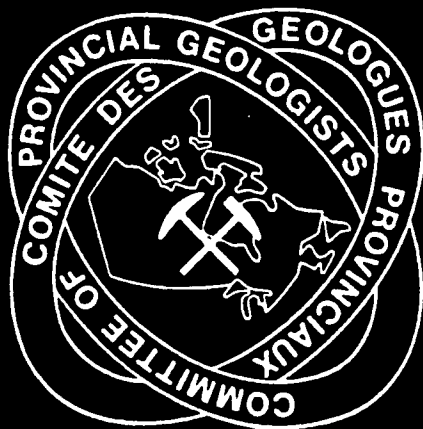




**Provincial
Geologists
Journal**

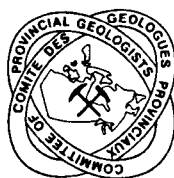
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Publication annuelle du Comité des géologues provinciaux



Geological Survey Branch
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February 1994



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Petroleum Resources

Compilé par le Ministère de
l'Énergie, des Mines et des
Ressources Pétrole

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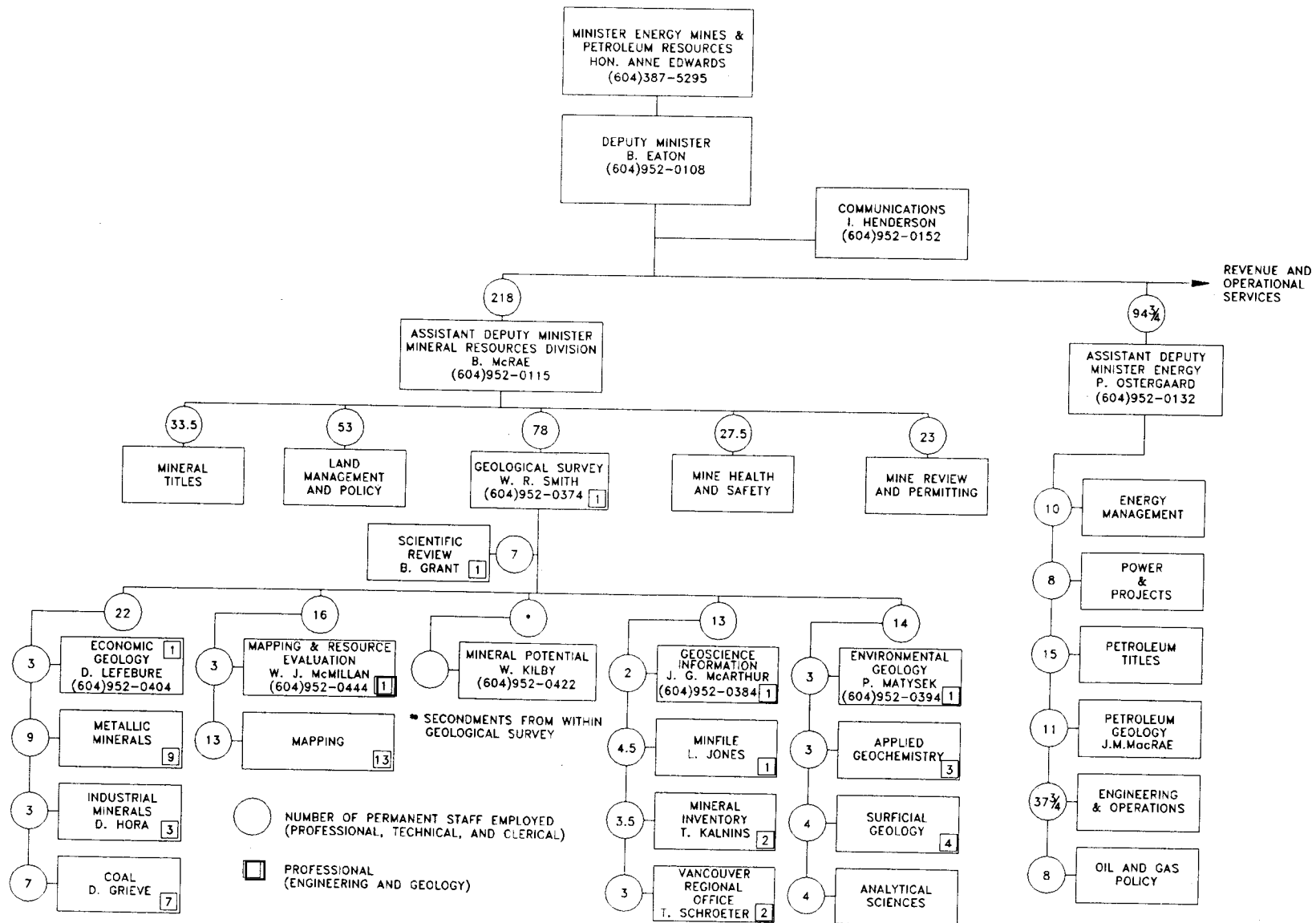
The Provincial Geologists Journal is available in each province and territory through the offices of the respective geological surveys listed at the back of the journal.

NOTES

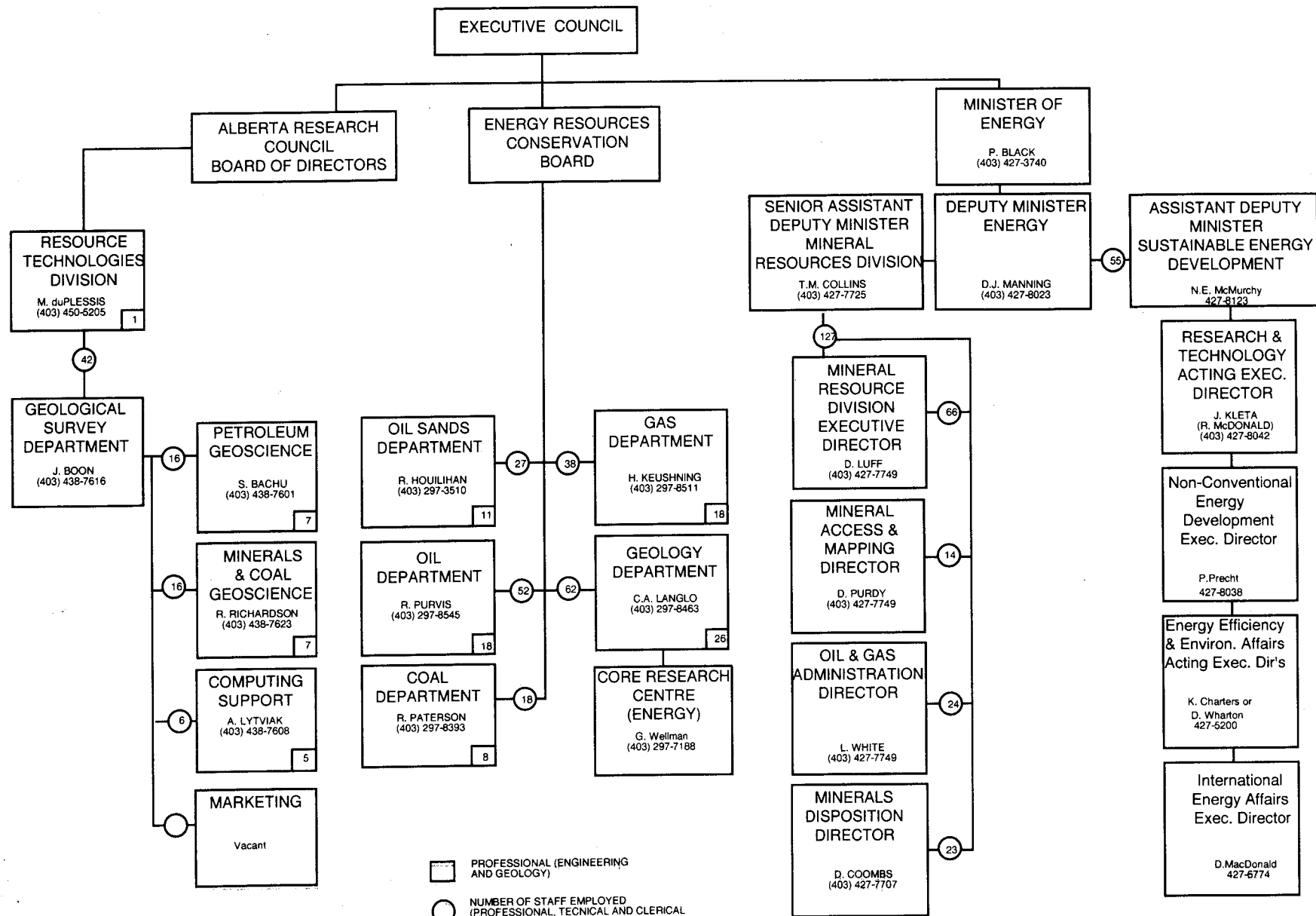
GEOSCIENCE ORGANIZATION CHARTS

Each provincial and territorial government in Canada has developed its own organization structure for conducting geoscientific survey and research work. Some provinces have what is formally called a Geological Survey (*e.g.*, Ontario Geological Survey), but in most jurisdictions the main elements of the geological survey function are embraced in one or more Branches or Divisions of provincial Mines/Energy/Natural Resources Departments (*e.g.*, the British Columbia Ministry of Energy, Mines and Petroleum Resources is divided into a Mineral Resources Division and a Petroleum Resources Division, with the bulk of geological survey and research work conducted in the Geological Branch of the Mineral Resources Division). The following organization charts are set out in standard format to help alleviate confusion amongst potential users of provincial geoscience services. The charts contain reference to the lines of reporting of the various units in each hierarchy, the manpower associated with each separate jurisdiction, and the names and telephone numbers of key individuals in each system.

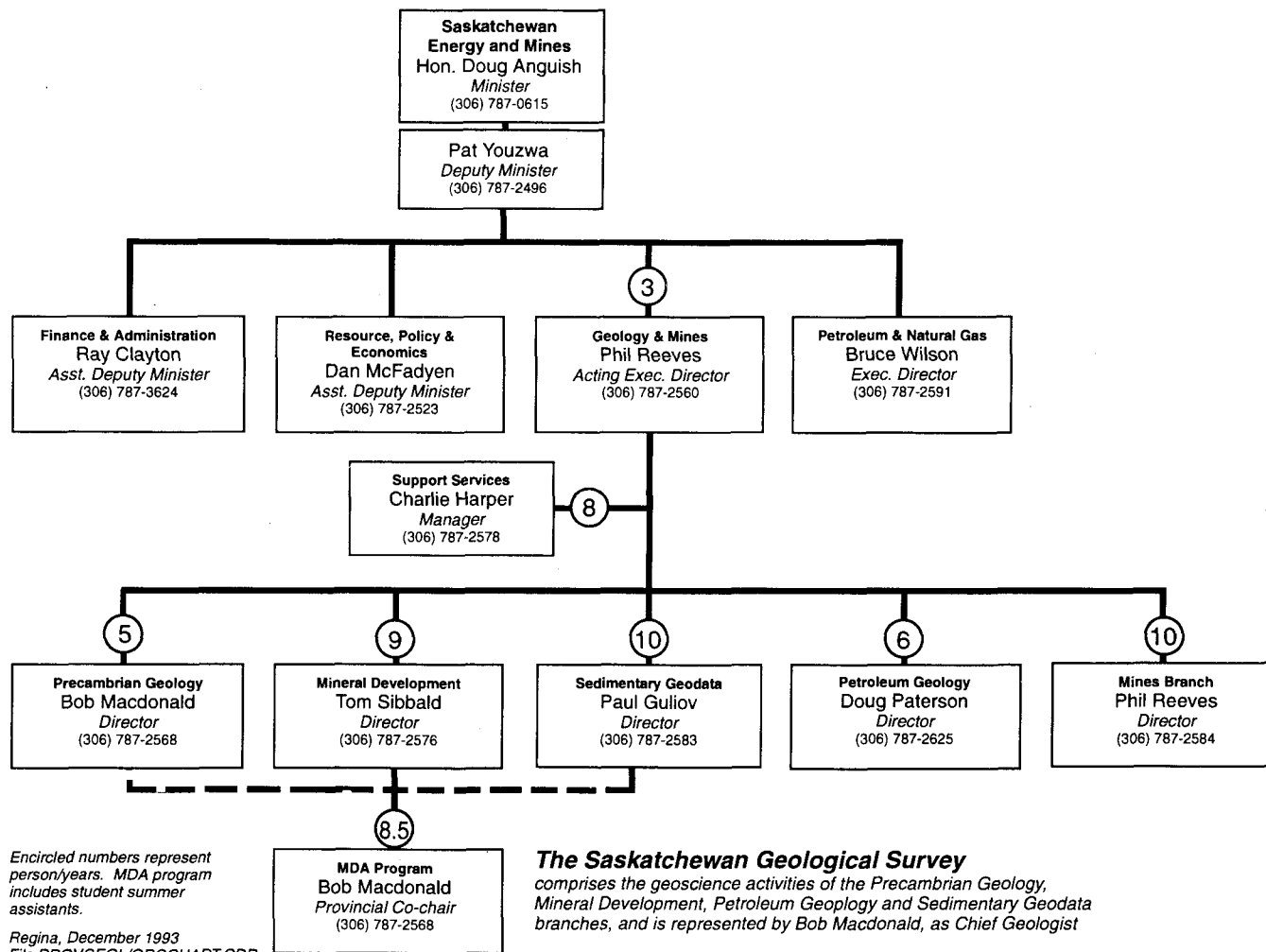
BRITISH COLUMBIA GEOSCIENCE ORGANIZATION CHART



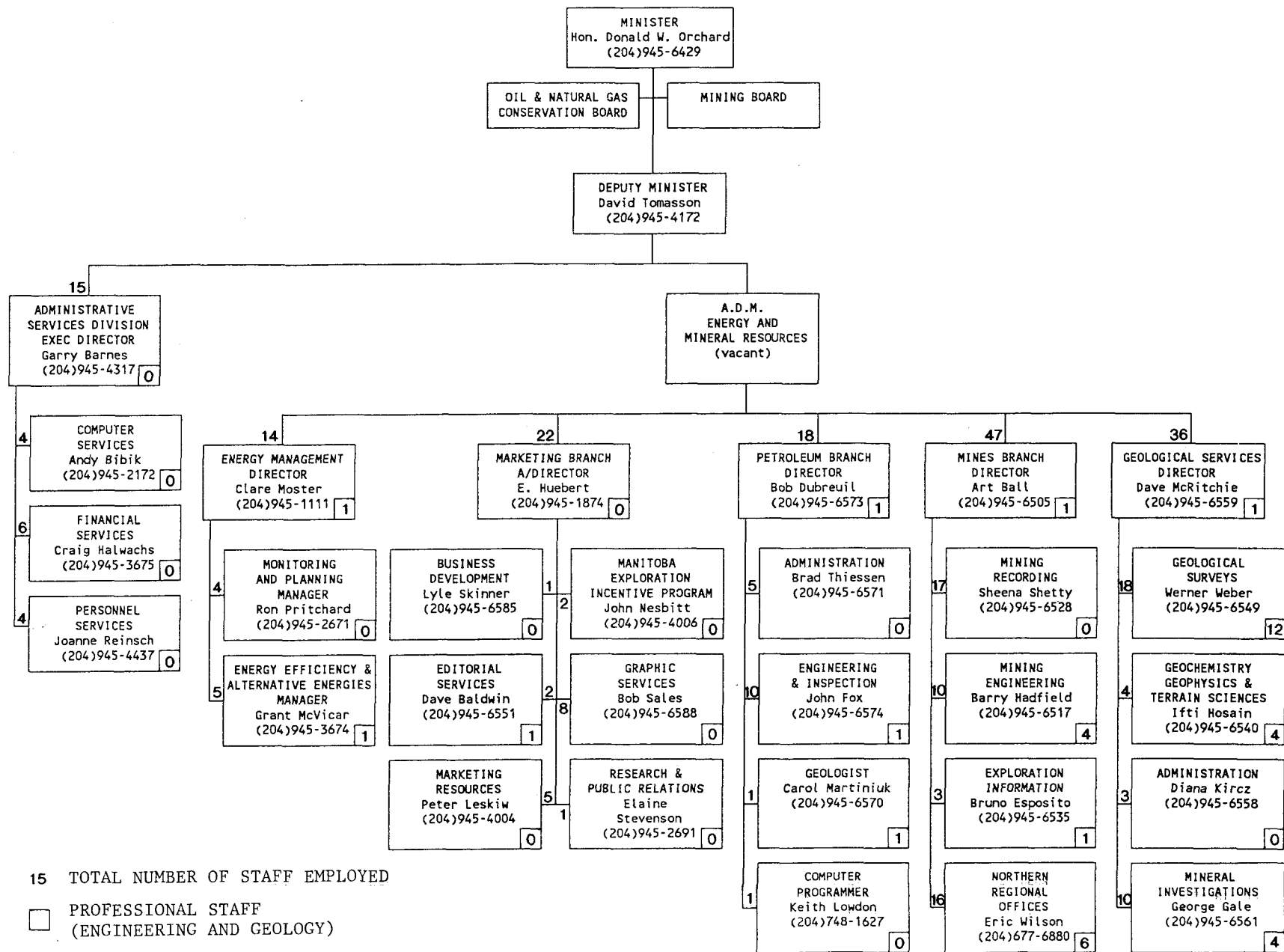
ALBERTA GEOSCIENCE ORGANIZATION CHART



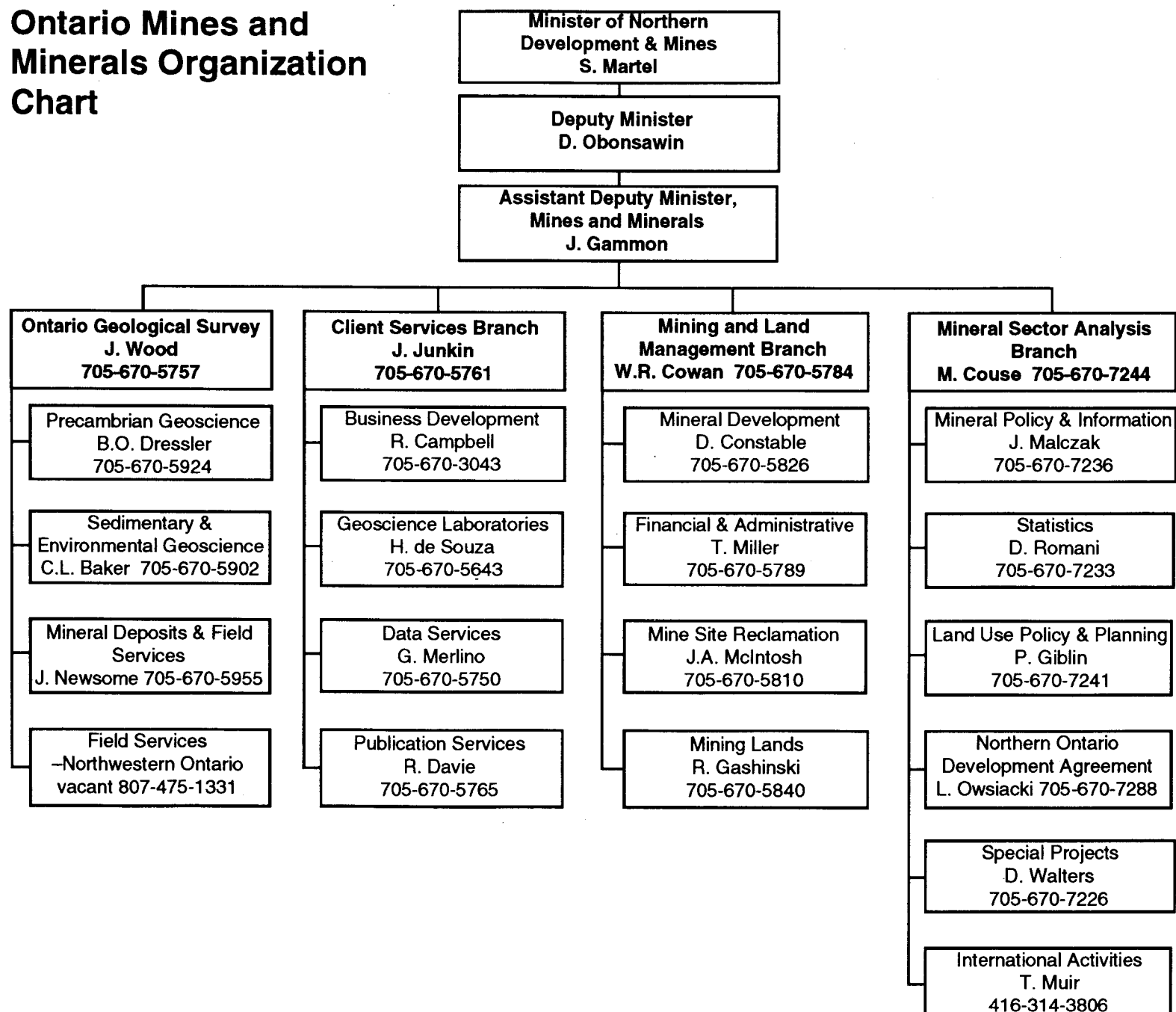
Saskatchewan Geoscience Organization Chart



