Coal	Blk		
		Broken	0.02	47.65	47.67	8	Coal	Blk		Dirty coal
5/48.78		V. Broken	0.58	47.67	48.25	8	Coal	Blk		Dirty bands
		Crushed	0.29	48.25	48.54	9	Coal	Blk		
		Broken	0.51	48.54	49.05	10	Mudstn	Dk. grey		Coal muds common
		Broken	1.16				Carb. Sltstn	Med. grey		
			3.47				Sltstn			Intbd ss/sltstn 20/80
		Blocky	0.47	53.60	54.07	11	Silty mudstn	Med. grey massive		Coalier near base
6/54.88	81	Blocky	0.26	54.07	54.33	12	Coal	Blk		Clean. Dirty at top 4 cm.
		Crushed	0.49	54.33	54.82	13	Coal	Blk		Clean
		V. Broken	0.01	54.82	54.83	13	SS	Well vfg. grey		
		V. Broken	0.61	54.83	55.44	14	Coal			Clean bright
		Broken	0.07	55.44	55.51	15	Mudstn	Brown		Volcaniclastic/pyroclastic. Feldspar*
										XLS up to 1 mm. Lower 2 cm = mixed coal/volcs.
		Blocky	0.40	55.51	55.91	16	Coal	Blk		Clean, bright
3/57.93		Blocky	1.63	55.91	57.54	17	Coal	Blk		
		Blocky	0.10	57.54	57.64	18	Mudstn	Dk. grey massive		Carb.
		Broken	0.29	57.64	57.93	19	Coal	Blk		Dirty banding
		Broken	0.45	57.93	58.38	20	Coal	Blk		
		V. Broken	0.22	58.38	58.60	21	Coal	Blk		Bright, clean
		V. Broken	0.42	58.60	59.02	22	Mudstn	Dk. grey massive		Carb. Plant debris. Some pyrite banding
			0.26				Coal	Blk		Very dirty @ base

BOX MARK	BCA	CORE STATE	INTERVAL THK	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUC	NOTES
			0.17				Mudstn	Blk		Intbd. coal/mudstn 40/60
		Broken	2.54				Mudstn	Dk. grey		Intbd coal/mudstn 10/90. Coal beds up to 6 cm.
		Broken	0.23	61.82	62.05	23	Coal	Blk		Intbd coal/mudstn. 70/30
		Broken	0.07	62.05	62.12	23	Mudstn	Blk		Carb
		Broken	0.12	62.12	62.24	23	Coal	Blk		Dirty
		Broken	0.96				Mudstn	Dk. grey		
		Crushed	0.60	63.20	63.80	24	Coal	Blk		Dirty
		Broken	3.00				Mudstn	Med. grey		Silty carb.
8/67.03		Broken	0.19	66.49	66.68	25	Coal	Blk		Sl. dirty
		Broken	0.52	66.68	67.20	25	Coal	Blk		
			7.03				Sltstn	Med. grey massive		
	85		0.19				Silty mudstn	Blk massive		Carb. Occ. thin sltstn lens
		Crushed	0.68	74.26	74.94	26	Coal	Blk		
10/76.22		V. Borken	0.78				Silty mudstn	Dk. grey massive		Carby silty mudstn
			2.59	78.67	78.26	27	Sltstn	Dk. grey massive		Dirty sltstn 25 cm sampled
			0.02	78.26	78.28	27	Mudstn, carb	Blk		Coaly
		Blocky	0.12	78.28	78.40	28	Coal	Blk		
10/79.27		Crushed	0.36	78.40	78.76	28	Coal	Blk		
		V. Broken	0.48	78.76	79.24	29	Coal	Blk		
		Blocky	0.13	79.24	79.37	30	Carb. mudstn	Dk. grey massive		Clean bright
		Blocky	0.06	79.37	79.43	30	Coal	Blk		
		Blocky	0.09	79.43	79.52	30	Mudstn	Blk. massive		
		Broken	0.79	79.52	80.31	31	Coal	Blk		
		Blocky	0.24	80.31	80.55	32	Coal	Blk		
			0.02	80.55	80.57	33	Mudstn	Blk		
		Broken	1.73	80.57	82.30	33	Sltstn	Dk. grey massive		Floor
			0.06				Coal	Blk		23 cm taken
	85	Broken	3.06				Sltstn	Med. grey v. thin		Pyrite banding
12/88.41			2.69				Sltstn	Med. grey massive		Intbd ss/sltstn 10/90
		V. Broken	1.72				Silty mudstn	Dk. grey massive		Dirty
		Crushed	0.58	89.52	90.10	34	Coal	Blk		
	60	V. Broken	0.69				Mudstn	Dk. grey massive		
13/91.46		Crushed	0.31				Mudstn	Blk massive		Coaly. Mixed mudstn/coal
	70	Broken	5.48				Sltstn	Med. grey vthin		Intbd ss/sltstn 35/65
16/109/76	72	Blocky	13.41				SS vfg	Lt. grey massive		Carb. lens on occasion. Occ. B. valves present in beds u to 5 cm thick
17/115.85		Blocky	6.11				SS fg	Lt. grey massive		A/A. Bvalve horizons A/A. Occ. burrows (1 cm wide) bioturbation
18/121/95	79		6.15				SS fg	Lt. grey massive		Rip-up clast horizons up to 10 cm carb. lens near base. TD.

PROJECT Telkwa
DATE Oct 4/92
HOLE # T92D-36
SITE #
CORE TYPE NQ
GEOLOGIST Angelo

CONTRACTOR J. T. Thomas
LOGGING CO. BPB
CASING 22.87
LOGGER Brian

BOX MARK	BCA	CORE STATE	INTERV TH	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT	NOTES
			22.87	0.00	22.87					Casing
1/24.39		Broken	1.14				Sltstn	Light brown, vthin		Intbd ss/sltstn. Poorly consol
		Very broken	0.27				Mudstn	Dark brown, massive		Very carb.
			5.90				Sltstn	Light brown, vthin		Intbd ss/sltstn (20/80). Poorly consol.
		Broken	0.31				Sltstn	Light brown, massive		Poorly consol.
		Blocky	0.13	30.49	30.62	1	Coal	Black		Pyrite bands up to 1/2 cm.
		Crushed	1.05	30.62	31.67	2	Coal	Black		
		Blocky	0.03	31.67	31.70	3	Coal	Black		Dirty
		Blocky	0.07	31.70	31.77	3	Mudstn	Dark brown, massive		
		Broken	0.23	31.77	32.00	3	Coal	Black		Sl. dirty, dull
		Broken	0.70	32.00	32.70	4	Coal	Black		Clean
		Broken	0.48	32.70	33.18	5	Coal	Black		Clean
2/30.48		Broken	0.22	33.18	33.40	6	Coal	Black		Dirty @ base - 2 cm
		Broken	1.18				Sltstn	Light brown, massive		Carb dirty sltstn grading to sl. carb clean sltstn @ base. Poorly consol.
			0.30				Mudstn	Black, massive		Coaly
		Crushed	0.21	34.86	35.07	7	Coal	Black		Very dirty
		Crushed	0.02	35.07	35.09	7	Sltstn	Black		
		Crushed	0.08	35.09	35.17	7	Coal	Black		Very dirty
3/36.59	67	Broken	1.04				Sltstn	Medium grey, vthin		Intbd ss/sltstn (30/70)
	71		6.52				Sltstn	Medium grey, vthin		A/A (5/95) Carb near base
			0.17				Coal	Black		Very dirty
			0.75				Mudstn	Black, massive		Very carb mudstn. Thin coal bands
			2.02				Sltstn	Dark grey, massive		Dirty sltstn. Plant debris.
			1.33				Sltstn	Dark grey, massive		A/A w. intbd carb zones
			2.20				Mudstn	Black		Intbd coal/sltstn/mudstn (30/20/50)
			0.08				Mudstn	Light grey, massive		Bentonitic Mudstn
			0.07				Carb mudstn	Black		
			0.73				Sltstn	Medium grey, massive		Roof samples
			0.04	51.87	51.91	8	Coal	Black		Clean, dull
			0.06	51.91	51.97	8	Coal	Black		Intbd coal/mudstn (60/40)
			0.25	51.97	52.22	9	Coal	Black		Dull, clean
			0.93	52.22	53.15	10	Coal	Black		Clean bright
			0.11	53.15	53.26	11	Mudstn	Light brown, massive		Carb @ top. Volcaniclastics
			0.02	53.26	53.28	11	Coal	Black		Mixed mudstn A/A & Coal
			0.66	53.28	53.94	12	Coal	Black		
			0.02	53.94	53.96	13	Mudstn	Dark brown		Volcaniclastic mixed w. coal.
6/54.88			0.74	53.96	54.70	13	Coal	Black		Bright clean, 2 cm sample removed for reflectance testing @ RCDM. Sample #1 - Occ. dirty bands.
			0.29	54.70	54.99	14	Coal	Black		Sl. dirty
6/57.93	55		2.60	54.99		15	Sltstn	Medium grey, massive		25 cm floor sampled
			2.53				Sltstn	Medium grey, vthin		Intbd vfg ss/sltstn (20/80)
7/60.98			0.33				SS, cgr	Light grey, massive		Clean s&p ss
			0.92				SS, cgr	Light grey, massive		Intbd (vfg ss/sltstn)/cg. ss (10/90)
			1.92				SS			Intbd A/A (70/30)
			0.34				SS, cgr	Light grey, massive		Subangular s&p
			0.31				Silty mudstn	Dark grey, massive		
			0.36				SS	Light grey, massive		SS A/A
	43		4.80				Sltstn	Medium grey, vthin		Intbd vfg ss/sltstn (30/70)
9/70.12	40		0.61				Sltstn	Medium grey, vthin		A/A - T.D.