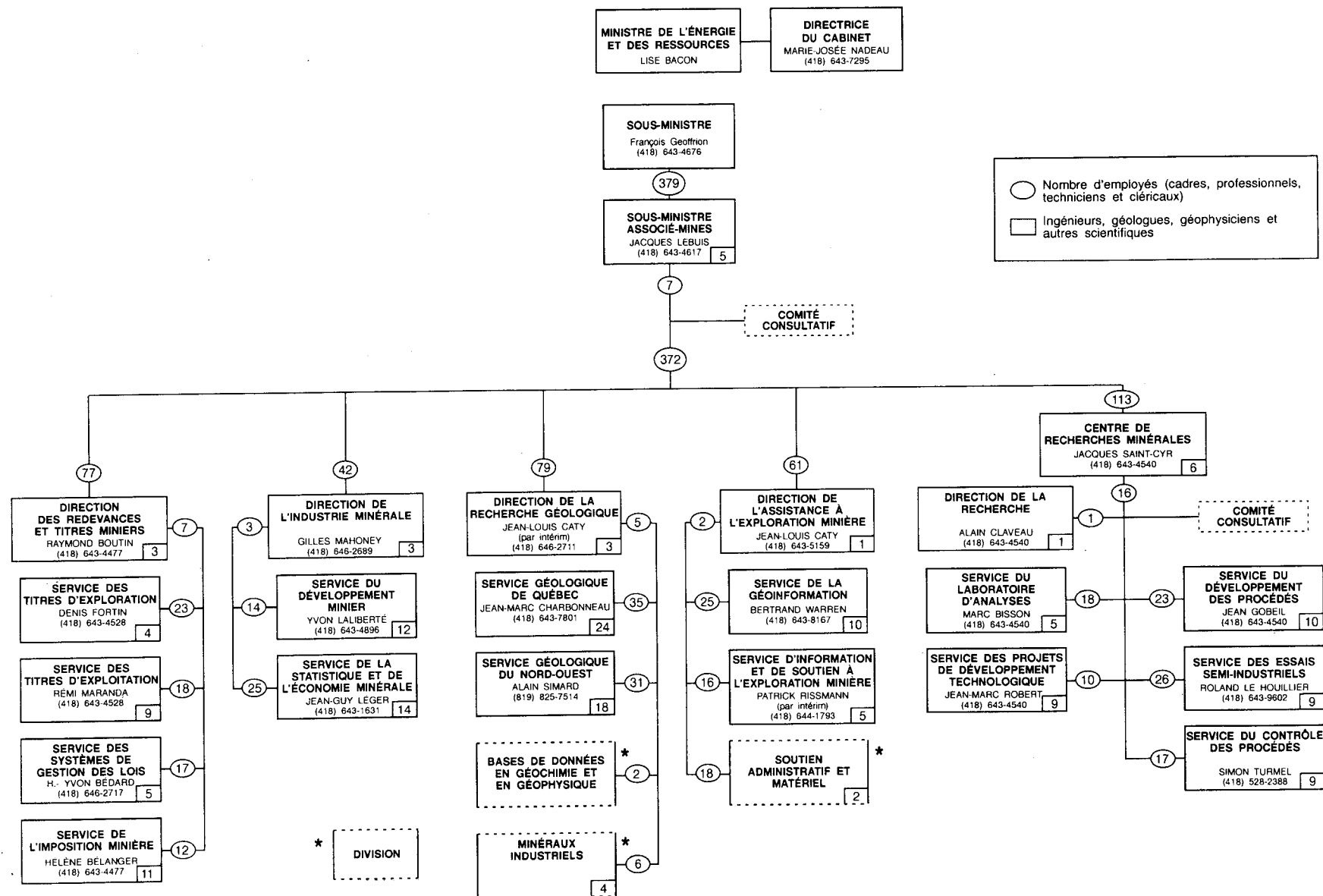
MANITOBA ENERGY AND MINES
DEPARTMENT OVERVIEW



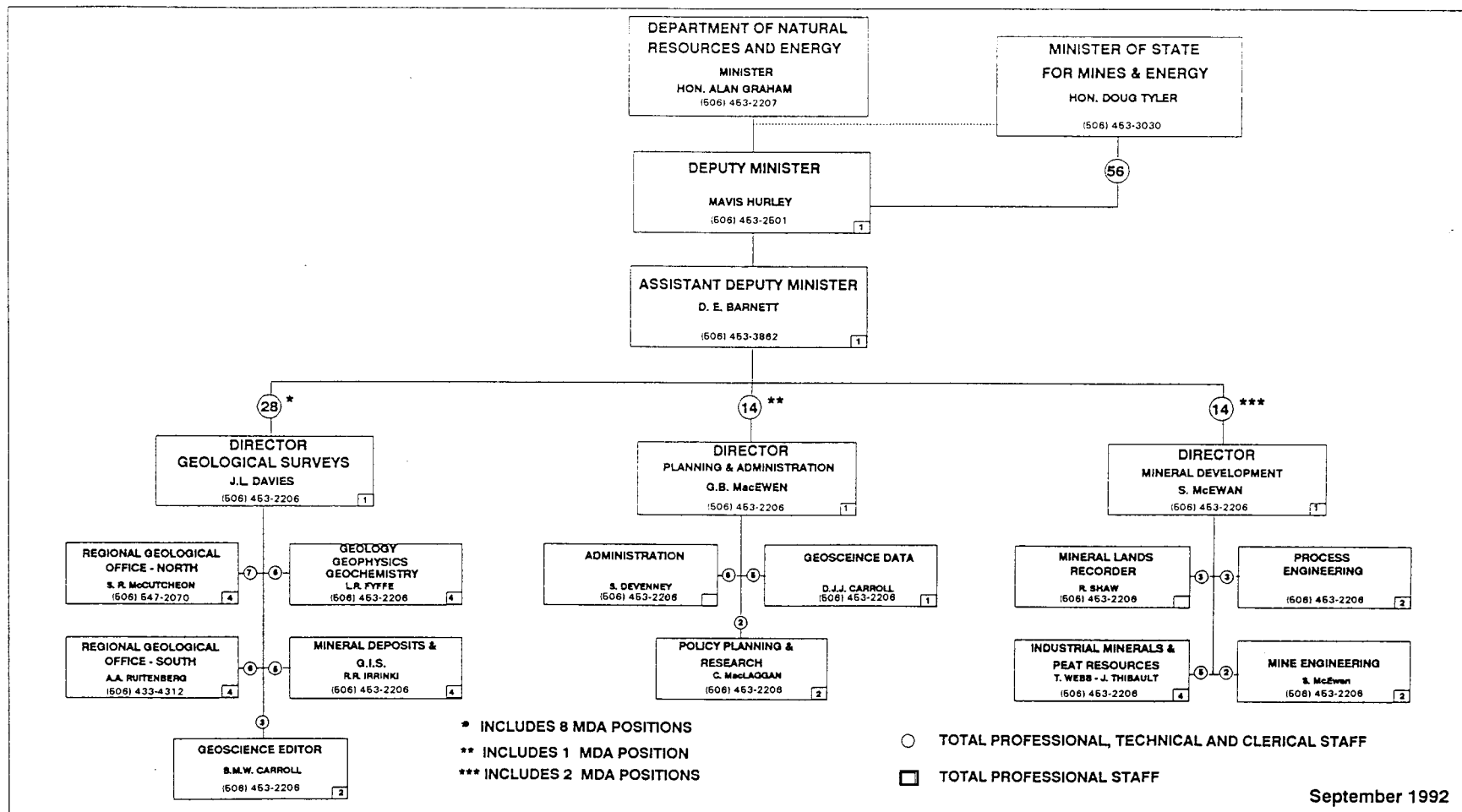
Ontario Mines and Minerals Organization Chart



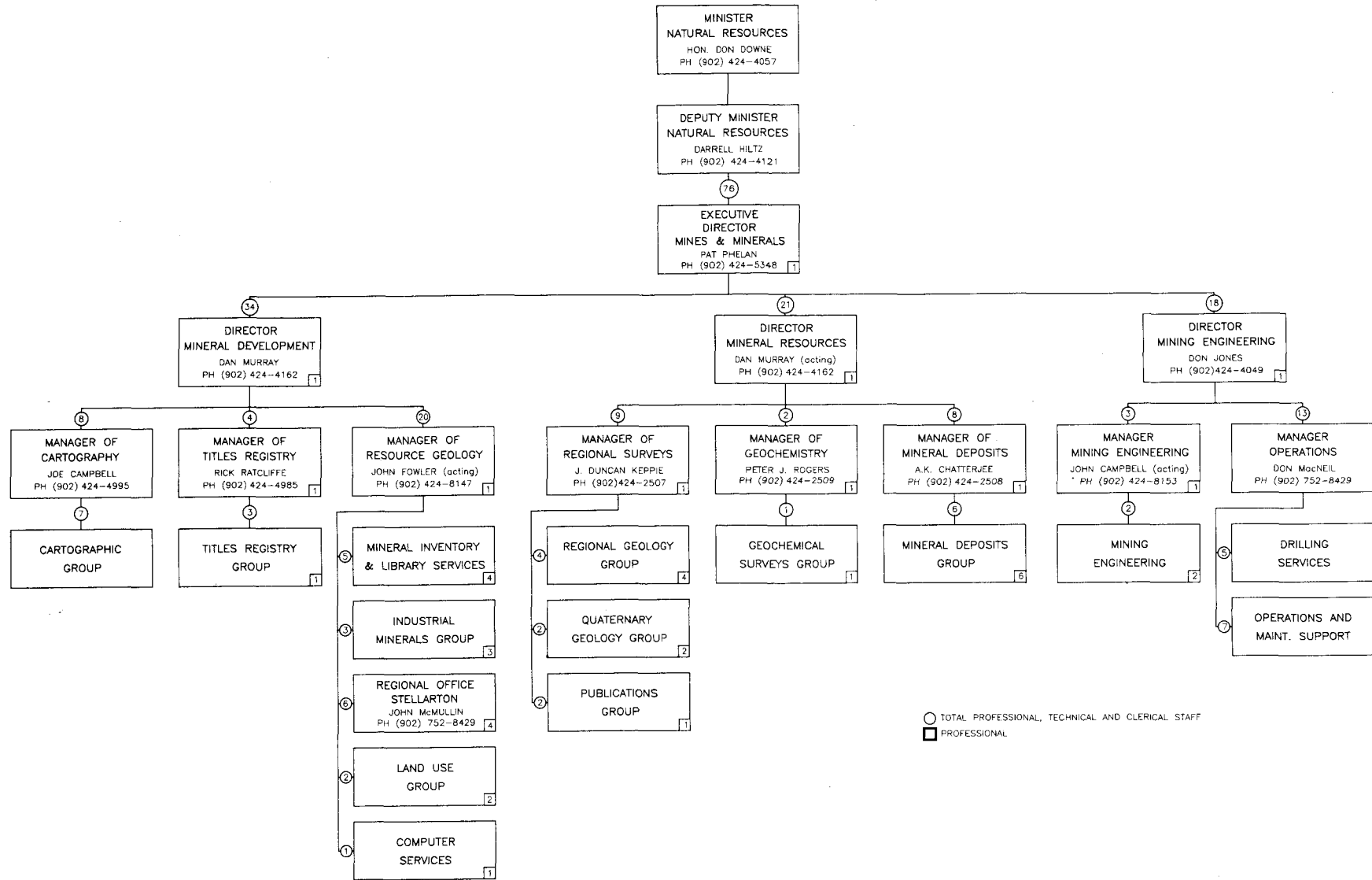
ORGANIGRAMME DU MINISTÈRE DE L'ÉNERGIE ET DES RESSOURCES DU QUÉBEC - SECTEUR DES MINES



NEW BRUNSWICK GEOSCIENCE ORGANIZATION CHART - 1993



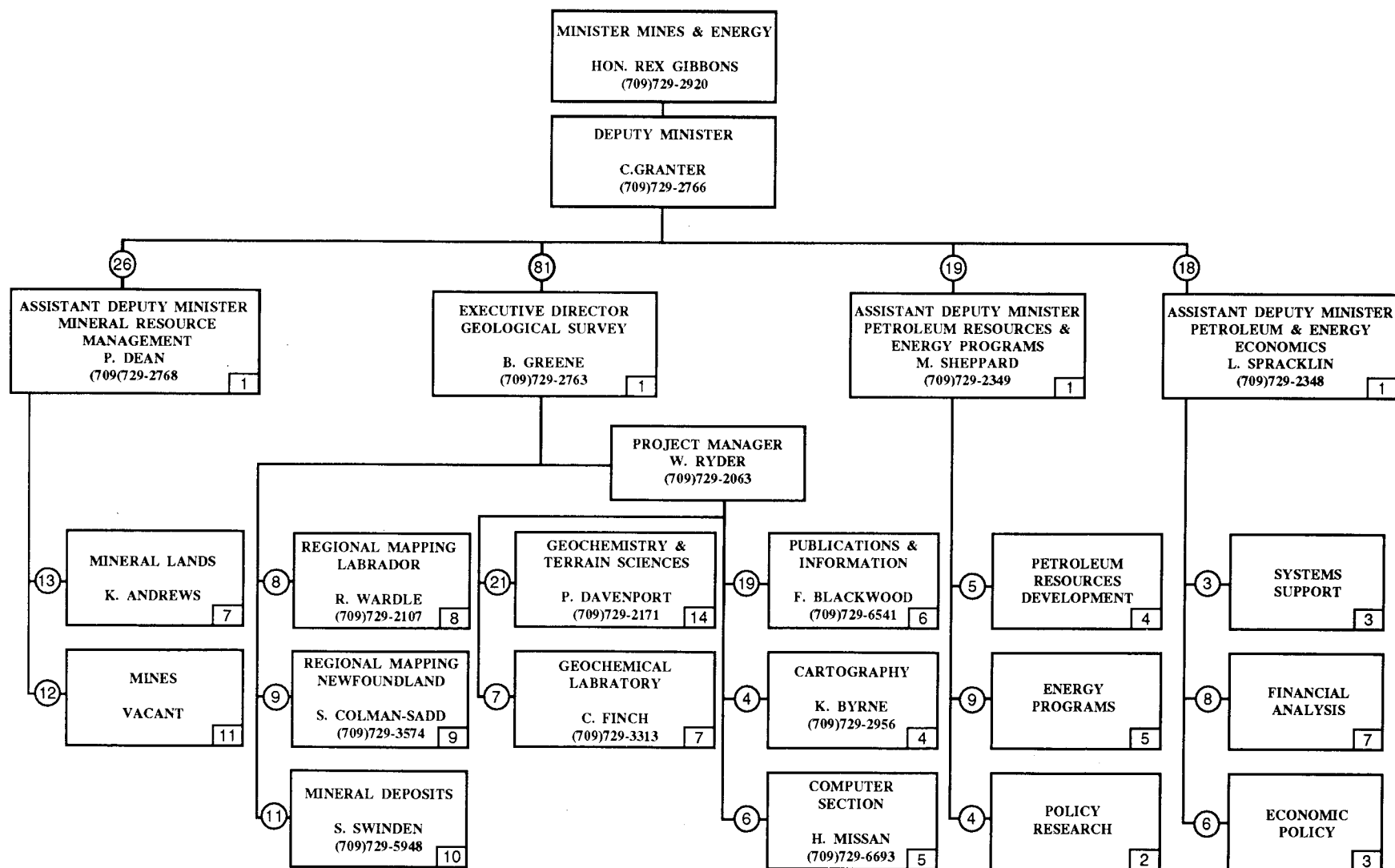
NOVA SCOTIA GEOSCIENCE ORGANIZATION CHART



○ TOTAL PROFESSIONAL, TECHNICAL AND CLERICAL STAFF

■ PROFESSIONAL

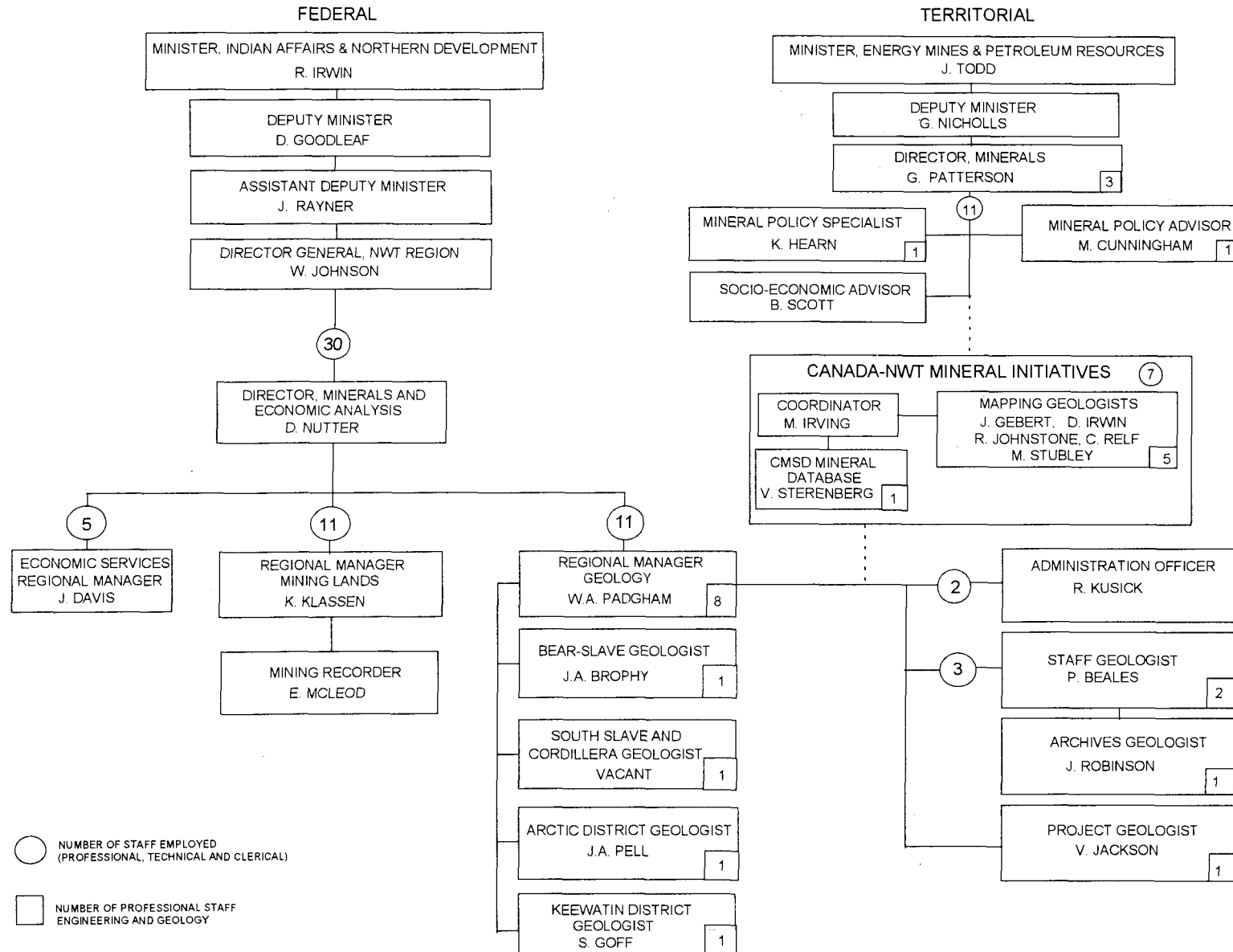
NEWFOUNDLAND GEOSCIENCE ORGANIZATION CHART