PROJECT **Telkwa**
DATE Oct. 5/92
HOLE # T92D-37
SITE #
CORE TYPE NQ
GEOLOGIST Angelo

CONTRACTOR J. T. Thomas
LOGGING CO. BPB
CASING 13.72
LOGGER Brian

BOX MARK	BCA	CORE STATE	INTERV TH	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUCT	NOTES
1/13.72			13.72	0	13.72					Casing
1/15.24		Broken	1.45				Silty mudstn	Medium grey, massive		Dull poorly consol.
		Broken	0.23	14.93	15.16	1	Coal			Clean
		Broken	0.54	15.16	15.70	2	Coal			Clean, dirtier near base
		Crushed	0.01	15.70	15.71	3	Mudstn			
		Broken	0.29	15.71	16.00	3	Coal			Sl. dirty
		Broken	0.51	16.00	16.51		Mudstn	Dark grey, massive		Carb @ top. Poorly consol.
		Broken	1.95	16.51	18.46		Mudstn	Medium grey, massive		Poorly consolidated
		Very broken	0.30	18.46	18.76	4	Coal	Black		Dirty coal
		Very broken	0.40				Carb mudstn	Dark grey		
2/21.34		Very broken	1.89				Sltstn	Medium grey, massive		Poorly consol. muddy sltstn
	59		2.44				Sltstn	Medium grey, vthin		Intbd vfg ss/sltstn (35/65)
			0.27				Mudstn			
			0.17	23.68	23.85		Coal	Black		Dirtier near base
2/24.39			0.16	23.85	24.01		Carb mudstn	Black, massive		
			4.45				Sltstn	Medium grey, massive		Carb zones up to 10 cm
	44		1.85				Sltstn	Medium grey, vthin		Intbd vfg ss/sltstn (40/60)
4/36.59	51		5.60				Sltstn	Medium grey, Vthin		A/A 45/55
	58		1.87				Sltstn	Medium grey, vthin		A/A 25/75
			5.20				SS, vfg	Medium grey, massive		Clean s&p SS
7/60.98	72		15.25				SS, vfg	Medium grey, massive		A/A bivalves horizons present throughout in bands up to 25 cm.
			4.36				SS, fg	Medium grey, massive		No more bivalves. Otherwise A/A
11/76.83	69		11.49				SS, fg	Medium grey, thin		Masive SS A/A w. carb lens & vfg ss beds w/in T.D.

PROJECT	**Telkwa**	CONTRACTOR	J.T. Thomas
DATE	Oct. 4/92	LOGGING CO.	BPB
HOLE #	**T92D-38**	CASING	12.2
SITE #		LOGGER	Al Bretton
CORE TYPE	NQ		
GEOLOGIST	Angelo		

BOX MARK	BCA	CORE STATE	INTERVAL THK	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUC	NOTES
			12.20	0	12.2					Casing
		V. Broken	1.28				Silty mudstn	Med. brown massive		Poorly consol.
		V. Broken	0.53	13.48	14.01	1	Carb. mudstn	Blk		Intbd thin coal/carb. mudstn
			0.06	14.01	14.07	1	Mudstn	Lt. grey		Volcanic ash layer. Small feldspar X/S visible
		Blocky	0.25	14.07	14.32	2	Coal	Blk		Bright clean
		Broken	0.36	14.32	14.68	3	Coal	Blk		
1/15.24		V. Broken	0.22	14.68	14.90	3	Coal	Blk		Bright
			0.12	14.90	15.02	4	Coal	Blk		Very dirty
		Broken	0.24	15.02	15.26	4	Coal	Blk		Clean bright
		Broken	0.12	15.26	15.38	4	Coal	Blk		Sl. dirty
		Broken	0.45	15.38	15.83	5	Coal	Blk		
		Broken	0.22	15.83	16.05	6	Coal	Blk		
		Broken	0.02	16.05	16.07	6	Mudstn	Blk		Very carb
		Broken	0.02	16.07	16.09	6	Coal	Blk		
		Broken	0.85	16.09	16.94	7	Silty Mudstn	Med. grey massive		25 cm. Floor taken
		Broken	0.11	16.94	17.05		Coal	Blk		Dirty bands @ top & centre
			0.07				Mudstn	Lt. grey massive		Sl. bentonitic
			0.66				Mudstn	Blk		Very carb/coaly
2/21/34	87	Broken	3.14				Silty ss vfg	Med. grey v.thin		Intbd ss/siltstn. 55/45 sl. carb @ top
	88		6.61				Sltstn	Med. grey v.thin		A/A 40/60 Occ. SSD
			2.10				SS vfg.	Lt. grey massive		
4/30.48			0.50				SS vfg.	Lt. grey massive		A/A but pyrite bands & blebs assoc. w. coaly bands
4/33.53		Blocky	3.08				SS vfg.	Lt. grey massive		Bivalve horizons
	77		9.05				SS vfg.	Lt. grey massive		Occ. bivalves & Carb lens. Occ. pyrite

PROJECT	Telkwa	CONTRACTOR	J.T. Thomas
DATE	Sept. 29/92	LOGGING CO.	BPB
HOLE #	T92D-39C	CASING	5.2
SITE #		LOGGER	Al Bretton
CORE TYPE	NQ		
GEOLOGIST	Angelo		

BOX MARK	BCA	CORE STATE	INTERVAL THK	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUC	NOTES
Run 1	81	Broken	0.47	5.2			Mudstn	Lt. grey massive		Bentonitic mudstn well consol. *silty esp. @ top
			0.10				Sltstn	Blk, massive		Very carb. coaly bands up to 12 cm.
2			0.50				Sltstn			Intbd carb. sltstn A/A/fg ss (85/15)
			0.23	6.45	6.68	1	Mudstn	Blk v. thin		
		Blocky	0.03	6.68	6.71	2	Coal	Blk		
3		Blocky	0.17	6.71	6.88	2	Coal			
		Blocky	0.69	6.88	7.57	3	Coal			Clean, bright banding
		Blocky	0.13	7.57	7.70	3	Coal			In shoe clean
4	1.5	Blocky	0.59	7.70	8.29	4	Coal	Blk		Clean
		Blocky	0.09	8.29	8.38	5	Mudstn	Brown		Carb.
		Blocky	0.21	8.38	8.59	5	Coal	Blk		Clean
		Blocky	0.01	8.59	8.60	5	Coal	Blk		Dirty
		Blocky	0.66	8.60	9.26	6	Coal	Blk		Clean
	1.5	V. Broken	0.72	9.26	9.98	7	Coal	Blk		Possible core loss
		Blocky	0.01	9.98	9.99	7	Mudstn	Brown		Ash/Pyroclastics
		Blocky	0.82	9.99	10.81	8	Coal	Blk		Minor visible pyrite
			0.22	10.81	11.03	9-Jan	Coal	Blk		Sl. dirty
			0.10	11.03	11.13	10	Mudstn	Blk		Carb. floor
			0.04	11.13	11.17	10	SS fg	Brown		Dirty carb
			0.09	11.17	11.26	10	Coal	Blk.		Dirty
			0.22	11.26	11.48		Mudstn	Brown		
			0.11	11.48	11.59	11	Coal	Blk		Very dirty
			0.17	11.59	11.76	11	Coal	Blk		Clean. Lower 3 cm = dirty

PROJECT	Telkwa	CONTRACTOR	J.T. Thomas
DATE	Sept. 29/92	LOGGING CO.	BPB
HOLE #	T92D-41	CASING	4.57
SITE #		LOGGER	Al Bretton
CORE TYPE	NQ		
GEOLOGIST	Angelo		

BOX MARK	BCA	CORE STATE	INTERVAL THK	FROM	TO	SAMPLE #	ROCK TYPE	DESCRIPTION	SED STRUC	NOTES
			4.72	0	4.72					
		Broken	0.03	4.72	4.75		Mudstn	Blk		Carb
		Crushed	0.12	4.75	4.87		Coal	Blk		#3 lower coal
2/15.24	81	Broken	9.43				Sandy sltstn	Med. grey v.thin		Intbd. ss/sltstn 5/95. Poorly consolidated
	84	Broken	1.71				Carb. sltstn	Dk. grey v.thin		A/A but carb.
		Broken	0.61			1	Sltstn	Med. grey v. thin		Intbd ss/sltstn 10/90. Abrupt lower contact 25 cm tkane
		Blocky	0.24	16.68	16.92	2	Coal	Blk		Clean sl. dirty @ top
3/18.29		Blocky	0.89	16.92	17.81	3	Coal	Blk		Clean
		Blocky	0.04	17.81	17.85	3	Coal	Blk		Clean
		Blocky	0.08	17.85	17.93	4	Mudstn	Dk. grey		Coaly
		Broken V.	0.17	17.93	18.10	4	Coal	Blk		
		Blocky	0.05	18.10	18.15	4	Coal	Blk		Very dirty
		Blocky	0.01	18.15	18.16	4	Mudstn	Med. grey		
		Broken	0.59	18.16	18.75	5	Coal	Blk		Sl. dirtier @ base Re--- Sample #2**
		Blocky	0.23	18.75	18.98	6	Coal	Blk		
		Blocky	0.01	18.98	18.99	6	Coal	Blk		Very Dirty
		Broken	0.43	18.99	19.42	7-Jan	Silty Mudstn	Med. grey massive		
		Blocky	0.09	19.42	19.51	7	Mudstn	Blk v. thin		Coaly
		Blocky	0.51	19.51	20.02	8	Coal	Blk.		
	73	Broken	2.11				SS vfg.	Med. grey vthin		Intbd vfg ss/sltstn 55/45
	83	Broken	5.85				Sltstn	Med. grey vthin		A/A 45/55
5/33.54			5.65				SS vfg.	Lt. grey massive		Occ pyrite banding assoc. with carb. zones
6/39.63			6.23				SS fg.	Lt. grey massive		A/A
9/54.88			15.25				SS fg.	Lt. grey massive		A/A Bivalve horizons up to 20 cm @ top*

Hole: T92R06 Project: Telkwa 92
Site: 27 Date Finished: 09/05/92 (Month/Day/Year)

Torrens Location:
lsd sect twp rg w Lithology by: Don
Drill Contr: McAuley
Surveyed Location: Driller: McAuley
N: 0.0 Geoph. Comp:
E: 0.0
EL: 0.0 Logs: gamma sonic
density neutron
Casing: 0.0 caliper electric
Case Type: verticality dipmeter
Downhole Units: Feet
other:
Comments:

DEPTH (ft)	DEPTH (m)	DESCRIPTION	COMMENTS
76.0	23.18	till	Clay with boulders
110.0	33.55	silt	
120.0	36.60	sandy siltstone, dark gray	Water
140.0	42.70	mudstone	
250.0	76.25	silt, light gray	
260.0	79.30	silt, dark gray	
313.0	95.47		
335.0	102.18	sandy siltstone	
340.0	103.70	sandy siltstone	Sandstone (fine)
352.0	107.36	silty mudstone	
391.0	119.26	sandy siltstone	Sandstone (fine)
392.0	119.56	COAL (clean)	Volcanic
430.0	131.15	sandy siltstone, medium soft	Multi coloured
460.0	140.30		
500.0	152.50	silt, dark gray, hard	

Hole: T92R08 Project: Telkwa 92
Site: 18 Date Finished: 09/07/92 (Month/Day/Year)

Torrens Location:
lsd sect twp rg w Lithology by: Don
Drill Contr: McAuley
Surveyed Location: Driller: McAuley
N: 0.0 Geoph. Comp:
E: 0.0
EL: 0.0 Logs: gamma sonic
density neutron
Casing: 0.0 caliper electric
Case Type: verticality dipmeter
Downhole Units: Feet
other:

Comments:

DEPTH (ft)	DEPTH (m)	DESCRIPTION	COMMENTS
65.0	19.83	till	(gravel/clay) Water @ 65' in gravel
95.0	28.98	mudstone	
98.0	29.89	silty mudstone	Fractured (water)
122.0	37.21	silty mudstone, medium soft	(s/ss)
135.0	41.18	mudstone	
137.0	41.79	COAL (clean), hard	
147.0	44.84	sandy siltstone	
152.5	46.51	COAL (clean)	
198.0	60.39	sandy siltstone	(sandstone fine)
199.0	60.70	COAL (clean)	
208.0	63.44	sandy siltstone, medium soft	
215.0	65.58	carby	
218.0	66.49	COAL	Carb & brown shale
219.5	66.95	colluvium, dark gray	Soft mudstone stringers
296.0	90.28	silty mudstone	(silty sandstone) Carb
299.0	91.19	COAL	Carby
305.5	93.18	siltstone	
306.0	93.33		Coaly shale
313.0	95.47		Soft shale and coal
320.0	97.60	carby	
327.5	99.89	sandy siltstone	
331.0	100.96		Carby and gravel shale
335.0	102.18		Shaley coal
337.0	102.79	COAL	
338.5	103.24	silty mudstone	
340.0	103.70	COAL	
350.0	106.75	silty mudstone	
368.0	112.24	silty mudstone	
375.0	114.38	COAL (clean), hard	
396.0	120.78		Carby shale and siltstone
402.0	122.61		Interbedded siltstone and calcite
426.0	129.93	siltstone, medium soft	
440.0	134.20	interbedded siltstone & sandstone (med)	Some calcite

Hole: T92R10 Project: Telkwa 92
Site: 17 Date Finished: 09/08/92 (Month/Day/Year)

Torrens Location:
lsd sect twp rg w Lithology by: Don
Drill Contr: McAuley
Surveyed Location: Driller: McAuley
N: 0.0 Geoph. Comp:
E: 0.0
EL: 0.0 Logs: gamma sonic
density neutron
Casing: 0.0 caliper electric
Case Type: verticality dipmeter
Downhole Units: Feet
other:
Comments:

DEPTH (ft)	DEPTH (m)	DESCRIPTION	COMMENTS
16.0	4.88	till, gray	(gravelly) rocks
30.0	9.15	mudstone	
40.0	12.20	siltstone	
72.0	21.96	sandstone (medium), greenish gray	
80.0	24.40	mudstone, soft	
95.0	28.98	siltstone, dark gray	
100.0	30.50	sandy siltstone, hard	
105.0	32.03	silty mudstone, hard	
145.0	44.23	sandy siltstone, dark green, hard	
151.0	46.06	mudstone, soft	
160.0	48.80	sandy siltstone, dark brown, hard	
186.0	56.73	silty mudstone	Calcite @ 178-180 (some soft bands)
201.0	61.31	mudstone, soft	
220.0	67.10	silty mudstone, greenish gray	
234.0	71.37	silty mudstone	
241.0	73.51	mudstone	
247.0	75.33	interbedded siltstone & sandstone (med), dark brown	Some calcite
255.0	77.77	sandy siltstone, dark gray	
270.0	82.35	interbedded siltstone & sandstone (med)	
295.0	89.97	sandy siltstone	Fine grained
307.0	93.63	silty mudstone	
320.0	97.60	sandy siltstone, hard	

Hole: T92R11 Project: Telkwa 92
Site: 21 Date Finished: 09/09/92 (Month/Day/Year)

Torrens Location:
lsd sect twp rg w Lithology by: Don
Drill Contr: McAuley
Surveyed Location: Driller: McAuley
N: 0.0 Geoph. Comp:
E: 0.0
EL: 0.0 Logs: gamma sonic
density neutron
Casing: 0.0 caliper electric
Case Type: verticality dipmeter
Downhole Units: Feet
other:

Comments:

DEPTH (ft)	DEPTH (m)	DESCRIPTION	COMMENTS
4.0	1.22	till	
19.0	5.80	siltstone	
23.0	7.02	till	Pebbles
74.0	22.57	mudstone, soft	Fractured @ 35 - 70'
76.0	23.18	COAL	
78.0	23.79		Carby shale and coal
90.0	27.45	mudstone	
92.5	28.21	COAL	
93.8	28.61	mudstone	
94.5	28.82	COAL	
103.0	31.42	, dark gray	
120.0	36.60	mudstone, light gray	
132.0	40.26	mudstone, dark gray	
140.0	42.70	sandy siltstone, dark gray, medium soft	
147.0	44.84	mudstone	Carby - log through pipe
149.0	45.45	COAL	
156.0	47.58	, soft	Carby shale coal mixed
167.0	50.94		Carby shale
170.0	51.85	sandy siltstone, dark gray, medium soft	Trip to log open
195.0	59.48	mudstone	
199.0	60.70		Carby shale
206.0	62.83	, dark gray	
208.0	63.44	COAL	Carby, log time 2.5 hrs.
218.0	66.49	silty mudstone, medium soft	
246.0	75.03	sandy siltstone, light gray, medium soft	
258.0	78.69	silty mudstone, dark gray, medium soft	
260.0	79.30	COAL	
264.5	80.67	silty mudstone	
265.5	80.98		Coal and carby shale
270.0	82.35	silty mudstone, dark gray	
273.0	83.27	COAL	Some carb shale
276.0	84.18		Carby shale coal and bent.
302.0	92.11	silty mudstone, light gray	