○ Number of staff employed (professional, technical and clerical)

□ Professional (engineering and geology)

NORTHWEST TERRITORIES GEOSCIENCE ORGANIZATION CHART



YUKON GEOSCIENCE ORGANIZATION CHART

MINISTER INDIAN AND NORTHERN AFFAIRS

HON. R. IRWIN
(819) 995-4988

DEPUTY MINISTER

D. GOODLEAF
(819) 997-0133

ASSISTANT DEPUTY MINISTER

J. RAYNER
(819) 953-3760

DIRECTOR GENERAL YUKON REGION

M. IVANSKI
(403) 667-3300

DIRECTOR MINERAL RESOURCES

A. C. OGILVY
35.05* (403) 667-3126 1**

REGIONAL MANAGER MINERAL RIGHTS

R. G. RONAGHAN
15.50* (403) 667-3260 0**

REGIONAL MANAGER MINERAL DEVELOPMENT

A. WAROWAY
12.25* (403) 667-3153 1**

CHIEF GEOLOGIST

S. R. MORISON
9* (403) 667-3200 5**

* NUMBER OF STAFF EMPLOYED (PROFESSIONAL, TECHNICAL, AND CLERICAL)

** PROFESSIONAL (ENGINEERING AND GEOLOGY)

PROVINCIAL GEOLOGICAL SURVEY
EXPENDITURES
1992-1993

PROVINCIAL GEOLOGICAL SURVEY EXPENDITURES
1992 - 1993

PROVINCE/ TERRITORY	SURVEY EXPENDITURES \$ X 10 ⁶	% OF TOTAL	TOTAL 1992 VALUE OF PROVINCIAL MINERAL PRODUCTION ¹ \$ X 10 ³	SURVEY EXPENDITURES AS % OF TOTAL VALUE OF PROVINCIAL MINERAL PRODUCTION	AREA OF PROVINCE/ TERRITORY KM ² X 10 ³	SURVEY \$ SPENT/KM ²	POPULATION (1991) X 10 ³	SURVEY \$ SPENT/ CAPITA
NEWFOUNDLAND	5.4	7.7	705 673	.76	405	13.3	568	9.5
NOVA SCOTIA	3.3	4.7	162 036	2.03	55	60.0	900	3.7
PRINCE EDWARD ISLAND	-	-	1 699	-	6	-	130	-
NEW BRUNSWICK	2.2	3.1	875 921	.25	73	30.1	724	3.0
QUEBEC	14.8	21.1	2 694 407	.54	1 541	9.6	6 896	2.2
ONTARIO	18.9	27.0	4 694 324	.40	1 069	17.7	10 085	1.9
MANITOBA	3.9	5.6	995 194	.39	650	6.0	1 092	3.6
SASKATCHEWAN	4.0	5.7	1 300 261	.31	652	6.1	989	4.0
ALBERTA	4.7	6.7	414 655	1.13	661	7.1	2 546	1.8
BRITISH COLUMBIA	7.0	10.0	1 869 582	.37	948	7.4	3 282	2.1
YUKON	2.2	3.1	478 005	.46	483	4.6	28	78.6
NORTHWEST TERRITORIES	3.7	5.3	481 858	.76	3 380	1.1	58	62.1
TOTALS	70.0	100.0	14 673 615	-	9 923	-	27 298	-

¹Source: Energy, Mines and Resources Canada; Statistics Canada

PROVINCE: BRITISH COLUMBIA - 1992-1993

PROGRAMS	SURVEY RESEARCH AGENCY	FUNDING AGENCY	NO. OF PROJECTS (OR FACILITIES)	PERMANENT SMY	CASUAL SMY	PERMANENT \$	OPERATING EXPENDITURES \$	TOTALS
Chief's Office	GSB (MRD)	EMPR	-	5	.5	262 000	227 000	489 000
Geochemistry	GSB (MRD)	EMPR	4	2	1	173 000	107 000	280 000
	GSB (MRD)	MDA	1	-	-	-	95 000	95 000
Surficial Geology	GSB (MRD)	EMPR	7	4	1	280 000	101 000	381 000
	GSB (MRD)	MDA	1	-	-	-	49 000	49 000
Regional Mapping	GSB (MRD)	EMPR	9	9	3	900 000	396 000	1 295 000
	GSB (MRD)	MDA	3	-	-	-	457 000	457 000
Mineral Deposits	GSB (MRD)	EMPR	9	8	5	751 000	243 000	994 000
Coal Resources	GSB (MRD)	EMPR	9	3	2	363 000	116 000	479 000
Industrial Minerals	GSB (MRD)	EMPR	13	2	1	183 000	97 000	280 000
Mineral Deposits Inventory and Analysis	GSB (MRD)	EMPR	5	8	2	530 000	190 000	720 000
	GSB (MRD)	MDA	1	-	-	-	20 000	20 000
District Geology	GSB (MRD)	EMPR	13	10.5	5	906 000	168 000	1 074 000
Scientific Review/Publications	GSB (MRD)	EMPR	-	6.5	-	273 000	280 000	553 000
	GSB (MRD)	MDA	1	-	-	-	38 000	38 000
Laboratory Analysis	GSB (MRD)	EMPR	-	7	-	373 000	43 000	416 000
Mineral Potential Initiative	GSB (MRD)	CRII	4	4	-	147 000	853 000	1 000 000
Oil and Gas Inventory and Analysis	PGB (ERD)	EMPR	-	5	1	514 000	82 000	596 000
Petroleum Subsurface Investigation	PGB (ERD)	EMPR	-	2	-	172 000	48 000	220 000
TOTALS								
GSB (MRD)	-	-	-	69	20.5	4 994 000	1 968 000	6 962 000
MDA	-	-	-	-	-	-	659 000	659 000
CRII	-	-	-	-	-	147 000	853 000	1 000 000
PGB (ERD)	-	-	-	-	-	686 000	130 000	816 000

GSB (MRD) - Geolgocial Survey Branch (Mineral Resources Division)
PGB (ERD) - Petroleum Geolgocial Branch (Energy Resources Division)
EMPR - Ministry of Energy, Mines and Petroleum Resources
EMR - Energy, Mines and Resources Canada
MDA - Canada - B.C. Mineral Development Agreement
CRII - Corporate Resource Inventory Initiative

PROVINCE: ALBERTA - 1992-1993

PROGRAM	RESEARCH		FUNDING	NO. OF PROJECTS	PERMANENT SMY	CASUAL SMY	PERMANENT \$	CASUAL \$	S & S
Chief's Office	ARC	ARC		4	1.18	0.10	\$181,958	\$3,210	\$29,474
Core Repositories	ARC	ARC/AE		2	0.01		\$666		\$13,865
Geological Surficial	ARC								
Reconnaissance	ARC	ARC		1	0.09		\$8,627		\$639
Reclamation	ARC								
Hydrogeological	ARC	ARC/MDA/Environment Canada/Mobil/ Norcen/Petro Canada/Pan Canadian		6	1.46	0.01	\$127,158	\$67	\$208,685
Information/Education	ARC	ARC/WUSC/Seminar Fees		2	0.20		\$21,877		\$6,783
Laboratory	ARC	ARC/ Private Sales		1	0.52		\$46,573		\$3,683
Mineral Analysis	ARC	ARC/MDA/AE		12	9.04	1.44	\$880,446	\$59,675	\$362,155
Energy Resources	ARC	ARC/Stanley/Computalog		4	0.24		\$23,402		\$33,468
Petroleum	ARC	ARC/Petro Canada/Oil India Ltd.		5	1.45	0.06	\$146,550	\$1,096	\$15,509
Oil Sands	ARC	ARC/AE/AOSTRA		6	4.50	0.11	\$435,554	\$2,328	\$132,152
Coal	ARC	ARC/AE/OCRT/Canmet/Norcen/ Pan Canadian/Petro Canada		6	3.20	0.21	\$310,150	\$7,000	\$171,646
Stratigraphy	ARC	ARC/AE/GSC/Amoco		2	6.02	0.07	\$616,118	\$1,416	\$340,771
Other	ARC	ARC/AE		11	2.84	0.02	\$286,461	\$270	\$233,792
Totals				62	30.75	2.02	\$3,085,540	\$75,062	\$1,552,622

ARC - Alberta Research Council

AE - Alberta Department of Energy

AOSTRA - Alberta Oil Sands Technical Research Authority

PROVINCE: SASKATCHEWAN - 1992-1993

Version printed	SURVEY/ RESEARCH AGENCY	FUNDING AGENCY	NO. OF PROJECTS/ FACILITIES	PERMANENT PY	CASUAL/ CONTRACT PY	SALARIES PERMANENT \$	CASUAL/ CONTRACT \$	OPERATING EXPEND. \$	TOTALS
Administration:				15.79	0.25	490 400	5 000	115 200	610 600
SGS:	SGS	SGS		4.79	0.25	266 400	5 000	41 200	312 600
Divisional	SGS	SGS		1.33		66 000		15 500	81 500
Precambrian	SGS	SGS		1.16	0.25	66 000	5 000	9 000	80 000
Mineral Development	SGS	SGS		0.50		35 300		10 700	46 000
Sedimentary Geodata	SGS	SGS		0.40		27 000		1 000	28 000
Petroleum Geology	SGS	SGS		1.00		47 000		2 500	49 500
Support Services	SGS	SGS		0.40		25 100		2 500	27 600
SRC:	SRC	SRC		11.00		224 000		74 000	298 000
Core repositories:				5.30	0.60	135 400	14 200	60 800	210 400
Phanerozoic	SGS	SGS	1	5.00	0.30	135 400	7 000	49 000	191 400
Precambrian	SGS	SGS	1	0.30	0.30	-	7 200	11 800	19 000
Geochemical surveys	SGS/UOR	SGS	1	-	-	-	-	22 000	22 000
Precambrian	SGS	SGS	1	0.30	0.25		2 800	12 200	15 000
Surficial/drift prospecting	SRC	SRC	2	0.30		28 000		40 000	68 000
Geological surveys, bedrock:	SGS	SGS	9	2.35	4.50	117 300	213 200	285 000	615 500
Detailed (typically 1:20,000)	SGS	SGS	8	2.25	4.25	110 000	206 300	284 400	600 700
Reconnaissance (1:100,000)	SGS	SGS							
Compilation (1:250,000 or less)	SGS	SGS	1	0.10	0.25	7 300	6 900	0 600	14 800
Geological surveys, surficial	SRC	SRC	2	1.00	-	86 000	-	43 000	129 000
Geophysical surveys			3	0.60	0.60	40 100	14 300	41 000	95 400
	SGS	SGS	2	0.30	0.60	17 100	14 300	25 000	56 400
	SRC	SRC	1	0.30		23 000		16 000	39 000
Hydrogeological surveys	SRC	SRC	4	2.50		208 000		55 000	263 000
Information and education	SGS	SGS	1	1.00		65 300		0 100	65 400
Laboratory analyses and studies:			11	0.30		23 000		107 100	130 100
Isotope/geochronology	Various	SGS	6					67 600	67 600
Other	SGS	SGS	2					22 500	22 500
	SRC	SRC	3	0.30		23 000		17 000	40 000
Mineral deposit inventory/compilation:	SRC	SRC	5	2.70	0.75	115 900	20 000	22 200	158 100
Metallic	SGS	SGS	1	2.40	0.75	113 900	20 000	12 200	146 100
Industrial	SGS	SGS	1	0.30		2 000		10 000	12 000
	SRC	SRC	3						0 000
Dil and Gas inventory and analysis			n/a	See Pet Nat Gas					
Publications/cartography:			7	7.00	1.50	328 800	54 100	176 400	559 300
General			n/a	6.60	1.00	289 300	36 100	90 800	416 200
	SGS	SGS							
	SRC	SRC		NO INFORMATION					
Computerization	SGS	SGS	5	0.20	0.50	14 500	18 000	68 100	100 600
	SRC	SRC	2	0.20		25 000		17 500	42 500
Resident Geologist offices	SGS	SGS	1	2.00		109 400		18 000	127 400
Subsurface (stratigraphic) studies			7	4.70		295 700		47 000	342 700
	SGS	SGS	5	4.00		229 700		19 000	248 700
	SRC	SRC	2	0.70		66 000		28 000	94 000
Water resource inventory & analysis	SRC	SRC	7	2.20		258 000		105 000	363 000
Mineral deposit studies:			10	2.77	1.25	207 900	37 500	123 900	369 300
Metallic	Various	SGS	2	0.50		47 300		32 500	79 800
Industrial minerals/kimberlite	Various	SGS	3	1.27	0.75	60 600	37 500	31 400	129 500
Metallic		SRC	5	1.00	0.50	100 000		60 000	160 000
Industrial minerals/kimberlite		SRC	2	0.50		25 000		56 000	81 000
Totals			70	44.11	9.55	2553 500	354 600	1128 100	4039 200
Total Saskatchewan Geological Survey									2303 600
Total Saskatchewan Research Council									1735 600

PROVINCE: MANITOBA - 1992-1993

PROGRAMS	SURVEY RESEARCH AGENCY	FUNDING AGENCY	NO. OF PROJECTS/OR FACILITIES	PERMANENT SMY	CASUAL/ TERM SMY	PERMANENT \$	SALARIES CASUAL \$	OPERATING EXPENDITURES \$	TOTAL
Core Repositories	MGS	MAN	4	.26	-	18100.00	0.00	37900.00	56000.00
Geochemical Surveys									
1)Bedrock	-	-	-	-	-	-	-	-	-
2)Soil	MGS	MAN	2	2.0	.28	105700.00	15100.00	29300.00	150100.00
3)Vegetation	MGS	MAN	1	1.0	.13	61300.00	4900.00	26100.00	92300.00
Geological Surveys, Bedrock Precambrian									
1)Reconnaissance (1:100 000)	-	-	-	-	-	-	-	-	-
2)Detailed (1:50 000 and larger)	MGS	MAN	12	7.26	.39	420700.00	22300.00	68000.00	511000.00
3)Phanerozoic	MGS	MAN	3	1.0	.12	46600.00	3700.00	5500.00	55800.00
Geological Surveys, Surficial									
1)Reconnaissance (1:100 000)	-	-	-	-	-	-	-	-	-
2)Detailed	-	-	-	-	-	-	-	-	-
Geophysical Surveys									
1)Airborne Electromagnetic	-	-	-	-	-	-	-	-	-
2)Airborne Magnetic, Gradiometer	MGS	MAN	3	1.0	-	56300.00	-	20500.00	76800.00
3)Ground Magnetic	-	-	-	-	-	-	-	-	-
4)Gravity	-	-	-	-	-	-	-	-	-
5)Seismic	-	-	-	-	-	-	-	-	-
Hydrogeology	MWR	MAN	2	3.0	-	160000.00	-	30000.00	190000.00
Information, Education, Assessment Services and Compilation	MGS	MAN	3	2.0	-	88500.00	-	17400.00	105900.00
Laboratory Analysis	MGS	MAN	3	9.26	-	365700.00	-	45200.00	410900.00
Mineral Deposit Inventory and Analysis	MGS	MAN	9	5.26	1.27	265200.00	43300.00	76800.00	385300.00
Industrial Minerals	MGS	MAN	4	3.0	.13	137300.00	4900.00	14200.00	156400.00
Oil, Gas Inventory and Analysis	MP	MAN	2	1.0	-	49600.00	-	13000.00	62600.00
Publications	MGS	MAN	2	3.0	-	103900.00	-	45600.00	149500.00
Resident Geologist's Office	MGS	MAN	1	-	-	-	-	-	0.00
Subsurface Invest, Indust Min Drilling and Management	MGS	MAN	6	-	.33	-	51400.00	26500.00	77900.00
Water Resource Inventory and Analysis	MWR	MAN	2	8.0	-	344000.00	-	150000.00	494000.00
Other:									
1)Administration 1	MGS	MAN	8	7.0	-	296200.00	-	115100.00	411300.00
2)Drafting	MGS	MAN	-	6.26	-	237800.00	-	24200.00	262000.00
3)Computerized Data Capture	MGS	MAN	3	4.0	-	166200.00	-	54200.00	220400.00
TOTALS	-	-	-	65.26	4.09	2923100.00	145600.00	799500.00	3868200.00

MGS - Manitoba Geological Services Branch; MP - Manitoba Petroleum Branch; MWR - Manitoba Water Resources

1 - Includes Field Equipment and Capital

PROVINCE: ONTARIO - 1992-1993

PROGRAMS	FUNDING AGENCY	NO. OF PROJECTS (OR FACILITIES)	SALARIES		OPERATING EXPENDITURES \$	TOTALS \$
			PERMANENT \$	CASUAL \$		
Administration (Director's Office OGS)	MNDM	-	649.6	132.7	988.2	1770.5
Drill Core Libraries	MNDM	7	436.0		189.7	625.7
Geophysical Surveys/Research	MNDM	1	203.3		263.6	466.9
Geochemical Surveys/Research	MNDM	2				
Geological Surveys:						
Precambrian	MNDM	17	1621.0	210.0	1312.5	3143.5
Sedimentary & Environmental			1028.5	90.0	557.3	1675.8
Paleozoic	MNDM	2				
Quaternary	MNDM	3				
Aggregate	MNDM	2				
Geoservices						
Publications	MNDM		529.3		553.8	1083.1
Data Services, Education, Library &						
Assessment Files	MNDM		913.7		487.2	1400.9
Laboratory Analysis	MNDM		965.6		728.3	1693.9
Resident Geologist's Office	MNDM	13	3450.8		1462.8	4913.6
Geoscience Research Grants Program	MNDM	22			581.6	581.6
Other Geological Research Grants	MNDM	13			650.0	650.0
NODA	CAN/ONT	6		551.1	313.1	864.2
TOTALS			9797.8	983.8	8088.1	18869.7