T9QR11

309.0	94.25	sandy siltstone, light gray, medium soft	
322.0	98.21	mudstone, light gray	
350.0	106.75	sandy siltstone	- Siltstone interbedded
370.0	112.85	sandy siltstone, light gray	
387.0	118.04	silty mudstone	Interbedded - multicolored
391.0	119.26	mudstone, brown	- Greenish
400.0	122.00	silty mudstone, hard	

Hole: T92R13 Project: Telkwa 92
Site: 16 Date Finished: 09/11/92 (Month/Day/Year)

Torrens Location:
lsd sect twp rg w Lithology by: Don
Drill Contr: McAuley
Surveyed Location: Driller: McAuley
N: 0.0 Geoph. Comp:
E: 0.0
EL: 0.0 Logs: gamma sonic
density neutron
Casing: 0.0 caliper electric
Case Type: verticality dipmeter
Downhole Units: Feet
other:
Comments:

DEPTH (ft)	DEPTH (m)	DESCRIPTION	COMMENTS
16.0	4.88	till	
17.5	5.34	mudstone, soft	
22.5	6.86	COAL (clean)	
26.0	7.93	mudstone, soft	
26.5	8.08	COAL	
36.0	10.98	mudstone, soft	
41.0	12.51	COAL (clean)	
42.0	12.81	COAL	Bentonite
51.0	15.56	silty mudstone, gray	
57.0	17.39	sandy siltstone	
61.5	18.76	silty mudstone	
64.0	19.52	COAL	Some carby shale
71.0	21.66	silty mudstone	
77.5	23.64	COAL	Some carb
95.0	28.98	mudstone, light gray	Interbedded s/ss fine
135.0	41.18	sandy siltstone	Some mudstone
140.0	42.70	interbedded siltstone & sandstone (med), brown	Trace of coal @ 138.5
154.0	46.97	silt	
160.0	48.80	sandy siltstone	With calcite
170.0	51.85	sandy siltstone, dark gray, medium soft	
180.0	54.90	silty mudstone	Interbedded s/ss and calcite
220.0	67.10	silty mudstone	
250.0	76.25	silty mudstone, dark gray, medium soft	Carby

Hole: T92R14 Project: Telkwa 92
Site: 8 Date Finished: 09/11/92 (Month/Day/Year)

Torrens Location:
lsd sect twp rg w Lithology by: Don
Drill Contr: McAuley
Surveyed Location: Driller: McAuley
N: 0.0 Geoph. Comp:
E: 0.0
EL: 0.0 Logs: gamma sonic
density neutron
Casing: 0.0 caliper electric
Case Type: verticality dipmeter
Downhole Units: Feet
other:

Comments:

DEPTH (ft)	DEPTH (m)	DESCRIPTION	COMMENTS
10.0	3.05	till	
22.0	6.71	mudstone, soft	
24.0	7.32	COAL	
36.0	10.98	silty mudstone, light gray	
42.0	12.81	COAL	
44.0	13.42	silty mudstone, light gray, soft	
51.0	15.56	COAL	Carby shale and bentonite stringers
58.0	17.69	silty mudstone	Carby
59.0	18.00	COAL, light gray	
60.0	18.30	silty mudstone, soft	
85.0	25.93	silty mudstone, light gray, soft	Trace coal @ 79'
94.5	28.82	COAL	Some carby shale
147.0	44.84	sandstone (medium), light gray	
185.0	56.43	sandy siltstone	Interbedded siltstone
240.0	73.20	silty mudstone	Interbbed ss/f (brownish/green)

Hole: T92R15 Project: Telkwa 92
Site: 15 Date Finished: 09/11/92 (Month/Day/Year)

Torrens Location:
lsd sect twp rg w Lithology by: Don
Drill Contr: McAuley
Surveyed Location: Driller: Mac Bette
N: 0.0 Geoph. Comp:
E: 0.0
EL: 0.0 Logs: gamma sonic
density neutron
Casing: 0.0 caliper electric
Case Type: verticality dipmeter
Downhole Units: Feet
other:

Comments:

DEPTH (ft)	DEPTH (m)	DESCRIPTION	COMMENTS
37.0	11.29	till, dark brown	Boulders and gravel
55.0	16.78	mudstone, light gray, soft	
74.0	22.57	sandy siltstone, light gray, soft	
97.0	29.59	sandy siltstone, light gray, hard	
125.0	38.13	sandy siltstone, hard	Interbedded mudstone
129.0	39.35	silty mudstone, dark gray	
142.0	43.31	sandy siltstone, light gray, medium soft	
158.0	48.19	silty mudstone, dark gray, medium soft	Interbedded siltstone
200.0	61.00	sandy siltstone, medium soft	
205.0	62.53	mudstone, medium soft	
280.0	85.40	silty mudstone, light gray	Interbedded brown/green

Hole: T92R16 Project: Telkwa 92
Site: 14 Date Finished: 09/18/92 (Month/Day/Year)

Torrens Location:
lsd sect twp rg w Lithology by: Don
Drill Contr: McAuley
Surveyed Location: Driller: McAuley
N: 0.0 Geoph. Comp:
E: 0.0
EL: 0.0 Logs: gamma sonic
density neutron
Casing: 0.0 caliper electric
Case Type: verticality dipmeter
Downhole Units: Feet
other:

Comments:

DEPTH (ft)	DEPTH (m)	DESCRIPTION	COMMENTS
13.0	3.97	till	Boulders - cased to 18'
35.0	10.68	mudstone	
41.0	12.51	sandy siltstone, light gray, medium soft	
50.0	15.25	mudstone, light gray	sandy siltstone
103.0	31.42	sandy siltstone, light gray	Interbedded s/md - Very hard @ 85'
110.0	33.55		Carby shale with coal traces
126.0	38.43	mudstone, dark gray	
128.5	39.19	COAL	
130.0	39.65		Carby shale and coal
130.5	39.80	COAL	
132.5	40.41	mudstone, dark gray, soft	
135.5	41.33	COAL	
140.0	42.70	mudstone, dark gray	
144.0	43.92		Coal and carby shale
150.5	45.90	COAL	
152.5	46.51	mudstone, dark gray	Some coal
155.0	47.28	mudstone	
158.0	48.19	silty mudstone	s/ss
205.0	62.53	mudstone, soft	Some coal and carb shale traces
280.0	85.40	silty mudstone, light gray	s/ss interbedded

Hole: T92R17 Project: TELKWA 92
Site: 11 Date Finished: 09/19/92 (Month/Day/Year)

Torrens Location:
lsd sect twp rg w Lithology by: Dan
Drill Contr: McAuley Drilling
Surveyed Location: Driller: MacBeth
N: 0.0 Geoph. Comp:
E: 0.0
EL: 0.0 Logs: gamma sonic
density neutron
Casing: 0.0 caliper electric
Case Type: verticality dipmeter
Downhole Units: Feet
other:

Comments:

DEPTH (ft)	DEPTH (m)	DESCRIPTION	COMMENTS
7.0	2.14	till	
28.0	8.54	mudstone, light gray	
32.5	9.91	silt, gray, hard	
181.0	55.21	mudstone, light gray, medium soft	Interbedded s
187.0	57.04	sandstone (fine), dark green, medium soft	Pyrite hilites
190.0	57.95	mudstone, light gray, medium soft	
194.0	59.17	mudstone, greenish gray, medium soft	Interbedded grey mdsd brown slt pyrite
197.0	60.09	silt, greenish gray, hard	Gry ss intbd browns sltstn carb trcs
202.0	61.61	mudstone, dark brown, medium soft	Dark brown to black mdsn, carby
204.0	62.22	COAL (clean), black, hard	
225.0	68.63	mudstone, gray, medium soft	
236.0	71.98	mudstone, dark gray, medium soft	
255.0	77.77	silt, gray, hard	Interbedded pyrite hilites
277.0	84.49	mudstone, gray, medium soft	
281.0	85.71	mudstone, dark gray, medium soft	Carby
295.0	89.97	mudstone, dark gray, medium soft	
299.0	91.19	COAL (clean), black, hard	297.5 4" parting
304.0	92.72	mudstone, light gray	
309.0	94.25	COAL (dirty), black, hard	
310.5	94.70	mudstone, gray	
311.5	95.01	COAL (dirty), black	
331.0	100.96	mudstone, gray	
334.5	102.02	silt, gray	
336.5	102.63	COAL (clean), black	
344.0	104.92	silt, gray	
347.5	105.99	COAL (clean), black	
353.0	107.67	mudstone, brown	With bentonite bands
359.0	109.50	mudstone, gray	Calcite bands
360.0	109.80	COAL (clean), black	
364.5	111.17	mudstone, gray	
367.0	111.94	mudstone, black	Carb coal tracks
371.0	113.16	mudstone, gray	
384.0	117.12	silt, gray	

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385.0 117.43 | mudstone, brown |
396.5 120.93 | COAL (clean), black, hard |
419.0 127.80 - mudstone, gray -

Hole: T92R-18 Project: TELKWA 92
Site: 13 Date Finished: 09/20/92 (Month/Day/Year)

Torrens Location:
lsd sect twp rg w Lithology by: Dan
Drill Contr: McAuley Drilling
Surveyed Location: Driller: MacBeth
N: 0.0 Geoph. Comp:
E: 0.0
EL: 0.0 Logs: gamma sonic
density neutron
Casing: 0.0 caliper electric
Case Type: verticality dipmeter
Downhole Units: Feet
other:
Comments:

DEPTH (ft)	DEPTH (m)	DESCRIPTION	COMMENTS
14.0	4.27	till	
16.0	4.88		Coal and carb shale
18.0	5.49	mudstone, light gray	
18.3	5.58	COAL	
45.5	13.88	mudstone, light gray, medium soft	
46.3	14.12	COAL	
56.0	17.08	mudstone, light gray, medium soft	
160.0	48.80	silty mudstone, medium soft	T.D.