MNDM - Ministry of Northern Development and Mines

NODA - Northern Ontario Mineral Development Agreement

OGS - Ontario Geological Survey

PROVINCE: QUÉBEC - 1992-1993

PROGRAMMES	MAITRE D'OEUVRE	FINANCEMENT	NOMBRE DE PROJETS OU D'INSTALLATIONS	EMPLOYES PERMANENTS PERS.-ANNEE C-P-A***	EMPLOYES OCCASIONNELS PERS.-ANNEE	BUDGET ALLOUE \$
Levés géologiques						
1) Côte-Nord et Nouveau-Québec	DGEGM	MER	10	8P-2A		943,300
2) Montréal-Laurentides	DGEGM	MER	8	5P-3A	1	537,600
3) Gaspésie-Iles-de-la-Madeleine	DGEGM	MER	3	5P-2A	-	430,800
4) Estrie-Laurentides	DGEGM	MER	10	6P-2A	-	986,400
5) Minéraux industriels du Québec	DGEGM	MER	2	3P-2A	1	73,200
6) Rouyn-Noranda	DGEGM	MER	13	6P-3A	-	722,900
7) Val-d'Or	DGEGM	MER	10	6P-3A	-	613,900
8) Chibougamau	DGEGM	MER	10	5P-3A	1	826,300
Bases de données	DGEGM	MER	-	2A	-	297,100
Supervision et contrôle	DGEGM	MER	-	2C-1P-5A	-	1,013,300
Gestion et planification	DGEGM	MER	-	2C-4A	1	556,500
Opérations (équipement de terrain, etc.)	DGEGM	MER	-	2P-16A	1	396,900
Assistance financière	DGEGM	MER/EMR*	55	1P	-	1,729,400
Géoinformation	DGEGM	MER/EMR**	-	2C-8P-17A	-	3,759,000
Information géoscientifique	DGEGM	MER	-	1C-3P-13A	-	1,184,900
Gestion interne	DGEGM	MER	-	1C-1A	5	578,100
Communication	DGEGM	MER	-	1A	-	147,500
TOTAUX			121	8C-59P-79A	10	14,797,100

DGEGM - Direction générale de l'exploration géologique et minérale

MER - Ministère de l'Énergie et des Ressources du Québec

EMR - Energy, Mines and Resources, Ottawa

* - Entente auxiliaire Canada-Québec sur le développement des régions du Québec

** - Entente auxiliaire Canada-Québec sur le développement minéral

(le projet de géomatique est financé à 80% par le gouvernement fédéral)

*** C = cadre, P = professionnel, A = autre

PROVINCE: NEW BRUNSWICK - 1992-1993

Geoscience Expenditures 1992-93

PROGRAMS	AGENCY	NO. OF PROJECTS	STAFF			SALARIES	OPERATING	TOTALS
			PERMANENT	CASUAL	CONTRACT			
Geophysics	GSB	1					\$5,900	\$5,900
Geological Surveys								
Bedrock	GSB	3	3.00	2.00		\$169,102	\$88,598	\$257,700
Surficial	GSB	1	1.00	1.25		\$50,179	\$37,921	\$88,100
Geochemical Surveys	GSB		3.00			\$127,800	\$63,500	\$191,300
Till	GSB	2		2.00				\$0
Drainage	GSB	1						\$0
Mineral Deposits	GSB	2	1.50			\$88,000	\$71,600	\$159,600
Regional Offices	GSB	2	6.00			\$244,060	\$85,400	\$329,460
Geoscience Information System	GSB		0.50			\$27,000	\$50,000	\$77,000
Diamond Drill Core Management	GSB	3	0.50	1.00		\$50,174	\$7,126	\$57,300
Publications (Editorial)	GSB	1	1.00			\$45,604	\$24,996	\$70,600
Grants to Prospectors	GSB	1	0.50				\$15,400	\$15,400
Prospecting Course	GSB							\$0
Directors's Office	GSB		2.00			\$89,393	\$18,325	\$107,718
Information, Education	PAB	3	3.00					\$0
Industrial Minerals	MDB	3	2.00	1.00		\$115,000	\$42,000	\$157,000
Peat Resources	MDB	1	1.00			\$50,000	\$9,427	\$59,427
Coastal Zone	MDB	1	1.00	1.00		\$36,000	\$14,000	\$50,000
Coal, Oil, Gas, Oil Shale	ERB	2	2.00			\$86,000	\$59,000	\$145,000
Canada-New Brunswick Agreement	GSB	8		2.75	8.00	\$305,000	\$79,000	\$384,000
Totals		35	28	11	8	\$1,483,312	\$672,193	\$2,155,505

GSB = Geological Surveys Branch;
MDB = Mineral Development Branch;
ERB = Energy Resources Branch

PROVINCE: NOVA SCOTIA - 1992-1993

PROGRAMS	SURVEY RESEARCH AGENCY	FUNDING AGENCY	NO. OF PROJECTS (OR FACILITIES)	PERMANENT STAFF MAN-YEARS	CASUAL STAFF MAN-YEARS	BUDGET ALLOCATIONS \$
Core Repositories	MD	NSDNR	3	4	1	204,100
Industrial Minerals	MD	NSDNR	3	3	2	221,400
Resident Geologist's Office	MD	NSDNR	N/A	2	-	123,400
Geochemical Surveys:	MR	NSDNR	1	2	-	194,100
Bedrock	-	-	-	-	-	-
Drainage	-	-	-	-	-	-
Soil	-	-	-	-	-	-
Geological Surveys, Bedrock:						
Reconnaissance (1:100 000)	-	-	-	-	-	-
Detailed (1:50 000)	MR	NSDNR	4	5	3	317,300
Geological Surveys, Surficial:						
Reconnaissance (1:100 000)	-	-	-	-	-	-
Detailed (1:50 000)	MR	NSDNR	1	2	-	124,900
Geophysical Surveys:						
Airborne Radiometrics	-	-	-	-	-	-
Airborne Magnetic (includes VLF-EM)	-	-	-	-	-	-
Ground Magnetic	-	-	-	-	-	-
Gravity	-	-	-	-	-	-
Seismic	-	-	-	-	-	-
Hydrogeological Surveys	-	-	-	-	-	-
Information and Education	MR	NSDNR	4	1	2	65,000
Laboratory Analysis	-	-	-	-	-	-
Mineral Deposit Analysis	MR	NSDNR	7	7	3	575,900
Publications	MR	NSDNR	N/A	2	0.5	108,000
Coal and Peat	ER	NSDNR	3	3	-	397,000
Oil and Gas Inventory and Analysis	ER	NSDNR	2	3	-	571,800
Subsurface Investigations	O	NSDNR	N/A	4	-	361,500
TOTALS			28	38	11.5	3,264,400

NSDNR - Nova Scotia Department of Natural Resources

MD - Mineral Development

MR - Mineral Resources

ER - Energy Resources

O - Operations

PROVINCE: NEWFOUNDLAND - 1992-1993

PROGRAMS	SURVEY RESEARCH AGENCY	FUNDING AGENCY	NO. OF PROJECTS (OR FACILITIES)	PERMANENT ¹ SMY	CASUAL SMY	PERMANENT \$	SALARIES CONTRACT ¹ \$	CASUAL \$	OPERATING EXPENDITURES \$
Director's Office	NDME	NDME/DEMR	4	9	1	227,117	69,329	5,117	89,342
Core Repositories	NDME	NDME	1	2	2	95,525	-	14,801	40,684
Geochemical Surveys:									
Bedrock	-	-	-	-	-	-	-	-	-
Drainage	NDME	NDME/DEMR	6	4	4	152,243	27,013	18,821	155,629
Soil	-	-	-	-	-	-	-	-	-
Geological Surveys, Bedrock:									
Reconnaissance (1:100 000)	NDME	NDME/DEMR	9	7	12	281,219	71,846	87,700	470,576
Detailed (1:50 000)	NDME	NDME/DEMR	15	9	6	284,868	187,839	44,373	180,118
Geological Surveys, Surficial:									
Reconnaissance (1:100 000)	-	-	-	-	-	-	-	-	-
Detailed (1:50 000)	NDME	NDME/DEMR	7	6	8	115,977	126,862	44,174	155,129
Geophysical Surveys:									
Airborne Electromagnetic	-	-	-	-	-	-	-	-	-
Airborne Magnetic	-	-	-	-	-	-	-	-	-
Ground Magnetic	NDME	NDME/DEMR	2	2	-	-	81,026	-	69,473
Gravity	-	-	-	-	-	-	-	-	-
Seismic	-	-	-	-	-	-	-	-	-
Radiometric	-	-	-	-	-	-	-	-	-
Hydrogeological Surveys									
Information and Education	NDME	NDME	6	13	-	312,867	145,153	-	245,030
Laboratory Analysis	NDME	NDME	4	8	-	246,954	29,013	-	60,977
Mineral Deposit Inventory and Analysis	NDME	NDME/DEMR	11	14	4	328,449	296,943	24,055	172,445
Publications	NDME	NDME	3	10	1	291,087	55,063	10,310	105,645
Resident Geologist's Office	-	-	-	-	-	-	-	-	-
Subsurface Investigations	-	-	-	-	-	-	-	-	-
Water Resource Inventory and Analysis	-	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-	-
TOTALS	-	-	68	84	38	2,336,306	1,090,087	249,351	1,745,048
Grand Total	5,420,792								

¹ includes long term temporary staff

NDME - Newfoundland Department of Mines and Energy

DEMR - Department of Energy, Mines and Resources, Canada

PROVINCE: NORTHWEST TERRITORIES - 1992-1993

DIAND 1 PROGRAMS	NO. OF PROJECTS/ FACILITIES	PERMANENT SMY	CASUAL SMY	PERMANENT \$ x 1000	CASUAL/ TEMPORARY \$ x 1000	OPERATING EXPENDITURES \$ x 1000
Head Office (Administration, General Support)	1	4.9	0.0	258.0	0.0	118.0
Core Repositories	1	0.1	0.2	8.0	5.0	40.0
Geological Surveys:						
Bedrock (1:50 000)	7	1.0	2.0	87.0	110.0	150.0
Surficial (1:50 000)	1	0.0	0.0	0.0	0.0	0.0
Education	-	0.2	0.0	15.0	0.0	8.0
Laboratory Analysis	-	0.0	0.0	0.0	0.0	17.0
Mineral Deposit Inventory and Analysis	-	1.6	0.0	165.0	0.0	99.7
Computerized Mineral Showings Database*	1	0.3	0.0	30.0	0.0	30.0
Publications	13	2.4	0.3	80.0	25.0	15.0
Other:						
Prospectors' Assistance	-	0.4		45.0		3.0
Geological Contracts	7	0.1		8.0		47.0
TOTAL DIAND		11.0	2.5	696.0	140.0	527.7
MIO 2 PROGRAMS	PROJECTS/ FACILITIES					OPERATING EXPENDITURES
Administration	1					165.0
Bedrock Mapping (1:50 000)	4					883.0
Computerized Mineral Showings Database*	1					170.0
Prospectors Assistance	1					107.0
Information/Education	1					75.0
TOTAL MIO 2	-					1400.0
GSC 3	14					1760.0
GRAND TOTAL Geoscience Expenditures						3687.7

1 Department of Indian Affairs and Northern Development

2 Canada NWT Mineral Initiatives Office

3 Geological Survey of Canada managed Mineral Initiatives Expenditures

*Database under joint development

PROVINCE: YUKON - 1992-1993

PROGRAMS	SURVEY RESEARCH AGENCY	FUNDING AGENCY	NO. OF PROJECTS (OR FACILITIES)	PERSON YEARS		SALARIES		OPERATING EXPENDITURES
				PERMANENT PY	CASUAL PY	PERMANENT \$	CASUAL \$	
Head Office (Administration, General Support)	INA	INA	1.00	2.75	0.00	120000.00	0.00	141000.00
Head Office (Administration, General Support)	MRCA	MRCA*	1.00	3.00	0.00	included	included	297600.00
Core Repositories	INA	INA	1.00	0.25	0.25	9000.00	8000.00	7000.00
Geological Surveys								
Bedrock (1:50 000)	INA	INA	2.00	1.25	0.50	63000.00	12000.00	46000.00
Bedrock (1:50 000)	MRCA	MRCA*	6.00	4.00	2.00	included	included	790500.00
Geological Surveys								
Surficial	INA	INA	1.00	0.50	0.25	25500.00	4000.00	5000.00
Surficial	MRCA	MRCA*	1.00	1.00	1.00	included	included	151900.00
Laboratory Analysis	INA	INA	1.00	0.00	0.00	0.00	0.00	4100.00
Laboratory Analysis	MRCA	MRCA*	1.00	0.00	0.00	included	included	* 90000
Education								* included in geological survey costs
Public	INA	INA	3.00	0.25	0.00	13000.00	0.00	23500.00
Thesis	INA	INA	2.00	0.00	0.50	0.00	10000.00	14000.00
Yukon MINFILE	INA	INA	1.00	2.00	0.50	95000.00	4000.00	21000.00
Publications	INA	INA	7.00	1.00	0.00	52000.00	0.00	26500.00
Other:								
Geoscience Element	MRCA	MRCA*	6.00	0.00	0.00	included	included	435025.00
Technology Element	MRCA	MRCA*	7.00	0.00	0.00	included	included	223316.00
Information Element	MRCA	MRCA*	6.00	0.00	0.00	included	included	38800.00
Subtotal - INA			19.00	8.00	2.00	377500.00	38000.00	288100.00
Subtotal - MRCA			28.00	8.00	3.00	included	included	1937141.00
Grand Total			47.00	16.00	5.00	377500.00	38000.00	2225241.00

INA - Indian and Northern Affairs Canada

MRCA - Mineral Resources Cooperation Agreement - Canada/Yukon Geoscience Office

MRCA* - Funding 70% INA, 30% Yukon Government

NOTES

GEOLOGICAL PROGRAM HIGHLIGHTS

NOTES

BRITISH COLUMBIA MINISTRY OF ENERGY, MINES AND PETROLEUM RESOURCES GEOLOGICAL SURVEY BRANCH

INTRODUCTION

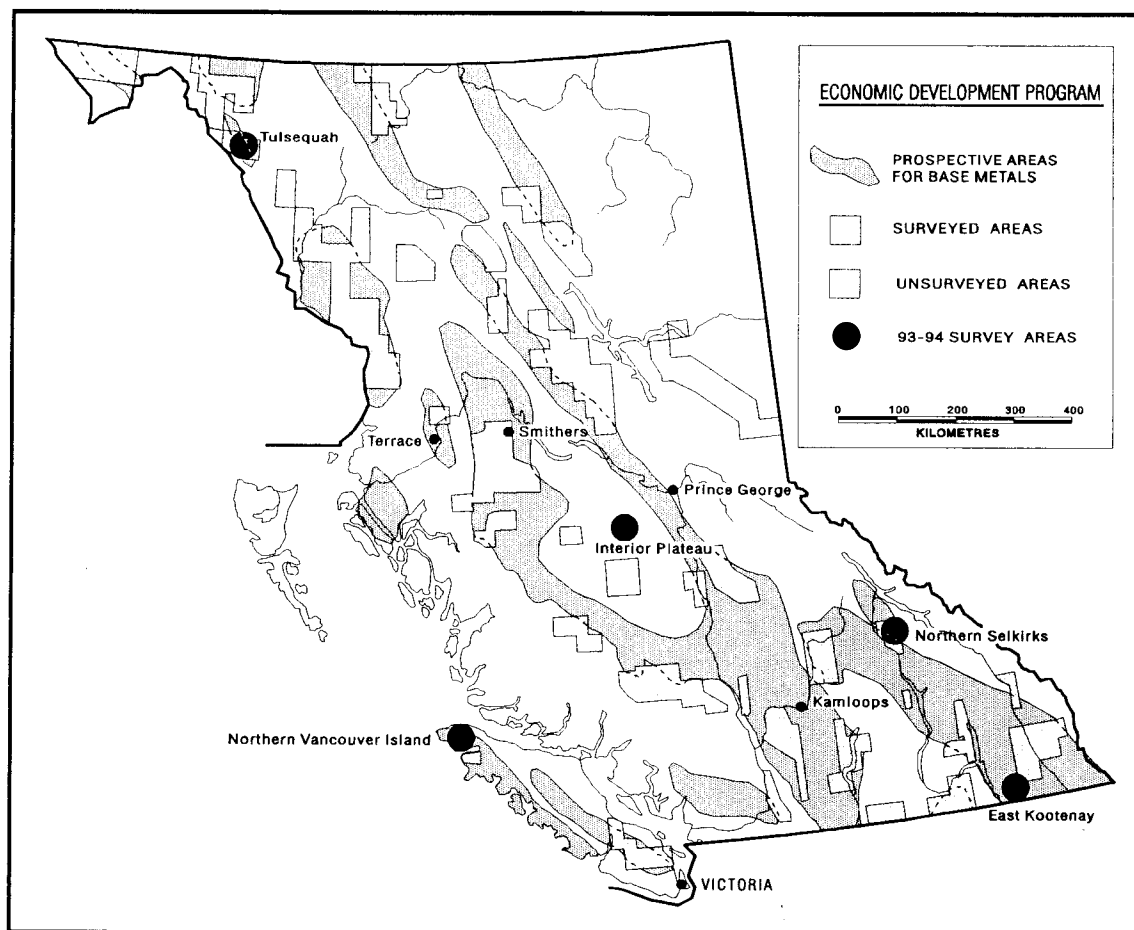
The Government of British Columbia released a "Mineral Strategy for B.C." in March 1993 to provide a focus for efforts to revitalize mineral exploration, improve our competitiveness and add value to our mineral products. The Mineral Strategy identified a key role for the Geological Survey Branch in achieving these objectives. The 93/94 field programs were focused on base metals and industrial minerals and were directly linked to Strategy Element #4: to encourage exploration investment through targeted geological studies in areas of high mineral potential.

The key objective of the 1993/94 Resource Management Program was to produce GIS-compatible mineral potential maps at 1:250 000 scale for the on-

going CORE (Commission on Resources and the Environment) Round Tables.

BUDGET AND REORGANIZATION

The 1993/94 base budget of the Branch was reduced by \$1.33 million to \$5.630. Some \$462,000 of this amount was a result of reorganization of the Mineral Resources Division in April 1993 which resulted in a transfer of the District Geologists to the new Land Management and Policy Branch. The base budget was supplemented by \$469,000 from an inter-ministry program, named the Corporate Resource Inventory Initiative (CRII) to prepare mineral potential maps for CORE.



To meet its budget target the Province deferred spending in 1993/94 on the Canada-British Columbia Partnership Agreement on Mineral Development (MDA-2). Geoscience projects initiated under this program in 1992 were put on hold.

The base budget reduction resulted in closure of the Branch's Analytical Laboratory. Lapidary and sample preparation, however, have been retained.

In July 1993 the Branch moved to the new headquarters of the Ministry of Energy, Mines and Petroleum Resources. The new building, named the Jack Davis Building after a former Minister, is a model of energy efficiency. The Branch occupies the 5th floor and part of the 4th floor. The sample preparation facility is located in the basement.

PROGRAM HIGHLIGHTS

The budget reduction caused a re-focus of the field program, away from high cost, frontier areas to areas with established mining infrastructure. This year new emphasis was placed on integrated, multi-disciplinary field programs. This maximized resources and integrated all of our skills to unearth the clues needed to discover buried mineral deposits and to establish the exploration techniques that best apply in the different regions. The Geological Survey of Canada participated as a partner in the Interior Plateau Project and provided biogeochemical studies and geophysical surveys and expertise in addition to geological and surficial mapping.

ECONOMIC DEVELOPMENT PROGRAM

BASE METALS INITIATIVE

Based on a screening process five projects were selected for delivery in 1993/94.

INDUSTRIAL MINERALS PROMOTION

The 1993/94 program was directed at promoting the development potential of B.C.'s industrial mineral endowment. A partnership was made with B.C. Trade and Development Corporation to promote B.C.'s industrial minerals in the Korean and Japanese markets.

The Branch in cooperation with Mineral Titles Branch and Crown Lands delivered regional meetings to explain revised tenure regulation for industrial minerals.

COAL PROGRAM

The coal program continued to focus on the quality of B.C. coals and was directed at mine site studies. A

number of research projects on the coal bed methane potential of B.C. coals were completed and published.

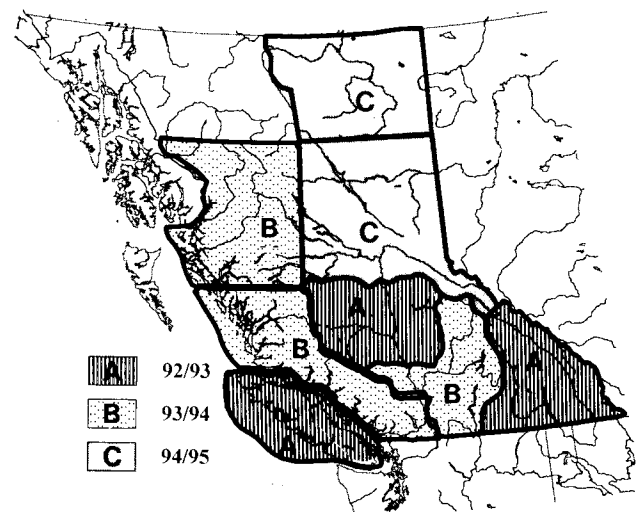
RESOURCE MANAGEMENT PROGRAM

REGIONAL MINERAL POTENTIAL EVALUATIONS

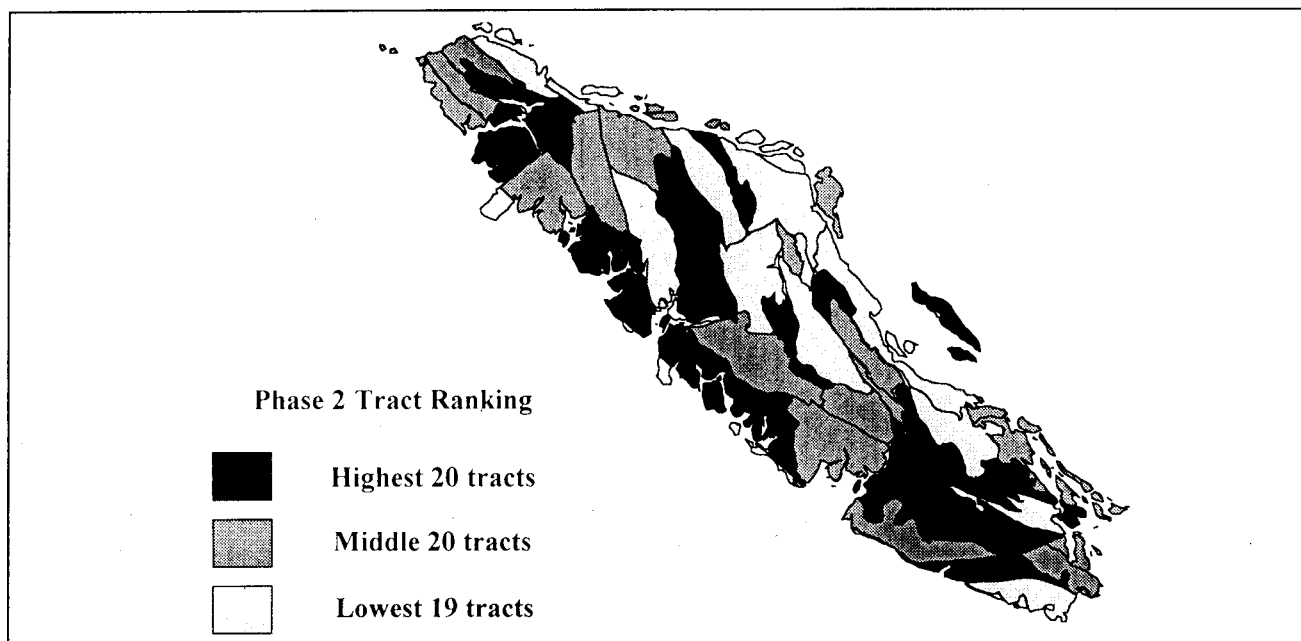
1:250 000 scale mineral potential evaluations were completed in 1993/94 for three large planning areas: Vancouver Island, Kootenays and Cariboo. The compilations provide information on the potential future economic benefits for mining in a mineral assessment tract. A tract is an area underlain by similar geology. The methodology is modified from a scheme developed by the USGS and involves 2 phases. In Phase I geological tracts are ranked according to historical exploration and mining use, i.e. exploration expenditures, production, number of known mineral occurrences, and value of known reserves. In Phase 2 a group of 20 to 30 specialists from industry and government estimate the potential for future discoveries in each tract. A USGS computer simulator uses the individual expert predictions of the number of deposits likely to occur in a tract to predict the amount of undiscovered resources. The gross-in-place value is calculated for each tract at four probability levels: 100%, 90%, 50% and 10%.

Phase I compilations are at an advanced stage for Thompson-Okanagan, Mid Coast and Nass-Skeena regions. Complete coverage of Province is planned for 1995.

MINERAL POTENTIAL - PROJECT AREAS



Six regions currently under study. The 92/93 regions show where CORE processes are currently underway.



Distribution of the 59 Mineral Assessment Tracts on Vancouver Island, grouped into three categories according to their mineral potential rank.

MINFILE MARKETING

British Columbia's MINFILE mineral inventory system has been adopted and adapted under license by the Government of the Northwest Territories for the development of a comparable system in the Northwest Territory. In November B.C.'s MINFILE team provided an intensive one week mineral inventory training program for 2 UN sponsored geologists from Tanzania.

The development of the MINFILE system continued with the addition of a major new module for tracking and monitoring exploration activities and

anomalies. This enhancement is designed to be used by the District Geologists and later it is expected to be a valuable tool for our exploration clients.

TECHNICAL LIAISON COMMITTEE

The Minister's Technical Liaison Committee in the Geological Survey Branch was active in 1993/94. The Committee met with the Minister, Honourable Anne Edwards, twice to offer advice on survey programs and budgets. In addition a one day forward looking "retreat" was held with the Branch management team.

NOTES

ONTARIO MINISTRY OF NORTHERN DEVELOPMENT AND MINES

ONTARIO GEOLOGICAL SURVEY

INTRODUCTION

In the Spring of 1993, a Mines and Minerals Division reorganization again changed the face of the Ontario Geological Survey. As it is currently organized, the OGS includes all head office and regional geoscientists in the Ministry. The publications function, the data services function and the geoscience laboratories are now part of the Client Services Branch of the Division. "Call on Us", a pamphlet which is available from any office of the Mines and Minerals Division, outlines the current organization.

During the 1993 field season, the Ontario Geological Survey carried out a variety of detailed regional and province-wide studies. Some projects were also undertaken in co-operation with other branches of the Division, other government agencies, universities and the private sector. A number of special geoscience projects were undertaken under the CanadaOntario Northern Ontario Development Agreement (NODA).

FIELD SERVICES SECTION, NORTHWESTERN ONTARIO

The Field Services Section, northwestern Ontario, of the Ontario Geological Survey is made up of 6 Resident Geologists' districts and covers 4 Mining Divisions: the Thunder Bay, Red Lake, Patricia and Kenora mining divisions. The area is approximately 700 by 700 km in size.

The goal of the Field Services Section (Northwest) is to stimulate and monitor exploration, development and production of the mineral resources in northwestern Ontario. This is done through the 6 Resident Geologists' programs which cover the Red Lake, Sioux Lookout, Kenora, Thunder Bay, Beardmore-Geraldton and Schreiber-Hemlo Resident Geologists' districts; the Canada-Ontario Northern Ontario Development Industrial Minerals project and the Manitouwadge Mineral Occurrence Inventory project; the 1990-91 Employment Equity Fund which provides funding for a native lecturer to give prospecting classes to the far north First Nation reserves and a Park Geologist to work with the Ministry of Natural Resources Park planners describing geological features within the park system.

The Resident Geologists' programs provide a professional consultative service and advice both in the

office and in the field. These services are made available to prospectors, exploration companies and the public on matters related to the geology, the mineral deposits and the exploration and mining activities conducted in northwestern Ontario. The Resident Geologists' general duties also included the provision of agencies (*i.e.*, Ontario Ministry of Natural Resources, Ontario Ministry of the Environment, Ontario Ministry of Labour) on land-use matters.

PRECAMBRIAN GEOSCIENCE SECTION

In 1992/1993 as in past years, the Precambrian Geoscience Section carried out detailed and regional mapping in areas of significant mineral potential. Six thematic investigations were also carried out.

Of the 7 base program-funded mapping projects 2 were in northwestern and 5 in northeastern Ontario. In addition to these projects, four detailed mapping surveys were funded under the Northern Ontario Development Agreement (NODA).

Included in the base-funded mapping program were: 1) Reconnaissance mapping of the Berens River Subprovince near Red Lake in NW Ontario; 2) detailed mapping of Colpitts-Bury lakes area north of Nakina (NW Ontario), four townships northeast of Timmins, two townships near Matachewan, and May Township and parts of neighboring townships north of the North Channel of Lake Huron (all in NE Ontario).

3 NODA-funded detailed mapping surveys were carried out in the Shebandowan greenstone belt west of Thunder Bay. Another NODA detailed mapping project was located west of Timmins where 2 townships were investigated.

Of the six thematic investigations carried out or initiated by the Precambrian Geoscience Section, 2 constitute joint OGS-university research projects, 1 is an industry-government co-operative project, 1 an OGS-funded project contracted to industry, and two are projects by Section staff.

One of the OGS-university research initiatives, on a felsic intrusive near Red Lake, was carried out by a Msc student of the University of Muenster, Germany, the other one, a geochemical characterization of specific volcanic facies in three Archean greenstone belts, involved three researchers of the Geology Department of the University of Portsmouth, United Kingdom.

In 1992, the OGS contracted a geophysical consultant to develop a user-friendly, PC-based geophysical data distribution system for the entire Single Master Aeromagnetic Grid for Ontario. The data was released in April of 1993.

There will be 2 downhole geophysical probes developed in a project funded by NODA and the Mining Industry Technology Council of Canada (~IEC). One of the probes will measure conductivity and magnetic susceptibility, the other is a bore hole orientation probe.

A NODA funded thematic investigation to evaluate the industrial mineral potential of Manitoulin Island was carried out by an OGS staff geologist. Another thematic, however, basefunded project by a staff geologist constituted the continuation of a multi-year investigation of Temiskamingtype supracrustal rocks and their mineralization potential.

MINERAL DEPOSITS AND FIELD SERVICES SECTION

The Mineral Deposits and Field Services Section was created during the reorganization of the Ontario Geological Survey (OGS) during the spring of 1993. The section consists of two main components or subsections the Mineral Deposits Subsection and the Field Services Subsection.

The Field Services component primarily involves the co-ordination and delivery of the Resident Geologist Program (RGP) throughout Ontario.

The Minerals Deposits Subsection is dedicated to the investigation of various mineral and elemental commodities (e.g., REE, PGE, diamond, base and precious metals), and their geological settings. Projects range from regional multi-disciplinary studies in conjunction with colleagues from the other sections within the OGS, to multi-year, province-wide investigations on several commodity-types within selected geological environments.

The following briefly summarizes the various projects conducted by, or in association with, the staff of the Mineral Deposits Subsection during 1993.

PROVINCIAL KIMBERLITE STUDY

R.P. Sage commenced a study on kimberlite in Ontario, designed to provide an accessible data base for the minerals industry on which to build its future exploration efforts. The first phase of this project, focused in northern Ontario, involves collecting as much data on the subject as possible, including kimberlite

samples for geochemical evaluation and the establishment of a reference material collection.

SHEBANDOWAN GREENSTONE BELT

C.E.C. Farrow began the first year of a two-year project that focuses on base metal sulfide and precious metal mineralization within the Shebandowan greenstone belt in northwestern Ontario. The study will investigate and document the characteristics of stratigraphically-controlled and intrusion hosted mineralization.

UMFREVILLE-SEPARATION LAKES AREA

The Umfreville-Separation Lakes area in Northwestern Ontario is the focus of a multi-year, comprehensive geoscientific study that includes the surficial and bedrock mapping of the greenstone belt(s) and surrounding granitoid complexes, gravity profile surveys, and rare-element pegmatite and metasedimentary-hosted sulfide mineralization investigations.

During the 1993 field season, C.E. Blackburn and J.B. Young completed the final year of a two-year, 1:15 840 scale bedrock mapping project of the Separation Lake greenstone belt. This year their efforts concentrated on the belt's eastern portion.

G.P. Beakhouse conducted 1:50 000 scale bedrock mapping of the dominantly granitoid and highgrade, migmatite Newsweek terrain within the Werner-Bug Lakes airway located approximately 80 kilometres NNW of Kenora and adjacent to the Manitoba-Ontario border. This geological environment hosts a variety of metallogenically diverse sulfide occurrences and past producing mines.

METASEDIMENT-HOSTED BASE METAL MINERALIZATION

J.R. Parker investigated the Bug Lake copper occurrence (English River) as part of the inaugural year of a five-year study on Archean sediment-hosted base metal mineralization in the metasedimentary sub-provinces of Ontario. Mr. Parker also examined zinc occurrences in Hurdman (Opatika) and Pense (Pontiac) townships in northeastern Ontario, reporting on the mineralization, rock-type association, alteration and structural considerations at each location.

GRANITE-RELATED MINERALIZATION

F.W. Breaks commenced a study designed to examine and evaluate the economic possibilities of various types of granite-related mineralization with the Superior craton of Ontario. The first year of this five-year project focused on the Raleigh Lake and Separation

tion Lake areas, where two new rare element pegmatite fields were found to host interesting and possibly significant lithium, tantalum and tin mineralization.

ABITIBI GREENSTONE BELT

G.M. Siragusa continued his documentation of property-scale descriptive features of gold occurrences/deposits in the Timmins area. This year his investigations focused on the Clavos and Montclerg deposits and St. Andrew Goldfields Ltd. Stock Township Mine in Stock and Taylor townships.

S.L. Fumerton completed the second year of a three-year Northern Ontario Development Agreement (NODA) project designed to document mineral occurrences and deposits within the Swayze greenstone belt, the data of which are to be released in a digital format. The study area encompasses seventy-eight townships southwest of Tameness.

SUDBURY IGNEOUS COMPLEX

Investigations on the geology and geochemistry of the sub layer rocks of the Sudbury Igneous Complex (SIC) were initiated during the 1993 field season by staff of the Ontario Geological Survey (OGS), and through co-operative efforts between the OGS and graduate students and staff from Laurentian University (LU).

P.C. Lightfoot (OGS), assisted by K.P. Farrell (LU), began a geochemical study on the inclusion-rich sub layer rocks associated with the copper-nickel sulfide ores of the Sudbury basin. The 1993 field work concentrated on 1) an embayment environment at the base of the Sudbury Irruptive (Whistle Mine), 2) a radial offset (the Parkin Offset), 3) a concentric offset (the Manchester Offset), and 4) a regional study of the variation in sub layer and inclusion geology.

M. More (LU), with assistance from P.C. Lightfoot (OGS) and R.R. Keays (LU), commenced a graduate thesis investigation on the footwall pyroxenite/peridotite body at Falconbridge Ltd.'s Fraser Mine. This study is designed to expand on the ultramafic body's petrologic Al and geochemical data base, and to test whether the ultramafic inclusions in the (SIC) sub layer were derived from an older footwall ultramafic source.

K.P. Farrell (LU), with assistance from P.C. Lightfoot (OGS) and R.R. Keays (LIJ), began a graduate thesis study on ultramafic inclusions in the SIC sub layer at Inco Ltd.'s Whistle Mine. The project is designed to determine the source of the inclusions relative to the source for the copper-nickel sulfide

mineralization, and to test for a genetic relationship between the inclusions and the SIC sub layer and/or Main Mass.

SEDIMENTARY AND ENVIRONMENTAL GEOSCIENCE SECTION 1993

As with many units within the the Ministry of Northern Development and Mines, the organization and structure of the Sedimentary and Environmental Geoscience Section (SEGS) changed significantly during the past year. The Section now consists of the Sudbury based geoscientists and support staff, the Toronto based Mines and Minerals Information Centre and the Southwest Resident Geologist's Office in London.

The result is an integrated Section whose focus ranges from the gathering and interpretation of data, to client services and end user assistance. These functions operate within, and are consistent with the aims of the Ontario Geological Survey.

MAPPING AND FIELD STUDIES

The mandate of the Sudbury based geoscience group is to investigate Phanerozoic age materials and sediments within the province. Activities include the mapping of Paleozoic age rocks and Quaternary sediments; assessment of the mineral resource potential contained therein (such as sand and gravel, limestone, salt gypsum, etc.); investigation of past and current geological processes which affect the occupation and use of the land; and defining the physical properties or geochemical signature of the landscape.

The Sudbury group is organized into 2 subsections, each headed by a supervisor. These are the Environmental Subsection, lead by Rob Milligan, and the exploration oriented Mineral Appraisal Subsection under Dr. Christine Kaszycki. In recognition of the fact that programs undertaken by either group require a range of skills, staff trained in a variety of disciplines are represented within each subsection.

The adoption of this Section structure has created a degree of flexibility which allows the formation of multidisciplinary work groups or project teams. Staff from the Environmental Subsection, a Quaternary geologist for example, can be assigned to exploration type projects should the need arise.

It should be made clear, however, that the line between environmental and exploration projects is, in a number of cases, somewhat artificial. It may be strongly argued that the results of studies detailed in the SEGS' portion of this volume yield data of use to

both disciplines; those interested in evaluating the resource potential of the land and those whose concerns are on identifying and protecting ecologically sensitive aspects of the landscape and subsurface. In short, we are producing baseline information with wide ranging benefits.

The geochemical programs of the Section are an excellent example of this. The survey results are of interest to exploration, as regional trends and anomalies may define the setting or presence of mineralization. The same database, however, can be used to characterize the natural environment and assess either past or future anthropogenic affects.

SOUTHWESTERN RESIDENT GEOLOGIST'S OFFICE

The Southwest Resident Geologist Office, headed by B.H. Feenstra, assists an eclectic client group by supplying geological information on the area's extensive glacial (Quaternary) deposits and Paleozoic bedrock. The duties of the office, however, go well beyond the distribution of OGS maps and reports. The office is charged with: cultivating client relations; promoting mineral resource development; expanding the geological database of the area; and commenting on land use issues.

To accomplish these duties the staff of the London Resident Geologist's Office are engaged in the following activities: gathering field data, often to satisfy pressing client demands; conducting field trips for environmental and industrial groups as well as academic institutions; fulfilling a public education role with regard to geological materials and processes; and providing input to municipal Official Plans.

MINES AND MINERALS INFORMATION CENTRE

The Mines and Minerals Information Centre (MMIC), located on the 2nd Floor of the Macdonald Block, Queen's Park was established to serve southern Ontario based clients requiring geoscience information. The MMIC offers customers a one-stop outlet for Mines and Minerals Division services.

The staff of the MMIC is headed by 2 senior geologists. These individuals answer enquires and handle a variety of other duties including public education, leading field trips and representing the Ministry at various functions and committees. MMIC clients are also served by staff solely responsible for publication sales and providing general information on the Mines and Minerals Division program.

Another aspect of the Toronto office is a reference library. The library receives over 65 journals and a wide selection of texts, catalogues and special volumes. The library provides searches of the GeoRef CD-ROM and GEOSCAN databases for in-person inquiries.

The newest and perhaps most exciting service available at the MMIC is access to a digital version of the provincial assessment files. This database, termed AFRI, contains the equivalent of over 1 million pages of text. The set-up and search capabilities of the system will revolutionize the manner in which information is sought.

ONTARIO GEOSERVICES CENTRE

CENTRE ROLE

The Ontario GEOservices Centre is a recognized Centre for Excellence for geoscience information services. The Centre provides state-of-the-art electronic data base, library, publication and laboratory services to the Mines and Minerals Division and to its public client base.

As the custodian responsible for Ontario's geoscientific information, the Centre is committed to the management, presentation and distribution of this information so as to foster Ontario's competitive position in mineral exploration and development. In addition, the Centre seeks to transfer technology and geoscience expertise through partnerships and strategic alliances with our clients.