Hole: T92R19 Project: TELKWA 92
Site: 12 Date Finished: 09/20/92 (Month/Day/Year)

Torrens Location:
lsd sect twp rg w Lithology by: Dan
Drill Contr: McAuley Drilling
Surveyed Location: Driller: MacBeth
N: 0.0 Geoph. Comp:
E: 0.0
EL: 0.0 Logs: gamma sonic
density neutron
Casing: 0.0 caliper electric
Case Type: verticality dipmeter
Downhole Units: Feet
other:

Comments:

DEPTH (ft)	DEPTH (m)	DESCRIPTION	COMMENTS
14.0	4.27	till	Rocks
43.5	13.27	silty mudstone	
44.5	13.57		Coal and carby shale
63.5	19.37	silty mudstone, light gray, medium soft	
68.0	20.74	COAL	
72.5	22.11	silty mudstone, light gray	
75.0	22.88	COAL	
80.0	24.40	silty mudstone, light gray	
83.0	25.32	mudstone	Carby
97.5	29.74	mudstone, light gray, medium soft	
99.5	30.35	COAL	
100.5	30.65	mudstone	
112.0	34.16	COAL, medium soft	20 - 25 GPM in coal seams
118.0	35.99	silty mudstone, dark gray	
123.5	37.67	COAL	Some shale stringers
124.0	37.82	COAL	Bentonite
135.0	41.18	silty mudstone, dark gray	
138.0	42.09	COAL	
139.0	42.40	silty mudstone, light gray	
141.0	43.01		Carb shale
143.5	43.77	COAL	
160.0	48.80	mudstone	Mudstone and siltstone
166.0	50.63	silty mudstone	
166.5	50.78	COAL	
173.0	52.77	silty mudstone, dark gray	
179.5	54.75	COAL	
183.0	55.82	silty mudstone	
195.0	59.48	sandy siltstone, light gray	(fine)
220.0	67.10	sandy siltstone, brown	Brown and green

Hole: T92R21 Project: TELKWA 92
Site: 20 Date Finished: 09/21/92 (Month/Day/Year)

Torrens Location:
lsd sect twp rg w Lithology by: Dan
Drill Contr: McAuley Drilling
Surveyed Location: Driller: MacBeth
N: 0.0 Geoph. Comp:
E: 0.0
EL: 0.0 Logs: gamma sonic
density neutron
Casing: 0.0 caliper electric
Case Type: verticality dipmeter
Downhole Units: Feet
other:

Comments:

DEPTH (ft)	DEPTH (m)	DESCRIPTION	COMMENTS
9.0	2.75	till	Rocks
50.0	15.25	mudstone, light gray	
140.0	42.70	sandy siltstone, light gray	Mudstone interbedded
193.0	58.87	silty mudstone, dark brown, medium soft	Interbedded soft mdsn
202.0	61.61	mudstone	Green and grey siltstone, fractured
206.0	62.83	mudstone	Carby
208.5	63.59	COAL	
216.0	65.88	mudstone, dark gray	
217.5	66.34	silty mudstone	Coal and carb shale
219.0	66.80	mudstone, gray	
220.0	67.10		Carb shale
223.0	68.02	COAL	
233.0	71.07	silty mudstone, light gray, soft	
234.0	71.37	COAL	
250.0	76.25	silty mudstone, light gray, medium soft	
260.0	79.30	silt, light gray	
297.0	90.58	mudstone, dark gray, medium soft	
298.0	90.89	COAL	Carby shale
300.5	91.65	COAL	
303.0	92.41	mudstone, dark gray	
306.5	93.48	COAL	
310.0	94.55		Carby shale and some coal
319.0	97.30	silty mudstone, dark gray	
329.0	100.35	silty mudstone, dark gray	
330.0	100.65		Carby shale and coal
340.0	103.70	COAL	
348.0	106.14	mudstone, dark gray, medium soft	
353.0	107.67	COAL	
362.0	110.41	silty mudstone, light gray	
364.0	111.02	COAL	Some carb shale
366.0	111.63	mudstone, dark gray, medium soft	Carby
369.5	112.70	COAL	
390.0	118.95	mudstone, light gray	

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398.0	121.39	sandy siltstone, dark gray, hard	Very hard
401.0	122.31	mudstone	Carby shale and some coal
405.0	123.53	COAL	
410.0	125.05	mudstone, light gray	
425.0	129.63	sandy siltstone, hard	Very hard
440.0	134.20	sandy siltstone, greenish gray, hard	

Hole: T92R23 Project: TELKWA 92
Site: 25 Date Finished: 09/24/92 (Month/Day/Year)

Torrens Location:
lsd sect twp rg w Lithology by: Dan
Drill Contr: McAuley Drilling
Surveyed Location: Driller: MacBeth
N: 0.0 Geoph. Comp:
E: 0.0
EL: 0.0 Logs: gamma sonic
density neutron
Casing: 0.0 caliper electric
Case Type: verticality dipmeter
Downhole Units: Feet
other:
Comments:

DEPTH (ft)	DEPTH (m)	DESCRIPTION	COMMENTS
10.0	3.05	till	
87.0	26.54	silty mudstone, light gray	
120.0	36.60	sandy siltstone, dark gray, medium soft	
130.0	39.65	sandy siltstone	
210.0	64.05	silty mudstone, dark gray, medium soft	s/ss & sf
216.0	65.88	mudstone, light gray, soft	
232.0	70.76	silty mudstone, medium soft	
239.0	72.90		Carby shale and trace of coal
360.0	109.80	silty mudstone, light gray	
450.0	137.25	silty mudstone	Interbedded some br - predomon. green
460.0	140.30	silty mudstone, greenish gray, hard	
465.0	141.83	COAL	Lost air cire in coal
480.0	146.40	sandy siltstone, dark gray, hard	
497.0	151.59	sandy siltstone, greenish gray, hard	
512.5	156.31	silty mudstone, dark gray, medium soft	
518.0	157.99	COAL	
540.0	164.70	mudstone, dark gray	Carb shale - trace of coal @ 531

Hole: T92R25 Project: TELKWA 92
Site: 104 Date Finished: 09/24/92 (Month/Day/Year)

Torrens Location:
lsd sect twp rg w Lithology by: Dan
Drill Contr: McAuley Drilling
Surveyed Location: Driller: MacBeth
N: 0.0 Geoph. Comp:
E: 0.0
EL: 0.0 Logs: gamma sonic
density neutron
Casing: 0.0 caliper electric
Case Type: verticality dipmeter
Downhole Units: Feet
other:
Comments:

DEPTH (ft)	DEPTH (m)	DESCRIPTION	COMMENTS
10.0	3.05	till	
82.5	25.16	mudstone, light gray, soft	
87.5	26.69	COAL	1.' of coal
96.5	29.43	mudstone	
101.5	30.96	COAL, light gray	Parting @ 96'; 6' of coal
108.0	32.94	mudstone, medium soft	
111.0	33.86	COAL	3'
112.0	34.16	mudstone	
122.8	37.45	COAL	10.8'
129.0	39.35	mudstone, light gray, medium soft	
134.5	41.02	COAL	5.5'
143.0	43.62	mudstone, light gray, medium soft	
146.0	44.53	COAL	5.0'
148.5	45.29	mudstone, light gray, medium soft	
151.0	46.06	COAL	2.5'
161.0	49.11	mudstone, light gray, medium soft	
162.0	49.41		Carb shale coal
166.0	50.63	mudstone, light gray	Trace of coal @ 164
168.5	51.39	COAL	
200.0	61.00	mudstone, light gray	
226.0	68.93	silty mudstone, light gray, medium soft	
250.0	76.25	sandy siltstone, light gray, medium soft	
260.0	79.30	sandstone (coarse), greenish gray, hard	

Hole: T92R27 Project: TELKWA 92
Site: 1 Date Finished: 09/25/92 (Month/Day/Year)

Torrens Location:
lsd sect twp rg w Lithology by: Dan
Drill Contr: McAuley Drilling
Surveyed Location: Driller: MacBeth
N: 0.0 Geoph. Comp:
E: 0.0
EL: 0.0 Logs: gamma sonic
density neutron
Casing: 0.0 caliper electric
Case Type: verticality dipmeter
Downhole Units: Feet
other:
Comments:

DEPTH (ft)	DEPTH (m)	DESCRIPTION	COMMENTS
32.0	9.76	till	Gravel
39.5	12.05	COAL	Some carb shale 1.5' of coal
42.0	12.81	mudstone	Carby
43.4	13.24	COAL	1.4' of coal
56.5	17.23	mudstone	
59.5	18.15	COAL	3' of coal
63.0	19.22	mudstone, light gray	
66.5	20.28	COAL	3.5' of coal
92.0	28.06	mudstone, light gray, medium soft	
94.0	28.67	COAL	2.5' of coal and carby shale
102.5	31.26	mudstone, light gray	
112.5	34.31	COAL	10' of coal
116.0	35.38	silty mudstone	
129.0	39.35	sandy siltstone, light gray	
160.0	48.80	sandy siltstone, brown	Greenish

Hole: T92R28 Project: TELKWA 92
Site: 2 Date Finished: 09/27/92 (Month/Day/Year)

Torrens Location:
lsd sect twp rg w Lithology by: Dan
Drill Contr: McAuley Drilling
Surveyed Location: Driller: MacBeth
N: 0.0 Geoph. Comp:
E: 0.0
EL: 0.0 Logs: gamma sonic
density neutron
Casing: 0.0 caliper electric
Case Type: verticality dipmeter
Downhole Units: Feet
other:
Comments:

DEPTH (ft)	DEPTH (m)	DESCRIPTION	COMMENTS
28.5	8.69		Overburden
47.0	14.34		
56.0	17.08	- sandstone (medium), hard	- Gravel
121.0	36.91	mudstone, medium soft	Gravel
160.0	48.80	sandy siltstone, hard	
200.0	61.00	- sandy siltstone, light gray, hard	-

Hole: T92R29 Project: TELKWA 92
Site: 4 Date Finished: 09/28/92 (Month/Day/Year)

Torrens Location:
lsd sect twp rg w Lithology by: Dan
Drill Contr: McAuley Drilling
Surveyed Location: Driller: MacBeth
N: 0.0 Geoph. Comp:
E: 0.0
EL: 0.0 Logs: gamma sonic
density neutron
Casing: 0.0 caliper electric
Case Type: verticality dipmeter
Downhole Units: Feet
other:
Comments:

DEPTH (ft)	DEPTH (m)	DESCRIPTION	COMMENTS
40.0	12.20	till	
55.0	16.78	silty mudstone, light brown	
58.0	17.69	COAL, light gray	
58.5	17.84	mudstone	
59.0	18.00	COAL	
60.5	18.45		
62.0	18.91	COAL, light gray	
96.5	29.43	silty mudstone, medium soft	
99.5	30.35	COAL	Carby
144.0	43.92	silty mudstone, light gray, medium soft	
160.0	48.80	silty mudstone, light gray, hard	

Hole: T92R30 Project: TELKWA 92
Site: Date Finished: 09/28/92 (Month/Day/Year)

Torrens Location:
lsd sect twp rg W Lithology by: Dan
Drill Contr: McAuley Drilling
Surveyed Location: Driller: MacBeth
N: 0.0 Geoph. Comp:
E: 0.0
EL: 0.0 Logs: gamma sonic
density neutron
Casing: 0.0 caliper electric
Case Type: verticality dipmeter
Downhole Units: Feet
other:

Comments:

DEPTH (ft)	DEPTH (m)	DESCRIPTION	COMMENTS
22.0	6.71	till, gray	
40.0	12.20	silty mudstone, light gray, medium soft	
47.0	14.34	sandy siltstone, gray, hard	
50.0	15.25	silty mudstone, greenish gray	
55.0	16.78	sandy siltstone	
56.0	17.08	COAL	
60.0	18.30	silty mudstone, light gray	
96.0	29.28	sandy siltstone, hard	Greenish/grey
103.0	31.42	silty mudstone	Carby shale and coal traces
107.5	32.79	COAL	3.5' coal
139.0	42.40	sandy siltstone, light gray	
160.0	48.80	sandy siltstone, gray	
162.0	49.41	COAL	2.0' coal
187.0	57.04	silty mudstone, light gray	
190.5	58.10	COAL	3.5' coal
203.0	61.92	silty mudstone	
215.5	65.73	COAL, hard	2.5' coal
217.5	66.34	mudstone	Siltstone/mudstone
225.0	68.63	COAL	5.5' coal
227.5	69.39	silty mudstone, light gray	
230.5	70.30	COAL	3.0' coal
236.0	71.98	silty mudstone	Carby shale and coal traces
240.0	73.20	silty mudstone	
249.0	75.94	COAL	1.0' coal
250.0	76.25	mudstone, light gray.	
260.0	79.30	COAL, hard	
400.0	122.00		Interbedded brown/green sandstone/sltstn

Hole: T92R33 Project: TELKWA 92
Site: 107 Date Finished: 09/30/92 (Month/Day/Year)

Torrens Location:
lsd sect twp rg w Lithology by: Dan
Drill Contr: McAuley Drilling
Surveyed Location: Driller: MacBeth
N: 0.0 Geoph. Comp:
E: 0.0
EL: 0.0 Logs: gamma sonic
density neutron
Casing: 0.0 caliper electric
Case Type: verticality dipmeter
Downhole Units: Feet
other:
Comments:

DEPTH (ft)	DEPTH (m)	DESCRIPTION	COMMENTS
31.5	9.61	till	
33.5	10.22	COAL	2' coal
37.5	11.44	- silty mudstone	-
39.5	12.05	COAL	2' coal
54.0	16.47	mudstone	
58.0	17.69	- mudstone	- Mudstone with coal throughout
68.0	20.74	COAL, hard	10' coal
140.0	42.70	silty mudstone, light gray	
320.0	97.60	- sandy siltstone, brown	- Some fractured fine grained to medium

Hole: T92R35 Project: TELKWA 92
Site: 110 Date Finished: 10/01/92 (Month/Day/Year)

Torrens Location:
lsd sect twp rg w Lithology by: Dan
Drill Contr: McAuley Drilling
Surveyed Location: Driller: MacBeth
N: 0.0 Geoph. Comp:
E: 0.0
EL: 0.0 Logs: gamma sonic
density neutron
Casing: 0.0 caliper electric
Case Type: verticality dipmeter
Downhole Units: Feet
other:

Comments:

DEPTH (ft)	DEPTH (m)	DESCRIPTION	COMMENTS
37.0	11.29	till, gray	
195.0	59.48	silty mudstone, medium soft	
255.0	77.77	sandy siltstone, light gray, hard	
287.0	87.54	silty mudstone, light gray, medium soft	
288.0	87.84	COAL	
316.0	96.38	silty mudstone, soft	
319.0	97.30	COAL	carby shale
325.5	99.28	silty mudstone, light gray	
327.5	99.89	COAL	
328.0	100.04	mudstone	
337.0	102.79	COAL	
340.0	103.70	silty mudstone, light gray, medium soft	
367.0	111.94	silty mudstone, light gray, medium soft	
368.0	112.24	COAL	
370.0	112.85	silty mudstone, light gray	
374.0	114.07	COAL	
376.0	114.68	silty mudstone, light gray	
379.0	115.60	mudstone	Carby trace of coal
380.0	115.90	COAL	
392.0	119.56	silty mudstone, dark gray, medium soft	
414.0	126.27	mudstone, light gray, medium soft	
423.0	129.02	, brown	Carby/shale/bent/coal traces throughout
424.0	129.32	COAL	
426.0	129.93	mudstone	Coal and carby shale traces
430.0	131.15	mudstone, light gray	
500.0	152.50	silt, brown, hard	Medium grained

Hole: T92R39 Project: TELKWA 92
Site: 114 Date Finished: 10/01/92 (Month/Day/Year)

Torrens Location:
lsd sect twp rg w Lithology by: Dan
Drill Contr: McAuley Drilling
Surveyed Location: Driller: MacBeth
N: 0.0 Geoph. Comp:
E: 0.0
EL: 0.0 Logs: gamma sonic
density neutron
Casing: 0.0 caliper electric
Case Type: verticality dipmeter
Downhole Units: Feet
other:
Comments:

DEPTH (ft)	DEPTH (m)	DESCRIPTION	COMMENTS
7.5	2.29	till	Gravelly
14.0	4.27	COAL, soft	
21.0	6.41	siltstone	
36.0	10.98	COAL, medium soft	Some shale @ 34.5 - 36
52.0	15.86	siltstone, medium soft	
66.0	20.13	mudstone	Carby, coal chips 60 - 63
69.0	21.05	siltstone, green, hard	
71.0	21.66	COAL	Carby shale
73.0	22.27	siltstone	
88.0	26.84	sandstone (medium), light brown	
89.0	27.15	COAL	Carby shale
115.0	35.08	siltstone, light brown, hard	
205.0	62.53	siltstone, brown	Interbedded br/gr sandstone and siltstone