A Business Development Unit has been established within the Centre to explore, develop and market commercially viable specialty products and services in a manner which will complement and enhance Ontario's private sector competitiveness.

CORE PROGRAM FUNCTIONS

Data Services Section

The Data Services Section is responsible for the management of public mineral sector information collected by, or entrusted to, the Mines and Minerals Division. This is done through the Mines Library, a vital depository of topical geoscientific information used by Ministry staff, particularly OGS geoscientists who must keep abreast of worldwide developments in their field of study, and through the ERLIS public access computer system.

Electronic data management is a new mandate; therefore, a large task is the building of a number of geoscientific and mining data bases to be accessed,

shared and duplicated in an organized and timely fashion by users with MNDM and in the mining industry. The overall program is expected to be completed over this decade and the Government has committed \$21.0M of capital investment towards this initiative which is at the technological forefront.

As data bases are set up, the Section is responsible for the ongoing updating, distribution and maintenance of the data and the associated computer applications.

Publication Services Section

The Publication Services Section is the publisher for the Ontario Geological Survey, editing and producing the results of the Survey's research as reports and maps in a variety of formats and at several quality levels. With an annual output of 3000-4000 pages and 40-60 maps, the section is one of the largest publishers in the Ontario Government and ranks alongside the Geological Survey of Canada as one of the largest geoscience publishers in the country.

A long tradition of excellence in geoscientific editing and innovative production methods for paper publications culminated in the release of the Geology of Ontario series of publications in 1991-92. Thanks to the Sudbury relocation, the Section is well positioned for the move into electronic publishing and distribution with leading-edge computer technology for text and map production that is fully compatible with the ERLIS system being implemented by the Data Services Section.

Geoscience Laboratories

The Geoscience Laboratories provide high-quality geoanalytical data in support of the program of the Mines and Minerals Division and the minerals industry client groups. In particular, it:

- * provides a wide range of high-quality mineralogical and elemental analysis services to the client group.
- * provides advice to prospectors and public
- * keeps pace with developments in geoanalytical methodologies and their applications.
- * anticipates and responds to demands for improved procedures and develops capabilities accordingly.
- * maintains a state-of-the-art geoanalytical facility.
- * maintains a high profile with the international geoanalytical, geological and geochemical communities.

The usefulness of the Laboratories rests ultimately in the application of mineralogical and elemental analyses to:

- * provide a complete description of samples for use in the preparation of geological maps.
- * study rock-forming processes relevant to mineral exploration
- * identify significant trends in 'pathfinder' element abundances that may lead to the discovery of economic levels of mineralization.
- * determine abundances of elements in support of economic viability studies.
- * determine the quality of industrial minerals and building materials.
- * provide data for geochemical mapping programs
- * respond to environmental concerns related to the minerals industry and baseline studies
- * act as a reference centre for geoanalytical methods and provide input and advice on methods development which benefits the Ontario-based exploration and development client groups
- * provide validated data for use in multi-year programs.

The spin-off value of the Laboratories activities includes:

- * benefits to the manufacturers of Ontario-based technology, with feedback of technological developments into the Ontario minerals industry.
- * advice to the minerals industry (especially small-scale producers) in terms of mineral beneficiation processing and by-product recovery.

The applied research and development component of the Laboratories' activities makes up almost 40% of the program delivery (the remaining 60+% reflects the support service provided to the geologist using established methods). The applied research and development activities of the Geoscience Laboratories currently fall into two broad categories:

- * applied research related to operational programs and client demands - research and development conforming to Ontario Government policy.

Business Development Unit

The Business Development Unit provides the specific management locus and administrative mechanism to explore, develop and market commercially viable specialty products and services in a manner which will complement and enhance Ontario's private sector competitiveness.

NODA

The Canada-Ontario Northern Ontario Development Agreement (NODA) was signed in November of

1991, and represents a four year \$95 million commitment to the Minerals, Forestry, and Tourism sectors in Northern Ontario. The Minerals Program of the NODA comprises \$30 million, and is shared equally between Natural Resources Canada (formerly Energy, Mines and Resources Canada) and the Ontario Ministry of Northern Development and Mines (MNDM).

Projects have been developed under six program areas: Mining and Minerals Technology, Geoscience, Information Transfer and Technology, Exploration Technology, Industrial Minerals and Economic Development and Administration, Communications and Evaluation.

Under the NODA Minerals Program, industry has been involved to a far greater extent than under any previous mineral development agreements in recommending projects and priorities. Working groups and technical advisory committees including industry representatives ensure that proposals considered for funding under the NODA Minerals Program are of lasting value to the minerals industry.

The 1993-1994 fiscal year represents the third year of the four year agreement, although there are up to two additional years available to complete projects.

This is the first full year of project implementation and approximately 31 provincial projects are being delivered across Northern Ontario. Sixty-two individuals were hired for projects under the NODA, including 30 university summer field assistants.

Initiation was delayed for many of the projects in the Information Transfer and Technology Program, pending an internal review within MNDM which resulted in the development of a strategic plan for information technology development within the Ministry. The Integrated Resource Management (ARM) document was recently completed, and most of the projects under the Information Transfer and Technology program are now under way.

The focus during the first three years of the NODA has been on the more field oriented areas of Geoscience, Industrial Minerals and Economic Development, and Administration, Communications, and Public Addiction. The next three years will reflect a gradual decline in these areas and an increase in the technology oriented programs of Mining and Minerals Technology, Exploration Technology, and Information Transfer and Technology.

MINISTÈRE DE L'ÉNERGIE ET DES RESSOURCES

GOVERNEMENT DU QUÉBEC

SECTEUR DES MINES

Pour l'année financière 1993-94, l'objectif de base du ministère de l'Énergie et des Ressources dans le secteur minier consiste à promouvoir le développement de l'industrie minière du Québec par un ensemble de mesures visant à appuyer l'initiative et le leadership du secteur privé et à assurer que l'exploitation des ressources minérales s'effectue dans une perspective de développement durable pour la collectivité québécoise. Plus particulièrement, il s'agit de :

1. stimuler les investissements privés pour le développement de nouveaux gisements ainsi que l'expansion et l'amélioration des capacités de production et de transformation primaire existantes;

2. focaliser la recherche et le développement sur des projets spécifiques répondant aux besoins de l'industrie et pouvant aider à consolider notre position concurrentielle et susciter le développement industriel à court et moyen termes;

3. contribuer au renouvellement des réserves de minerai de cuivre et de zinc et favoriser la diversification de la production minière dans les régions du Québec par la stimulation de l'exploration minière;

4. assurer la promotion et la défense de l'amiante et, au niveau mondial, promouvoir l'adoption de législations visant un usage sécuritaire de ce produit.

Chacune des directions du Secteur des mines répond plus spécifiquement à l'un ou l'autre des grands objectifs cités.

LA DIRECTION DE L'INDUSTRIE MINÉRALE (DIM)

La Direction de l'industrie minière tient à jour les connaissances relatives au contexte fiscal, économique et réglementaire dans lequel évolue le secteur minier et elle favorise la mise en valeur, l'exploitation, la transformation primaire et la mise en marché des ressources minérales du Québec dans une perspective de développement durable.

LE SERVICE DE LA STATISTIQUE ET DE L'ÉCONOMIE MINÉRALE (SSEM)

Au sein de la Direction de l'industrie minière, le Service de la statistique et de l'économie minière est chargé d'acquérir, de traiter et de diffuser les connaissances statistiques propres aux activités de l'industrie

minière québécoise et les connaissances économiques reliées au contexte dans lequel elle évolue.

De plus, le SSEM participe à la recension et à l'élaboration des politiques qui guident l'action gouvernementale en vue de favoriser l'exploration, l'exploitation, la transformation primaire et la mise en marché des ressources minérales du Québec dans une perspective de développement durable.

De façon plus spécifique, le Service de la statistique et de l'économie minière:

- * recueille, vérifie, traite et publie des données statistiques sur les activités des compagnies minières et des agents d'exploration au Québec;
- * analyse l'évolution des marchés nationaux et internationaux des divers secteurs de l'industrie minière présents au Québec en contact avec les principaux acteurs du domaine afin de dégager les perspectives d'avenir, collabore au recensement et à l'élaboration des politiques gouvernementales, participe à l'orientation de la planification stratégique du Secteur des mines et propose des interventions appropriées;
- * publie des périodiques, informe les agents économiques des performances et des perspectives de l'industrie minière et fournit, sur demande, des informations statistiques non confidentielles;
- * participe au suivi de l'évolution des politiques gouvernementales, des activités et de la réglementation des principaux organismes ayant une incidence directe sur l'industrie minière afin de proposer des interventions susceptibles d'en favoriser la croissance;
- * formule des avis à l'intention des autorités du ministère de l'Énergie et des Ressources et d'autres organismes gouvernementaux.

En 1993-1994, le SSEM prévoit produire, outre les publications périodiques (*La ressource minière*, *L'industrie minière du Québec*, *Statistiques sur l'industrie minière*, *production et investissement*, *Répertoire des établissements*) diverses études portant, notamment, sur l'économie de l'exploration, l'impact de la fiscalité sur l'industrie minière, la productivité de la main-d'œuvre minière québécoise, la problématique des activités de R/D des entreprises minières et l'usage contrôlé et sécuritaire de l'amiante chrysotile.

LE SERVICE DU DÉVELOPPEMENT MINIER (SDM)

Le SDM a comme principaux mandats de :

- Promouvoir la réalisation de projets d'investissements pouvant contribuer au développement durable de l'industrie minière, notamment en proposant des interventions gouvernementales appropriées et en administrant certains programmes d'assistance financière.
- Suivre et analyser l'évolution des activités des intervenants dans chacun des secteurs de l'industrie minière du Québec dans le but de fournir à la direction du ministère et à ses gestionnaires des informations et des avis pertinents sur leur état de situation et leurs perspectives d'avenir, de contribuer à la planification stratégique des activités du Secteur des mines du ministère et de suggérer des interventions ou des politiques sectorielles appropriées.
- Suivre et analyser les politiques gouvernementales et les mesures législatives des principaux organismes ayant une incidence directe sur les activités de l'industrie minière, afin d'en mesurer les impacts et de proposer des interventions ou des orientations susceptibles de contribuer au mieux-être de l'industrie.

En 1993-1994, le SDM prévoit notamment être actif dans la mise en oeuvre des programmes d'assistance financière inscrits à l'Entente auxiliaire Canada-Québec sur le développement minéral (EADM) qui sont sous sa responsabilité : études technico-économiques et travaux d'expérimentation, infrastructures de développement minéral, industrie de l'amiante, exploitations minières en difficulté et recherche d'opportunités et promotion.

De plus, il collaborera à la mise en oeuvre du volet «Soutien aux entreprises» de l'EADM. Il poursuivra également ses activités dans les principaux dossiers suivants : la sous-grappe minière de la grappe industrielle de transformation des métaux et des minéraux, la mise en oeuvre du programme de soutien du secteur minier de la région Chapais-Chibougamau et les études et essais de restauration des parcs à résidus miniers appartenant à la Couronne.

Enfin, il entend continuer ses analyses des incidences économiques des politiques et des règlements touchant l'environnement dans le secteur minier et l'accessibilité au territoire, ainsi que de produire des avis et des notes appropriés aux autorités du ministère concernant le développement minier, l'environnement minier et l'accessibilité au territoire.

ACTIONS ACCRÉDITIVES

Cette partie décrit brièvement les particularités du régime fiscal québécois relatif au financement par actions accréditives. Ce régime s'applique aux frais d'exploration engagés au Québec par des particuliers et pour des personnes qui, directement ou indirectement, n'exploitent pas une mine (essentiellement, ce sont les compagnies "juniors"). L'ensemble de ces mesures a été prolongé jusqu'au 31 décembre 1995 suite au Discours sur le budget du 20 mai 1993.

Le régime québécois a les particularités suivantes par rapport au régime fédéral actuel:

- Les frais souterrains d'exploration (galeries d'exploration ou forage sous terre) bénéficient d'une allocation additionnelle de 25 %.
- Les frais d'exploration définis comme "frais de surface" sont admissibles à une allocation supplémentaire de 50% (la déduction totale pour de tels frais est donc de 175 %).
- Ces frais n'entrent pas au calcul des "pertes nettes cumulatives sur placements" (P.N.C.P.) au calcul de l'impôt du Québec.
- Les investisseurs qui n'ont plus de solde à l'exemption des gains en capital peuvent diminuer leurs gains en capital sur la vente d'actions accréditives par la différence entre le prix de base rajusté des actions (qui est nul) et leur coût d'acquisition.
- Les frais d'émission, jusqu'à concurrence de 15 % du produit d'une émission d'actions accréditives, peuvent être déduits en une année au lieu de devoir être étalés sur cinq ans; ces frais d'émission n'entrent pas non plus au calcul des P.N.C.P.

L'ensemble de ces mesures fait en sorte que le prix de vente des actions accréditives peut être aussi bas que 34 % de leur coût d'acquisition, en tenant compte de l'impôt fédéral, avant que l'investisseur subisse une perte.

LOI SUR LES MINES

Cette loi prévoit les diverses modalités relatives à l'attribution des droits miniers, et elle édicte les conditions d'exercice de l'activité minière au Québec. Le 17 juin 1991, l'Assemblée nationale du Québec décidait de modifier à nouveau la Loi sur les mines en adoptant le projet de Loi 130 (1991, chapitre 23), principalement afin d'assurer le réaménagement et la restauration d'un terrain affecté par des activités minières.

Ainsi, une personne qui effectue certains travaux miniers d'exploration ou d'exploitation, qui dirige une

usine de concentration de certaines substances minérales ou qui effectue certains travaux d'exploitation à l'égard de résidus miniers sera dorénavant tenue de faire approuver par le ministre un plan de réaménagement et de restauration du terrain affecté par ses activités, de se conformer au plan et de déposer une garantie à cet effet. En cas de défaut, le ministre pourra notamment faire exécuter les travaux requis aux frais de la personne qui omet de se soumettre à ces exigences et, s'il ne peut en recouvrer les frais au moyen de la garantie, toute somme due à la Couronne constituera une dette privilégiée sur tous les biens du débiteur. La Loi 130 comporte également une disposition par laquelle le ministre pourra enjoindre une personne qui a déjà cessé ses activités minières sur un site donné, de procéder à des travaux de réaménagement et de restauration nécessités par la présence de résidus miniers.

Par ailleurs, la Loi 130 indique que certains territoires pourront être délimités à des fins non exclusives de récréation, de tourisme et de conservation de la flore ou de la faune et que certaines conditions spécifiques pourront être imposées à l'égard des travaux miniers effectués dans ces territoires. En procédant ainsi, le gouvernement québécois espère conserver accessible à l'industrie minière la plus grande partie de son territoire, tout en tenant compte de ses autres utilisations.

LE CENTRE DE RECHERCHES MINÉRALES (CRM)

Le Centre de recherches minérales (CRM) est une direction générale du Secteur des mines, de l'actuel ministère de l'Énergie et des Ressources. Il compte 128 employés permanents (chercheurs, techniciens, fonctionnaires et ouvriers) et une vingtaine d'employés occasionnels. Il dispose, en 1993-1994, d'un budget annuel de 9,6 M\$. Il est doté d'un Comité consultatif, dont les membres proviennent des milieux de la recherche et des entreprises du secteur minier et métallurgique.

Le CRM poursuit ses efforts en vue d'élargir sa clientèle. En 1992-93, la valeur des 107 projets réalisés pour le compte de clients industriels s'élève à 4,4 M\$.

Sa clientèle se concentre dans le secteur minéral du Québec, qu'il s'agisse d'entreprises minières ou métallurgiques, de firmes juniors d'exploration, de firmes de génie-conseil, de laboratoires ou de centres de recherche engagés dans des domaines d'activité connexes. Il faut ajouter, à ce noyau d'une centaine d'entreprises ou organismes, plusieurs usines de transformation dont les procédés traitent ou utilisent

des substances minérales. Tout compte fait, ce sont plus de 300 établissements qui peuvent faire appel aux services du CRM, plusieurs d'entre eux de façon régulière.

Le CRM dispose d'une expertise reconnue et d'un savoir-faire certain pour adapter, améliorer ou tester des procédés existants ou encore pour développer de nouveaux procédés de traitement ou de transformation des substances minérales. Autant à l'échelle du laboratoire qu'à sa station d'essais, son personnel et ses équipements lui permettent de réaliser une multitude de projets axés autant sur le développement que l'optimisation de procédés et de contribuer ainsi aux efforts des entreprises en matière de R&D.

En 1992-1993, les laboratoires d'analyses du CRM ont effectué l'analyse de quelque 35 100 échantillons, dont 49% proviennent de la Direction générale de l'exploration géologique et minérale du ministère.

Le CRM gère aussi la participation gouvernementale du Québec dans le programme de neutralisation des eaux de drainage dans l'environnement minier pour un montant de 466,2 k\$ dans douze projets.

La raison d'être du CRM traduit sa fonction gouvernementale qui est de contribuer au développement des entreprises québécoises qui oeuvrent dans les domaines de l'exploration, de l'exploitation, du traitement et de l'utilisation des substances minérales.

Sa mission est de développer et optimiser les procédés d'exploitation et de traitement des substances minérales, tout en offrant des services d'analyse minérale.

Le CRM ne ménage pas les efforts pour offrir et rendre des services de qualité à ses clients à la fois dans des activités reliées plus spécifiquement au court terme, mais sans négliger le moyen et long terme qui comportent plus de risques autant sur le plan technologique que financier.

Le CRM entend maintenir sa position de leader dans un certain nombre de secteurs. En contrôle de procédés, le CRM fait des efforts supplémentaires pour devenir pour l'industrie minérale un centre d'excellence dans l'application aux opérations de l'automatique et de la simulation et pour augmenter son niveau d'intervention en industrie. Le CRM s'implique davantage dans le transfert de connaissances en étant encore plus actif dans l'organisation de cours de formation et de séminaires spécialisés.

Le CRM est déjà très engagé dans l'élaboration de projets de nature précompétitive, c'est-à-dire des projets de nature plus générique, qui s'adressent à des problèmes communs à plusieurs intervenants et qui

peuvent impliquer des collaborations d'autres équipes de recherches pour leur réalisation. Dans le secteur du fer entre autres, cinq projets de cette nature sont en voie de réalisation pour un montant global de 1,68 M\$.

Cette approche semble d'ailleurs favoriser le mailage université-entreprise et accélérer le transfert technologique vers les entreprises participantes. D'autre part, les avantages fiscaux que peuvent en retirer les entreprises sont très favorables au Québec et servent à alléger les coûts de la recherche pour les entreprises. Le CRM ne ménage pas ses efforts pour sensibiliser sa clientèle à cet état de fait.

La place, qu'occupe le CRM dans le réseau de la R&D minérale, lui permet de mobiliser les expertises et les ressources disponibles au Québec ou ailleurs, de coordonner de tels projets en participation et de les mener à terme au bénéfice de toute l'industrie minérale.

DIRECTION DE LA RECHERCHE GÉOLOGIQUE (DRG)

La Direction de la recherche géologique (DRG) a pour mission de définir et de promouvoir le potentiel minéral des différentes régions du Québec. Elle le réalise essentiellement par un programme de levés et d'études géoscientifiques qu'elle a adapté aux besoins de sa clientèle minière. La mise en oeuvre de ce programme relève de deux services géologiques et de leurs sept bureaux régionaux. Elle nécessite aussi la contribution de spécialistes regroupés à l'intérieur de divisions. La DRG dispose, en 1993-1994, d'un budget annuel de 6,9 M\$. Une partie des activités géoscientifiques de la DRG est financée par le gouvernement fédéral dans le cadre de l'Entente auxiliaire Canada-Québec sur le développement minéral.

SERVICE GÉOLOGIQUE DE QUÉBEC (SGQ)

Le Service géologique de Québec dessert les deux tiers du territoire québécois dont les Appalaches, les Basses-Terres du Saint-Laurent, la majeure partie du Grenville et l'ensemble du territoire du Nouveau-Québec situé au nord du 55^e parallèle. Il gère quatre bureaux régionaux, animés chacun par un géologue résident qui agit à titre de responsable pour la programmation des travaux dans son district. Il est supporté en région et à Charlesbourg par des métallogénistes, des géologues régionaux, des géochimistes, un géophysicien et du personnel de la Division des minéraux industriels.

Au cours de l'année 1993-1994, le Service géologique de Québec dispose d'un budget de 3,2 millions

de dollars pour la réalisation d'une quarantaine de projets. Le budget global est réparti entre quatre divisions régionales, correspondant à autant de districts régionaux en plus de la Division des minéraux industriels.

La Division Côte-Nord - Nouveau-Québec dispose d'un budget de 833,4 K\$, dont la plus grande partie a été consacrée à des levés et études dans le Grenville. Les travaux sur la Côte-Nord, incluant la région de Fermont, se sont poursuivis; ils portent sur la continuation d'un levé au 1:50 000 sur le Haut Plateau de Manicouagan aux environs de la rivière Sainte-Marguerite. Nous avons poursuivi le levé géologique et métallogénique du Complexe lité mafique de Sept-Îles et réalisé un levé géophysique hélicoptéré dans le Groupe de Wakeham. Nous entendons publier à court terme les résultats de ce levé réalisé au nord de Natashquan. Une géotraverse a été effectuée entre Baie-Comeau et le Relais Gabriel au nord, le long de la route 389.

Aucun travail de terrain n'a été effectué dans la région de la Fosse de l'Ungava, où les efforts ont porté sur la compilation des travaux qui ont été effectués de 1983 à 1988.

La Division Montréal - Laurentides compte sur un budget de 564,8 K\$. Le principal élément de la programmation touche la révision sur le terrain de la géologie du feuillet de Pembroke en plus de l'étude structurale de la région de Fort-Coulonge et de l'étude des corridors de déformation de la région de Grand-Remous - Maniwaki - Danford Lake. Des études métallogéniques se sont poursuivies sur la minéralogie et la géochimie des tourmalinites, sur la gîtologie de la terrane de Mont-Laurier - Cabonga - Dozois et en particulier sur les pegmatites et gneiss à néphéline du réservoir Cabonga. Les travaux d'inventaire de tourbières de la Mauricie - Lanaudière et des carrières des Basses-Terres du Saint-Laurent se sont également poursuivis.

Les travaux sur le territoire de la Division Estrie - Laurentides ont été menés avec un budget de 697,5 K\$. En Estrie-Beauce, ils ont porté sur le projet de levé géologique régional dans la région de La Patrie dans le synclinorium de Connecticut Valley-Gaspé, sur l'évaluation métallogénique des dolomies cambriennes de la Formation de White Brook, sur l'évaluation d'ardoises et sur la révision de la géologie du feuillet de Lyster (21L/05). Deux projets d'inventaires se sont poursuivis, soit celui des ressources en granulats de l'Estrie-Beauce, feuillets 21L/02 et 03, et celui des carrières de la Beauce - Côte du Sud. Dans le Grenville,

la révision au 1:50 000 de la géologie du Complexe de la Bostonnais s'est poursuivie et une étude a été entreprise sur la métallogénie du gîte de McNickel.

La Division Gaspésie - Îles-de-la-Madeleine a présenté cette année d'autres feuillets publiés suite aux travaux de compilation des dernières années. Le budget de 621,5 K\$ alloué à cette région a permis de réaliser une deuxième et dernière étape d'un projet de géochimie alluvionnaire dans le Bas-Saint-Laurent, de cartographier la région du Mont Brown (feuille 22A/13) ainsi que la moitié du feuille 22B/08, en plus de réanalyser des échantillons pour l'or (Gaspésie Est).

La Division des minéraux industriels s'intéresse également à la tourbe et aux matériaux de construction. La plus grande partie de ses activités se trouve actuellement sur les territoires des quatre divisions régionales du Service géologique de Québec et, dans une moindre mesure, en Abitibi. Elle est donc responsable des levés, des compilations et des études qui touchent l'ensemble du Québec pour répondre à des besoins exprimés par la clientèle du ministère intéressée par ces substances minérales. Un budget de 86,8 K\$ est consacré au soutien technique aux entreprises et à la production de documents de synthèse et d'information, tel un atlas sur les gravières et sablières du Québec en phase finale de réalisation.

SERVICE GÉOLOGIQUE DU NORD-OUEST (SGNO)

Le Service géologique du Nord-Ouest dessert tout le Nord-Ouest québécois. Les Divisions de Rouyn-Noranda, de Val-d'Or et de Chibougamau, chacune animée par un géologue résident, sont logées dans les bureaux régionaux des mines. Le personnel de la direction du Service et quatre métallogénistes de la Division des gîtes minéraux sont regroupés dans le bureau de Val-d'Or. Un métallogéniste est basé au bureau de Chibougamau. Le Service compte également un géochimiste dans ses rangs.

Le SGNO dispose, pour l'année 1993-1994, d'un budget de 2,46 millions, ce qui représente une diminution de près de 10% par rapport à l'année dernière. Rappelons que suite aux coupures des dernières années le service a dû réduire le nombre et l'envergure des levés géologiques et géophysiques de même que les contrats aux firmes et instituts.

À cause de la coûteuse logistique requise, un seul levé (1:20 000) fut effectué en région isolée soit celui du lac Troilus qui en était à sa phase terminale. Il s'agit toutefois d'un levé important puisqu'un gîte prometteur, le gîte du lac Troilus (Metall Mining) se trouve à

proximité de la région levée. Le levé détaillé de la région de Belleterre au Témiscamingue s'est poursuivi pour une deuxième année. Un nouveau levé détaillé a été amorcé dans le secteur d'Amos, un autre secteur d'intérêt pour l'exploration minérale. Ajoutons qu'un important levé géologique régional (1 : 50 000) a été complété dans le Grenville, à l'est de Senneterre, dans un secteur qui suscite beaucoup d'intérêt. Enfin, un second levé géophysique (magnétique, électromagnétique et VLF) héliporté détaillé (100 m) a été complété dans le secteur du lac Caopatina au sud de Chibougamau.

Au niveau des études, l'étude des grandes discontinuités structurales de l'Abitibi a été complétée par le Centre d'études sur les ressources minérales (Université du Québec à Chicoutimi).

Dans le domaine de la métallogénie, la Division des gîtes minéraux a poursuivi ses travaux sur les minéralisations de métaux usuels et de métaux précieux. Les études des gîtes de Bousquet 2 et Grevet se sont poursuivies et l'étude du gîte de Géant Dormant a été amorcée. Ces études sont le fruit d'un partenariat industrie-gouvernement-université.

Un autre important projet de partenariat s'est mis en marche dans la région de Chibougamau. Des géologues des gouvernements provincial et fédéral et des chercheurs universitaires appuyés par SOQUEM et MSV ont amorcé la révision des modèles métallogéniques en usage.

Mentionnons que l'implantation du Système d'information géominière du Québec (SIGÉOM) a progressé : la compilation des forages à l'échelle 1:50 000 a été complétée.

Soulignons enfin que tous les levés et études de l'année ont été réalisés soit dans le cadre de l'Entente auxiliaire sur le développement minéral soit dans le cadre du Programme fédéral-provincial de soutien au secteur minier de Chapais-Chibougamau.

Au cours de la dernière année le Service a réalisé 11 cartes 1 : 20 000 ou l'équivalent et produit une vingtaine de rapports géologiques. Les géologues du Service ont collaboré à la préparation de 6 articles scientifiques. Ils ont également présenté dans divers congrès régionaux, nationaux ou internationaux, 20 conférences et 7 photoprésentations. Enfin, ils ont guidé 18 excursions géologiques.

DIRECTION DE L'ASSISTANCE À L'EXPLORATION MINIÈRE (DAEM)

Le mandat de la Direction de l'assistance à l'exploration minière est de fournir une aide à l'industrie

de l'exploration minière grâce au traitement, à la gestion et à la diffusion de l'information géoscientifique et grâce à la gestion de certains programmes d'assistance financière à la prospection et à l'exploration.

En 1993-1994, le Programme d'assistance financière à la prospection minière dans l'Est du Québec et le Programme de soutien du secteur minier de la région Chapais-Chibougamau bénéficient de l'Entente de développement économique des régions du Québec (EDERQ) intervenue entre Québec et Ottawa. Le projet de géomatique du ministère est financé en majeure partie par le gouvernement fédéral dans le cadre de l'Entente auxiliaire Canada-Québec sur le développement minéral.

SERVICE DE LA GÉOINFORMATION

Le Service de la géoinformation a édité et mis en forme, au cours de l'exercice financier 1992-1993, 91 nouveaux documents géoscientifiques faisant état des résultats des travaux géologiques, géochimiques et géophysiques réalisés par le ministère. Ces documents sont diffusés à la clientèle par le Service de l'information et du soutien à l'exploration minière.

Le Service, pour le compte du ministère de l'Énergie et des Ressources, a débuté l'implantation du SIGÉOM, un système intégré d'information géominière à référence spatiale, qui facilitera grandement, pour l'industrie minière, l'accès et le traitement de l'information géoscientifique disponible concernant le territoire québécois.

Cette volonté d'implantation fait suite à une démarche réfléchie, cohérente et structurée de planification entreprise depuis 1987. Cette démarche a comporté la réalisation d'un plan directeur des systèmes d'information, d'une étude d'opportunité technologique et d'un projet pilote d'utilisation de la géomatique dans une région minière particulièrement active (région de Rouyn-Noranda). L'étude d'opportunité et le projet pilote ont été réalisés dans le cadre de l'Entente Canada-Québec sur le développement minéral. Les résultats très encourageants de ce projet ont conduit à des mises à l'essai du prototype développé, pour expérimenter en situations opérationnelles concrètes le fonctionnement du futur système. Finalement, une conception administrative, élaborée à la lumière des informations recueillies précédemment, a complété la planification détaillée du système à implanter.

Les objectifs retenus sont les suivants:

- assurer une production et une mise à jour rapide de l'information géoscientifique concernant le territoire québécois;

- assurer à la clientèle minière un accès rapide et intégré, en format numérique, à cette information;
- utiliser une technologie accessible à cette clientèle, pour lui permettre de s'en servir pour produire et traiter ses propres données.

Le SIGÉOM sera donc un système intégré d'accès, de traitement et de diffusion de l'ensemble de l'information géominière à référence spatiale du Québec. Cette information comprend la géologie, la géochimie, la géophysique, les gîtes minéraux, la localisation des travaux et les données issues des dossiers d'exploration minière.

Afin de permettre aux compagnies minières, aux prospecteurs et aux consultants du domaine minier d'utiliser le système pour y incorporer leurs propres données et leurs propres traitements, le SIGÉOM utilisera des logiciels commerciaux reconnus, opérant sur des micro-ordinateurs de type IBM PC courants.

L'implantation et le fonctionnement du SIGÉOM nécessiteront un investissement de quelque 16 millions de dollars au cours des dix prochaines années. L'implantation elle-même se fait en cinq phases, chacune identifiant des biens livrables bien précis, en commençant par ceux qui seront les plus utiles à la clientèle minière. Cette implantation proprement dite, au coût de 10 millions, sera financée à 80 % par le gouvernement fédéral (excluant le salaire du personnel) dans le cadre de l'Entente auxiliaire Canada-Québec sur le développement minéral.

Des cartes et fichiers numériques de compilation de forage sont présentement disponibles pour la région de l'Abitibi. Des postes de consultation et de diffusion de l'information numérique seront mis à la disposition de la clientèle au début de 1994 dans les bureaux de Québec, Montréal, Val-d'Or, Rouyn-Noranda et Chibougamau.

SERVICE D'INFORMATION ET DE SOUTIEN À L'EXPLORATION MINIÈRE (SISEM)

Le Service d'information et de soutien à l'exploration minière (SISEM) a été formé il y a deux ans, suite au regroupement de la Division des données géoscientifiques et de la Division des programmes d'aide.

DIVISION DES DONNÉES GÉOSCIENTIFIQUES

La Division des données géoscientifiques regroupe les activités du Centre de diffusion, les activités ayant trait à la gestion d'une base de données documentaires (banque EXAMINE) et d'une base de don-

nées sur les gîtes minéraux (banque COGITE), les travaux de l'équipe des cartes de localisation et les activités de nature promotionnelle et éducative.

Le Centre de diffusion a traité plus de 3 858 commandes, ce qui représente un accroissement de 21 % par rapport à l'exercice précédent.

Au 31 mars 1993, la banque EXAMINE contenait 52 072 références de rapports d'exploration minière publiés, 3 446 références de publications de la direction générale et 1 700 références de thèses universitaires.

La banque COGITE à laquelle s'ajoute les nouveaux indices minéralisés répertoriés mensuellement comprend à ce jour au delà de 7544 gîtes et indices minéralisés. L'équipe COGITE a repéré 294 indices minéralisés dans les nouvelles publications de la DGEEM, dans les nouveaux rapports d'exploration minière ainsi que dans les anciens rapports publiés entre 1977 et 1986. De plus, l'équipe a revu et corrigé 1595 fiches de gîtes.

L'équipe des cartes de localisation a numérisé, sur le logiciel à références spatiales (MICROSTATION), les quelque 3 300 périmètres de travaux relatifs aux publications de la DGEEM. De plus, diverses tâches prérequisées à la numérisation des périmètres des quelque 50 000 rapports d'exploration minière ont été réalisées. Ces données numérisées seront intégrées au système d'information géominière (SIGÉOM).

Dans le cadre du volet promotion-éducation, 30 sorties promotionnelles et éducatives ont été organisées à travers la province, rejoignant près de 43 000 personnes. Deux affiches éducatives (Minéraux du Mont Saint-Hilaire et Minéraux du Québec) ont été réalisées au cours de l'année ainsi qu'une pochette pour contenir toute la documentation promotionnelle et éducative produite par le MER mines. Cette po-

chette a été baptisée "Ensemble éducatif, géologie pour tous".

DIVISION DES PROGRAMMES D'AIDE

La Division des programmes d'aide a pour mandat de concevoir et d'administrer des programmes d'assistance financière à la prospection et à l'exploration minière.

Pour l'année financière 1993-1994, un budget de 4 M \$ a été consacré à la mise en oeuvre de trois programmes d'aide. Deux de ces programmes s'inscrivent dans le cadre de l'Entente auxiliaire Canada-Québec sur le développement économique des régions du Québec (EADRQ), soit :

- * le Programme d'assistance financière à la prospection minière dans l'Est du Québec (Bas-Saint-Laurent et Gaspésie - Îles-de-la-Madeleine)
- * le volet II (assistance à l'exploration) du Programme de soutien du secteur minier de la région de Chabais-Chibougamau.

Le troisième programme, qui a démarré cette année, fait partie de l'Entente auxiliaire Canada-Québec sur le développement minéral (EADM); il s'agit du volet III (assistance à la prospection et à l'exploration minière) du programme exploration géologique et minière.

L'assistance financière octroyée dans le cadre des trois programmes se répartit comme suit :

- * 1,6 M \$ à 325 prospecteurs pour quelque 250 projets de prospection;
- * 1,9 M \$ à 36 compagnies pour 45 projets d'exploration;
- * 350 K \$ à 3 fonds miniers régionaux (Bas-Saint-Laurent, Saguenay-Lac-Saint-Jean et Estrie-Chaudière-Appalaches).

NOTES

NEW BRUNSWICK DEPARTMENT OF NATURAL RESOURCES AND ENERGY

MINERALS AND ENERGY DIVISION

VALUE OF MINERAL PRODUCTION

The value of mineral production rose to \$886 million in 1992, reflecting the return to full production at the No. 12 mine of Brunswick Mining and Smelting Corporation Limited, following a 10-month strike in 1990-91, and a marginal increase in base metal prices through mid-1992. However, in late 1992, falling metal and potash prices reversed the trend somewhat. The \$886 million total value comprises \$568.2 million from base metals, \$248.6 million from nonmetals, \$32 million from fuels, and \$36.9 million from structural materials.

MINERAL EXPLORATION

The total investment in mineral exploration in New Brunswick during 1992 was \$12.2 million and the preliminary forecast for 1993 is \$14.6 million. The number of new mineral claims was approximately 16 000, down 33% from the previous year. The principal companies involved are Brunswick Mining and Smelting Corporation Limited, Noranda Exploration Company, Limited, Rio Algom Exploration Inc., Teck Corporation, BHP Minerals Canada Ltd., and Freewest Resources Inc.

GEOSCIENCE PROGRAMS

October 25, 1992 was the 40th anniversary of the completion of discovery hole "B-12" at Brunswick No. 6 sulphide deposit. This 106.68 m hole intersected 54.86 m of massive sulphides grading 4.77% Zn, 1.63% Pb, and 73.7 g/t Ag. It started an unprecedented staking rush in northern New Brunswick, and laid the foundation for the Province's modern mining industry. The mainstay of the industry, the Brunswick No. 12 mine, is now thought to have reserves for another 15 to 17 years. Hence, the search for new deposits is the Province's number one priority.

In northern New Brunswick, the Geological Surveys Branch is collaborating with the Geological Survey of Canada, universities, and industry on the EXTECH program whose principal objective is to develop methods of locating concealed sulphide deposits in the Bathurst mining camp. A large portion of the Branch's budget is being allocated to detailed bedrock mapping and mineral deposit studies within the

Bathurst camp in order to assist industry in the search for concealed sulphide deposits, a search that is necessary to sustain the base metal industry and economy of northern New Brunswick.

S.R. McCutcheon, J.P. Langton, L.R. Fyffe, R.A. Wilson, A. Caron, M.P. Rennick, E. Brooks, and R.R. Irrinki are involved in detailed mapping, mineral deposit studies, and geocompilation projects in the Ordovician felsic volcanic complex that hosts many of the massive sulphide base metal deposits in the Bathurst camp. J. Walker continued his compilation of the Siluro-Devonian terrane that flanks the Bathurst camp to the north. The results of the mapping program will be published at a scale of 1:20 000 with a view to later compiling the data on 1:50 000 and 1:250 000 maps. Surficial geological mapping in the Bathurst camp by M. Parkhill included detailed mapping near the Halfmile Lake, Captain North Extension, and Forty Four Mile Brook sulphide deposits. The results will indicate the type and nature of surficial materials, ice-flow history, glacial dispersion of geochemical anomalies, background till geochemistry, and pebble lithologies associated with base metal sulphide deposits.

In southern New Brunswick, A.A. Ruitenberg, M.J. McLeod, and S.C. Johnson will soon publish the results of several years of meticulous geological mapping in that region. The final products will take the form of two 1:250 000 maps (21 H and 21 G).

A.G. Pronk and A.A. Seaman carried out surficial geology and till geochemistry projects whose main purpose is to guide mineral exploration by helping explorationists interpret glacial dispersion of geochemical anomalies. However, the information is also very useful for forestry studies.

Diamond-drill core storage and maintenance continues to be a problem. Three storage facilities now in place in Sussex, Bathurst, and Fredericton are almost full. The Province continues to collect much of the core realized from current mineral exploration and engineering projects and to store it in newly constructed roofed core storage racks. During 1993, approximately 32 000 m of core was collected, bringing the total amount in storage to 400 600 m.