Hole: T92R40 Project: TELKWA 92
Site: Date Finished: 10/01/92 (Month/Day/Year)

Torrens Location:
lsd sect twp rg w Lithology by: Dan
Drill Contr: McAuley Drilling
Surveyed Location: Driller: MacBeth
N: 0.0 Geoph. Comp:
E: 0.0
EL: 0.0 Logs: gamma sonic
density neutron
Casing: 0.0 caliper electric
Case Type: verticality dipmeter
Downhole Units: Feet
other:

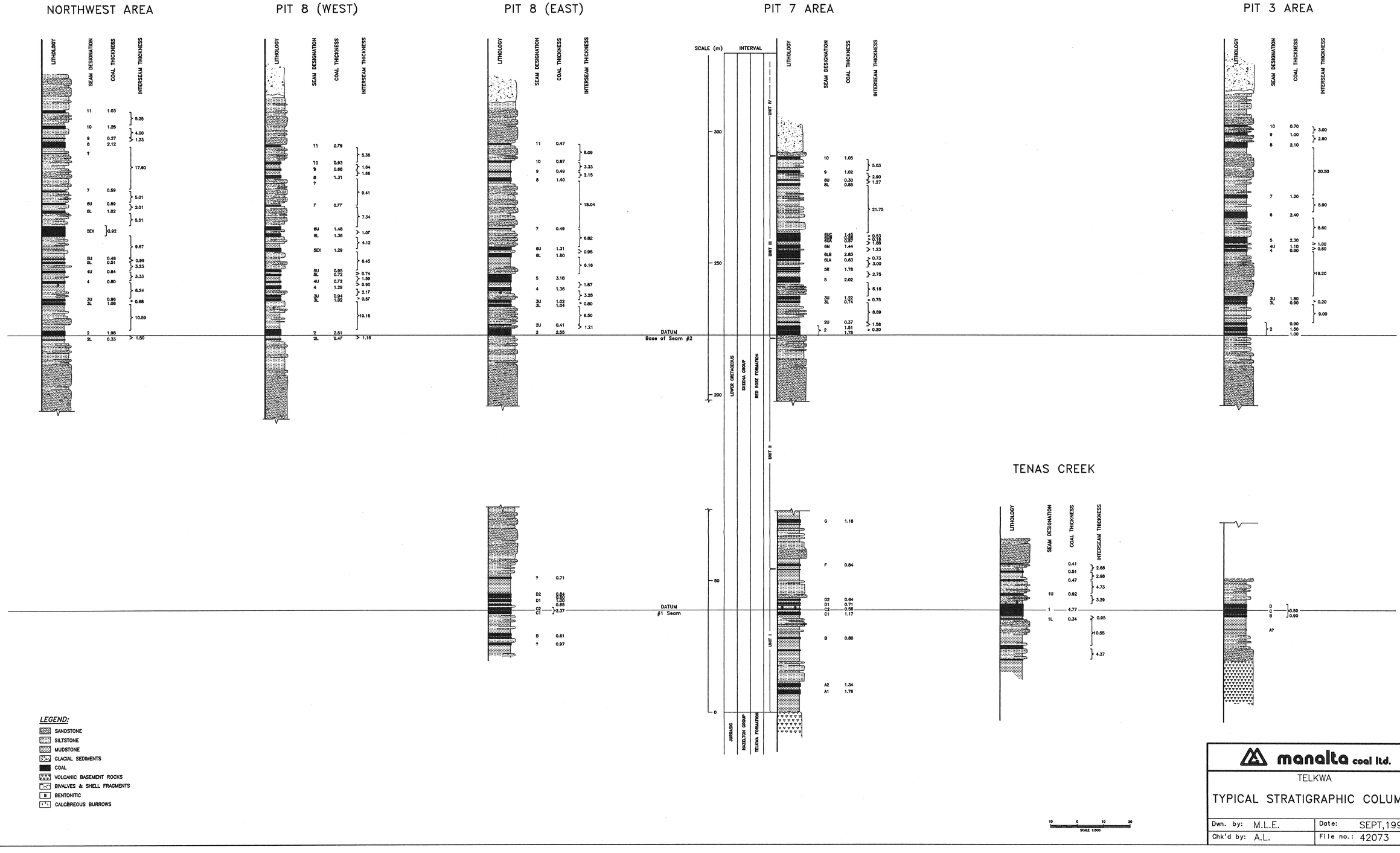
Comments:

DEPTH (ft)	DEPTH (m)	DESCRIPTION	COMMENTS
42.0	12.81	till	
74.0	22.57	sandstone (medium)	
76.5	23.33	-	- Bentic shale coal stringers
80.0	24.40		Bentic shale
82.0	25.01	mudstone, green	
89.0	27.15	-	- Bentic shale coal stringers
96.0	29.28	COAL	
96.4	29.40	, brown	Shale
100.5	30.65	- COAL	-
102.0	31.11	mudstone, gray	
106.0	32.33	COAL	Carby shaly
107.0	32.64	- mudstone, brown	-
108.0	32.94	COAL	Carby
111.0	33.86	mudstone, gray	
130.0	39.65	- sandstone (fine), brown	- Whitish
136.0	41.48	mudstone, dark gray	
150.0	45.75	sandstone (medium), brown	brown/white
156.0	47.58	- mudstone, dark gray	-
158.0	48.19	COAL	Carby
160.0	48.80	mudstone, green	Carby bent
161.5	49.26	- COAL	-
164.0	50.02		Bentic shale coal tr
169.0	51.55	siltstone	Bentic
179.0	54.60	- mudstone, dark gray	- Bentic
200.0	61.00	sandstone (fine)	with mudstone
220.0	67.10	sandstone (medium), hard	

Hole: T92R43 Project: TELKWA 92
Site: 96 Date Finished: 10/06/92 (Month/Day/Year)

Torrens Location:
lsd sect twp rg w Lithology by: Dan
Drill Contr: McAuley Drilling
Surveyed Location: Driller: MacBeth
N: 0.0 Geoph. Comp:
E: 0.0
EL: 0.0 Logs: gamma sonic
density neutron
Casing: 0.0 caliper electric
Case Type: verticality dipmeter
Downhole Units: Feet
other:
Comments:

DEPTH (ft)	DEPTH (m)	DESCRIPTION	COMMENTS
6.0	1.83	till	
22.0	6.71	gravel	
88.0	26.84	silty mudstone	
90.0	27.45	mudstone	Carby
98.5	30.04	silty mudstone	
100.0	30.50	COAL	
139.5	42.55	siltstone	Coal traces @ 112 & 128
159.6	48.68	COAL	6" shale @ 142
167.0	50.94	siltstone	
170.5	52.00		Carby shale coal traces bent
180.0	54.90	mudstone, gray	
185.0	56.43	sandstone (medium)	
188.0	57.34	silty mudstone	
192.0	58.56		Carby shale and coal traces
203.0	61.92	siltstone	
208.0	63.44		Shaley coal
214.0	65.27	siltstone	
226.5	69.08	, brown	Bentonite & carby
230.0	70.15	sandstone (fine)	
262.0	79.91	sandstone (fine)	Some siltstone
280.0	85.40	sandstone (medium), dark gray	Mudstone stringers



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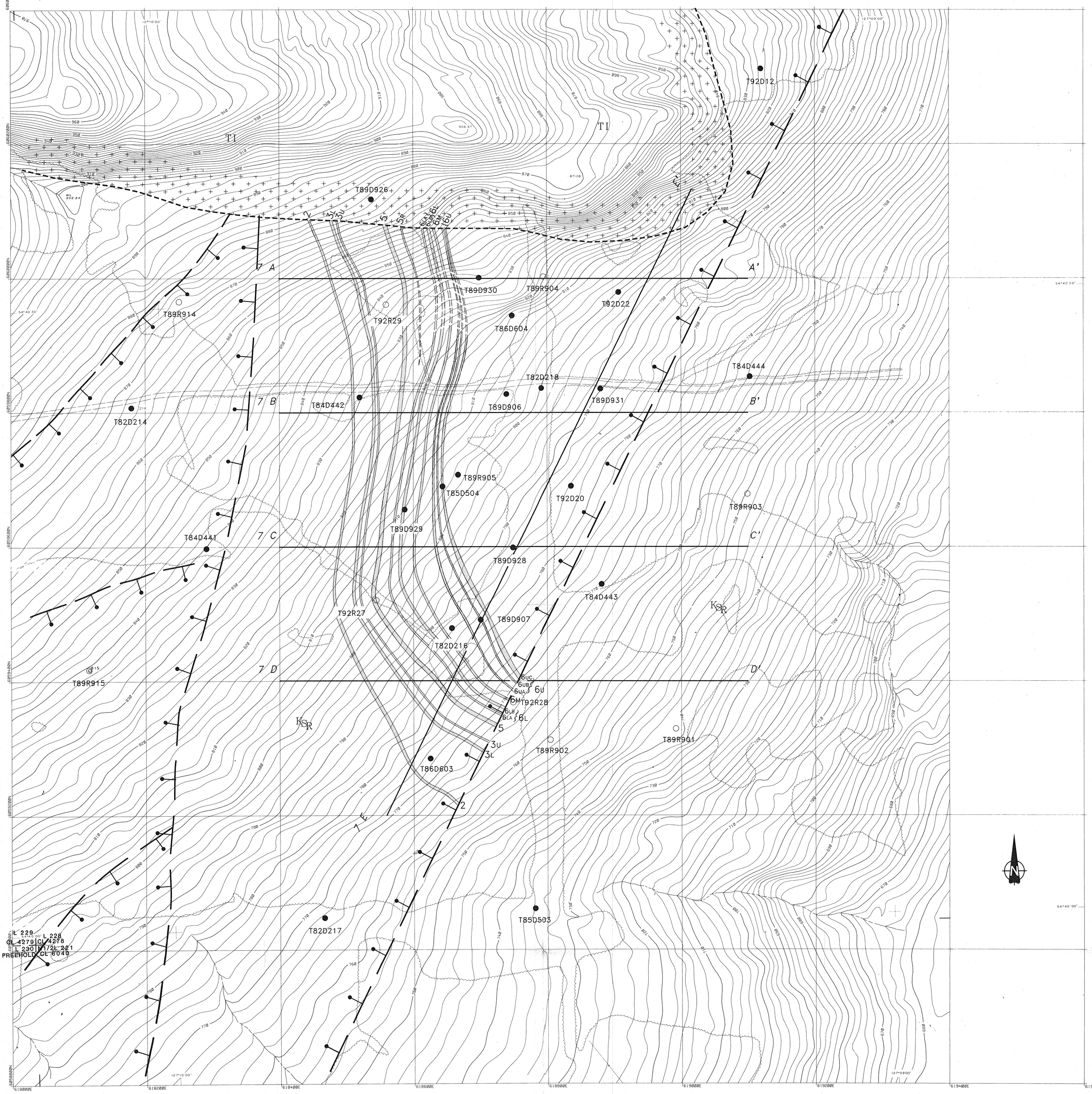
TELKWA

TYPICAL STRATIGRAPHIC COLUMNS

Dwn. by: M.L.E.	Date: SEPT,1993
Chk'd by: A.L.	File no.: 42073



SCALE

0 50 100 m

LEGEND:

- GEOLOGICAL CONTACT (APPROXIMATE)
- NORMAL FAULT (TEETH ON DOWNTHROWN SIDE)
- THRUST FAULT (TEETH ON UPTHROWN SIDE)
- TI — TERTIARY INTRUSIVE (GRANODIORITE)
- K_{SR} — SKEENA GROUP (CRETACEOUS) RED ROSE FORMATION –SANDSTONE, SILTSTONE, MUDSTONE & COAL
- SEAM SUBCROP POSITION:
  - APPROXIMATE
  - PRESUMED
- DIAMOND DRILL HOLE
- ROTARY DRILL HOLE
- 7 A A' — CROSS SECTION

manalta coal ltd.

TELKWA

WEST CEINTRAL B.C.

GEOLOGY MAP

PIT 7

AUTHOR: A.L.	SCALE: 1:2 000	DRAWN BY: M.L.E.
DATE: JULY,1993	REVISED:	DRAWING No: 42043 C
To Accompany		

TELKWA - PIT #7
Drill-hole Seam Intersections

	2 Seam								3 Seam				5 Seam					6 Lower Seam				6M Seam		6 Upper Seam						8 Seam						
Seam:	2A	2P	2B	2	ibrdn	2U	ibrdn	2B/3L	3L	3P	3U	ibrdn	5	ibrdn	5R	ibrdn	5/6LA	6LA	6LP	6LB	6P1	6M	6P2	6UA	6UP1	6UB	6UP2	6UC	ibrdn	8L	ibrdn	8U	ibrdn	9	ibrdn	10
	2a	2 prtg	2b			2-upr		ibrdn	3-lwr		3-upr		5		5R		ibrdn	6-lwrA	ibrdn	6-lwrB	ibrdn	6-mdl	ibrdn	6-uprA	ibrdn	6-uprB	ibrdn	6-uprC		8-lwr		8-upr		9		10
	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
Drill-hole																																				
T92D-12	N/C																																			
T92D-22	0.71	1.14	1.27	3.12		---		19.76*	1.00	1.82	1.77		---		---			0.42	0.44	2.35	2.62	2.30		---		---		1.54									
T89R-904	1.98	---	1.61	3.59		---		10.62	0.52	1.17	1.35	5.22	1.52	2.74	2.14	4.12	9.00	0.94	0.76	2.07	2.52	0.99	0.61	0.39		---		---		0.85	1.27	0.30	2.90	1.02	5.03	1.05
T89D-930	1.72	---	1.58	3.30		---		6.46	0.58	1.05	1.15	9.17	1.19	2.43	1.36																					
T86D-604	1.81	---	1.57	3.38		---		8.69	0.42	0.76	1.12	4.65	1.92	5.02	1.85	3.81	10.68	0.62	0.70	1.56	2.44	1.96		---		---		1.71									
T92R-29	0.57	---	0.43	1.00		---		10.41	0.55	0.38	1.20																									
T89D-931	1.75	---	1.85	3.60		---		10.96	0.58	1.03	1.53	8.52	1.75				8.74	0.30	0.00	2.29	0.71	2.30		---		---		0.74									
T82D-218	1.79	---	1.74	3.53		---		9.82	0.58	0.76	1.39	5.37	1.74		---		2.74	0.50	1.21	2.43																	
T89R-906	1.71	---	1.53	3.24	2.09	0.38	7.13	9.60	0.53	0.68	1.36	5.09	1.75		---		2.82	0.54	1.23	2.63	0.64	0.70	0.62	0.15	0.14	0.29	0.45	1.55									
T84D-442	1.47	---	1.02	2.49																																
T92D-20	1.53	---	1.99	3.52		---		9.53	0.52	0.73	1.03	6.42	2.78		---		6.43	0.25	1.02	3.43	0.74	1.55		0.68	0.00	0.99	0.90	1.11									
T89R-905	1.94	---	1.97	3.91	1.10	0.08	11.18	12.36	0.27	0.46	0.96	6.66	2.19		---		1.55	0.64	1.36	3.00	0.52	1.55	1.55	0.75	0.18	0.57	0.38	1.64									
T85D-504	2.19	0.23	1.50	3.92		---		10.56	0.72	1.23	0.97	6.18	2.10		---		1.60	0.82	0.70	4.30	1.32	1.20	2.91	0.73	0.22	0.46	0.39	1.55									
T89D-929	2.39	0.75	1.52	4.66		---		10.86	1.33	0.27	0.98	6.04	2.16		---		1.10	0.83	0.27	3.16																	
T89D-928	1.88	---	1.72	3.60		---		11.68	0.84	0.43	1.69	7.08	3.00		---		1.88	1.04	1.09	3.36	0.67	0.99	3.69	0.72	0.24	0.57	0.55	1.72									
T89D-907	2.12	0.32	1.14	3.58		---		11.14	1.18	0.16	0.99	5.27	2.13		---		2.31	0.82	0.40	3.11	0.71	1.18															
T82D-216	2.28	0.24	1.44	3.96	1.31	0.58	9.10	10.99	1.06	0.30	0.90	5.42	1.84		---		2.10	0.49	0.33	3.10	0.59	1.14															
T92R-27	2.16	---	1.59	3.75	1.83	0.43	8.14	10.40	1.10	0.69	1.08	5.21	2.14																							
T86D-603	2.07	---	1.68	3.75																																
T82D-217	N/C																																			
T84D-443	#1 seams																																			
T84D-444	#1 seams																																			
T85D-503	#1 seams																																			
T89R-901	#1 seams																																			
T89R-902	#1 seams																																			
T89R-903	#1 seams																																			
T89D-926	N/C																																			
T89D-927	#1 seams																																			
T92R-28	N/C																																			
Averages:	**1.78**	**0.54**	**1.51**	**3.44**	**1.58**	**0.37**	**8.89**	**10.27**	**0.74**	**0.75**	**1.22**	**6.16**	**2.02**	**3.40**	**1.78**	**3.97**	**4.25**	**0.63**	**0.73**	**2.83**	**1.23**	**1.44**	**1.88**	**0.57**	**0.16**	**0.58**	**0.53**	**1.45**	**---**	**0.85**	**1.27**	**0.30**	**2.90**	**1.02**	**5.03**	**1.05**

where: N/C = No Coal

* = possibly structurally thickened; not considered in averages