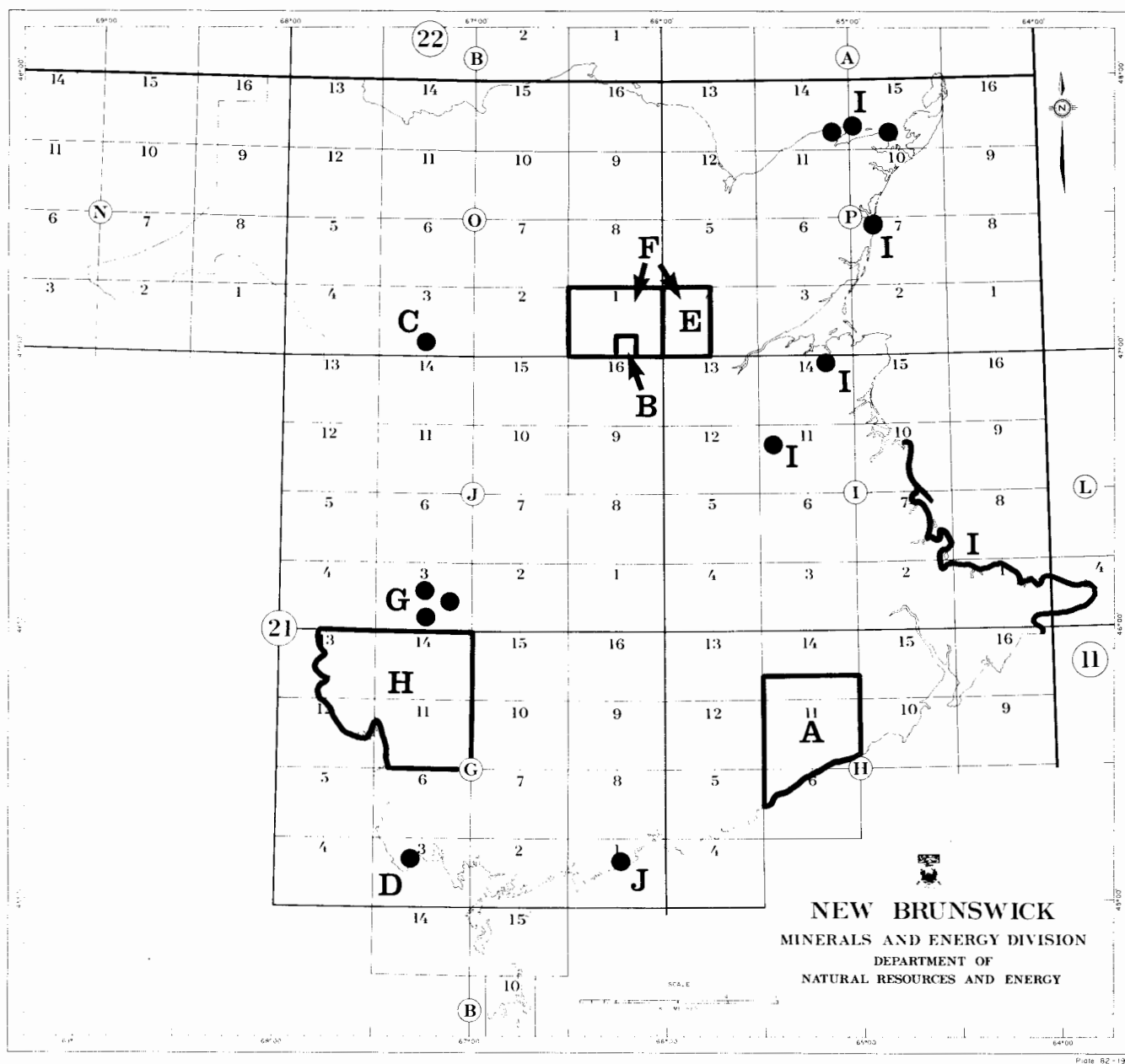


Plate 62-190

Figure 1. Projects funded by the Government of New Brunswick in 1993 (ordinary budget).

- A. R. Boldon *et al.*: Geochemical surveys (21 H/6, 11, 14)
- B. L.R. Fyffe: Clearwater Stream deposit (21 O/1b)
- C. Y. Han and R.K. Pickerill: Location of trace fossils in Wapske Formation (part of 21 O/3)
- D. R.R. Irrinki *et al.*: St. Stephen nickel deposit (part of 21 G/3)
- E. J.P. Langton: Tomogonops project (21 P/4W)
- F. M.P. Rennick *et al.*: Geocompilation project (21 O/1 and 21 P/4W)
- G. A.A. Ruitenberg: Metallogeny of the southern Tobique Zone (part of 21 J/3)
- H. A.A. Seaman: Southern Pokiok Batholith project (21 G/14 and parts of 21 G/11, 12, 13)
- I. J.J. Thibault: Tourbe et littoral
- J. D.V. Venugopal: Evaluation for the potential of acid rock drainage near Musquash Reservoir.

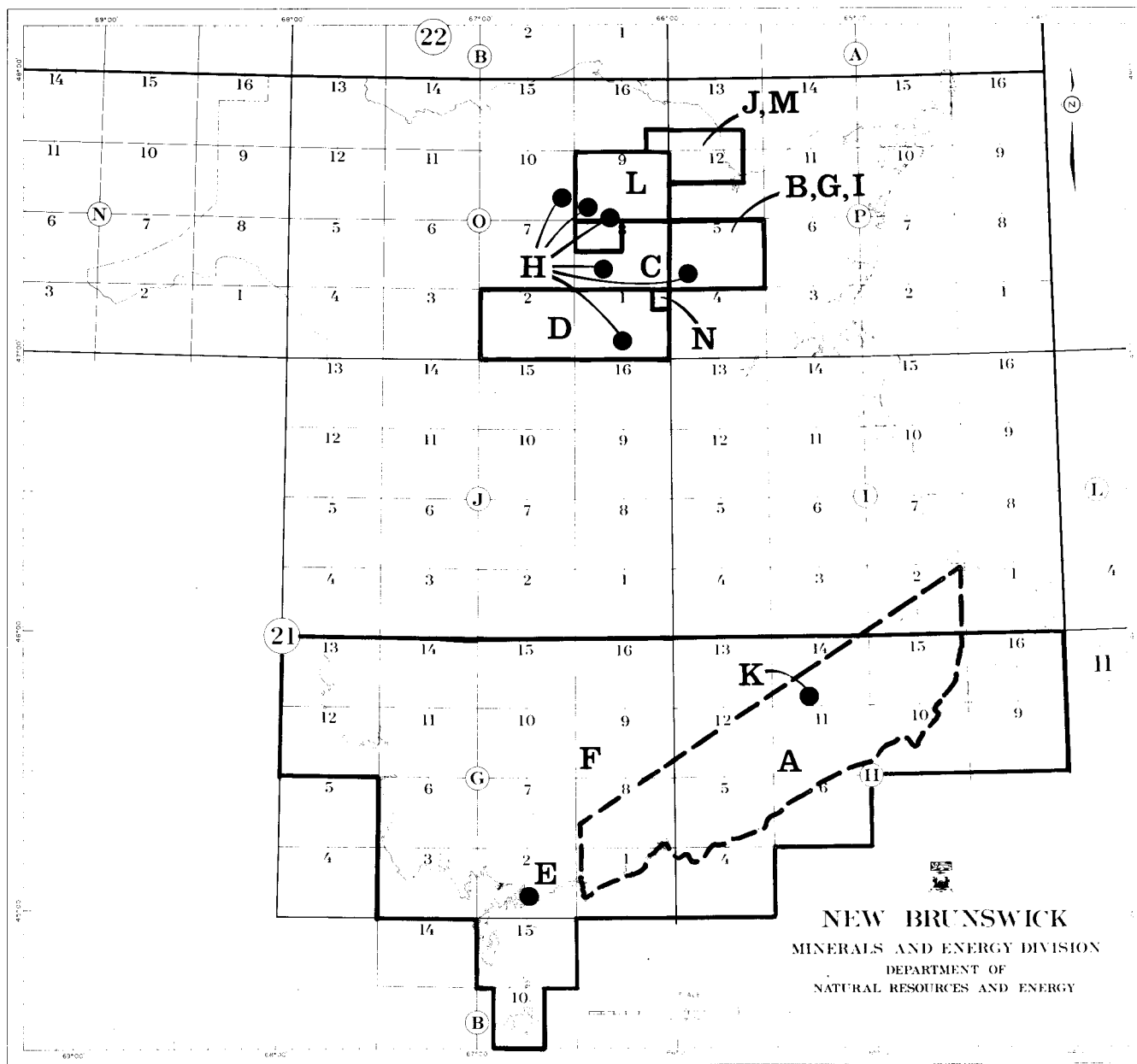


Figure 2. Projects funded through the Canada-New Brunswick Cooperation Agreement on Mineral Development Agreement and the Economic Diversification Agreement in 1993.

- A. S. Barr *et al.*: Models for mineralization potential in the Caledonian Highlands, southern New Brunswick*
- B. E. Brooks: Mineral occurrences, Nepisiguit Falls map area (21 P/5)
- C. A. Caron: Bedrock geology, Devils Elbow area (21 O/8e, f)
- D. A. Doiron et É. Boisvert: Géochimie des tills (21 O/1, 2)*
- E. S.C. Johnson: Bedrock geology, Pocologan River-New River area (part of 21 G/2)
- F. S.C. Johnson *et al.*: Southern New Brunswick geocompilation (21 G, 21 H)
- G. D.R. Lentz and W.D. Goodfellow: Northern New Brunswick massive sulphide deposits (21 P/5)*
- H. M.A. Parkhill: Surficial geology and till geochemistry projects, northern New Brunswick
- I. J.M. Peter and W.D. Goodfellow: Geochemistry, sediments associated with massive sulphide deposits, northern New Brunswick (P/5)*
- J. M.P. Rennick: Antinouri Lake-Nicholas Denys geocompilation project (21 O/16A; 21 P/12e, f, g; 21 P/13b, c, d)
- K. J.A.R. Stirling and B. Roulston: Mineralogy and chemistry, red sylvite, PCA potash mine*
- L. J. Walker and S.R. McCutcheon: Stratigraphy, Tetagouche Lakes map area (21 O/9)
- M. G. Watson *et al.*: Geoscience studies, northern New Brunswick*
- N. R.A. Wilson: Geology, Mountain Brook-Stony Brook area (21 O/1h)

* project carried by the Geological Survey of Canada.

In 1993, the Mineral Exploration Stimulation Program (MESP) awarded 26 grants totalling \$19 000 to New Brunswick prospectors. The grants can be used to fund prospecting expenses such as chemical analyses, geophysical surveys and instrument rentals, and travel.

Barbara Carroll and Shasta Abbott carry out the editorial tasks necessary for quality publications distributed by the Minerals and Energy Division.

Related mineral and geoscience activities were carried out by the Mineral Development and Energy branches. T.C. Webb and D.V. Venugopal are responsible for industrial minerals, whereas Jacques Thibault and Dominique Bérubé are responsible for peat and geomorphological studies of the Province's coasts. Clint St. Peter (Energy Branch) is responsible for fossil fuels.

NOVA SCOTIA DEPARTMENT OF NATURAL RESOURCES

GEOSCIENCE ACTIVITIES

INTRODUCTION TO THE DEPARTMENT

The Mines and Energy component of the Department of Natural Resources has a dual mandate to encourage research and development leading to enhanced documentation of mineral and energy resources and to promote their orderly regulation and use. Three divisions in the Department, Mineral Resources and Mineral Development from the Mines and Minerals Branch and Energy Resources from the Energy Branch, administer geoscience projects.

DEVELOPING AND ENCOURAGING GEOSCIENCE ACTIVITIES

Nova Scotia is in the second year of a Canada-Nova Scotia Cooperation Agreement on Mineral Development. This agreement provides \$10 million over 3 years (1993-1996) to encourage the economic development of the mineral industry in Nova Scotia.

GEOSCIENCE ACTIVITIES

A wide variety of geoscience activities are being undertaken by the staff of the Department. These projects can be categorized as follows: 1) energy resources studies; 2) metallic and non-metallic mineral resources and deposit studies; 3) regional mapping; 4) geochemistry; 5) Quaternary research; and 6) services to industry and the public. Most of these activities are supported by the Cooperation Agreement.

ENERGY RESOURCE STUDIES

Evaluation of the Province's energy resources include geological research of coal and coalbed methane resources and development and monitoring of private sector geological exploration for petroleum and natural gas offshore. The Department, through the Energy Resources Division, is responsible for all petroleum and natural gas exploration monitoring and development activities onshore. It works in conjunction with Canada-Nova Scotia Offshore Petroleum Board in administering offshore petroleum resources.

A report on the geology, geochemistry and mineralization of the Devonian-Carboniferous South Mountain Batholith is being prepared for publication in 1994. Papers were published on the Liscomb Complex in the central Meguma Terrane, geochemistry of leucogranite within the South Mountain Batholith, dis-

seminated gold mineralization at North Brookfield and mineralogy of the Beaverdam gold deposit. The placer potential for gold in Nova Scotia was investigated and a preliminary report is anticipated in 1994. A number of talks were presented at various meetings and conference (GAC/MAC, PDA, AGS and CIMM district meeting).

Work on describing the occurrences and mineral potential of limestone, dolomite, silica, barite, andalusite, mica and garnet and metallic mineral inventory program in Cape Breton Island continues.

GEOLOGICAL MAPPING

Geological mapping continues as part of multidisciplinary projects in the Avalon Composite Terrace in central Cape Breton and in the central Meguma Zone. These projects are coordinated and integrated programs with the Geological Survey of Canada and funded in part by the Canada-Nova Scotia Cooperation Agreement on Mineral Development 1993-1996. Mapping in the Avalon focused on the structure stratigraphy and gold and sulphide mineralization associated with metamorphic rocks of the George River Group in the Creignish Hills. The central Meguma project area includes mapping and aeromagnetic studies of the Meguma Group, the Musquodoboit Batholith mapping, mapping the Carboniferous Kennetcook (Windsor) Basin and Quaternary/Cretaceous investigations. Aeromagnetic processing enhancement and ground-truthing with rock and magnetic susceptibility mapping and sampling are being investigated in selected areas. Preliminary results indicate it will be a valuable tool in mapping subdivisions of the Meguma Group which may be significant in the exploration for disseminated stratabound mineralization.

The Surficial Geology Map of Nova Scotia (1:50 000) was published and an accompanying report is in preparation. Several reports were published including: *Memoirs on the Geology of the Antigonish Basin*, *Geology of the Loch Lomond Basin and Glengarry Half Graben*, and paper on the Debris Avalanches in the Central Cape Breton Highlands.

EXPLORATION GEOCHEMISTRY

The geochemistry Section performs several roles as an aid to a varied client base including industry, government and the general public. Systematic geochemi-

cal mapping survey of surface and interstitial waters, surface sediments, soils, glacial materials and vegetation are conducted to estimate and map the chemical environment of Nova Scotia. The Section also has GIS technology which is applied to geoscience data to better define additional mineral potential. The geochemical signature of known mineral deposits is also studied to refine anomaly recognition and develop new exploration methods. Baseline monitoring studies are conducted to estimate long term changes to the geochemical landscape. All of the information is maintained in a digital database on MS dos and UNIX platforms.

During 1993, work progressed on several fronts with reports completed on the Dominique tin deposit for multi media and biogeochemistry on selected base metal deposits on Cape Breton Island. Baseline studies of the Sackville River watershed were completed and work commenced on the Petpeswick Lake area. Exploration assistance was rendered with biogeochemical investigations of disseminated Meguma gold at North Brookfield and detail till and soil sampling along the Tobeatic shear zone near East Kemptville. Work also continued on integrating radar imagery with surface chemistry in the Cobequid-Chedabucto Bay fault system in central Nova Scotia.

The section produced papers in the Journal of Geochemical Exploration and presentations at the 1993 conference "Integrated Methods in Mineral Exploration" held in Denver, Colorado.

SERVICE TO INDUSTRY AND THE PUBLIC

LIBRARY SERVICE

Results of departmental geoscience projects are made available by means of published reports and maps, by open files and by published papers and articles in external journals and other publications. The departmental library in Halifax provides access to all published and open file material and is the sales office for all geoscience publications of the department. Assessment reports submitted by industry are also available on microfiche. Limited library service is also provided in the Stellarton office. In addition, geoscience staff is available for individual consultation.

ELECTRONIC DATABASES

All departmental geoscience publications, maps, open files and assessment reports are indexed and input into the national GEOSCAN system. Searches of

the GEOSCAN database are provided on request at no charge. Databases dedicated to mineral occurrences (both metallic and industrial), to drillholes and to geological and geophysical maps have been developed and are also available for custom searching. Studies are underway to determine which desktop PC system to adopt for a departmental geoscience GIS.

DRILL CORE LIBRARY

The departmental core library is based in Stellarton and holds more than 500 000 m of core from thousands of drillholes as well as many other geotechnical samples, such as chip samples from off-shore hydrocarbon exploration, rock slabs, building stone samples and geochemical pulps. Much of the drill core in the Core Library was obtained from drill programs carried out by the departments own diamond drilling section. Although in the past drilling was often done under contract to exploration companies, this activity is now exclusively restricted to departmental geoscience programs, both to assist in regional studies and to test mineral occurrences (coal, gypsum, building stone, aggregates, industrial minerals, metallic minerals, etc.). All core is maintained on a non-confidential basis and may be accessed for study and sampling on request. The core library facilities are being expanded with the construction of an additional store building under the Canada-Nova Scotia Cooperation Agreement on Mineral Development.

PROSPECTOR

The Prospectors Assistance Program is a Federally funded plan under the MDA that provides direct financial aid to individual bona fide prospectors and explorationists. The total allocation for grants for the period July 1993 to March 1996 is \$400 000. Recipients of grants are required to submit reports and results of their activities to the department.

The department organizes and sponsors a number of Prospecting Courses for the public at various locations in the Province.

LAND USE AND RESOURCE MANAGEMENT

The Integrated Land Use project provides information needed to formulate policy to ensure the protection, conservation and management of energy and mineral resources. Mineral Resource Land Use (MRLU) map and reports are being compiled to provide input for all strategic land and resource planning in Nova Scotia. The intent is to promote multi-purpose or sequential land use and to avoid sterilization of re-

sources. The issue of setting aside large areas of land as protected wilderness before a comprehensive evaluation of the mineral potential is receiving attention. A policy for Integrated Resource Management Planning on Crown lands is being developed.

PUBLIC AWARENESS

Various publications, projects and displays targeted towards the general public and school children promote a greater appreciation for the mining industry and mineral development.

NOTES

INDIAN AND NORTHERN AFFAIRS CANADA

EXPLORATION AND GEOLOGICAL SERVICES DIVISION YUKON

Exploration and Geological Services Division (EGSD) is part of the Mineral Resources Directorate of the Northern Affairs Program, one of five programs of Indian and Northern Affairs Canada. EGSD consists of five geologists, one geotechnician, an office manager, and a map sales manager. This group is responsible for geoscience data collection, interpretation and dissemination of information in partial fulfillment of the management of mineral resources in Yukon Territory.

EGSD compiles summaries of exploration assessment reports in "Yukon Minfile", a text and map-based mineral occurrence digital inventory, formerly the Northern Cordillera Mineral Inventory of Archer, Cathro and Associates (1981) Ltd. EGSD purchased the file in 1990 through the Canada/Yukon Economic Development Program and later transformed it into a computer database similar to B.C. Minfile. The entire database is updated annually and is now available in WordPerfect 5.1 format. Please contact Mike Burke (403-667-3202) for further information.

A new Canada/Yukon Economic Development Agreement (EDA) was finalized in 1991 and is scheduled to last until 1996. The Government of Yukon is the prime administrative agency for the Mineral Resources Cooperation Agreement (MRCA), which consists of three elements under the Canada/Yukon EDA: 1) Geoscience, 2) Mining Technology and 3) Information. The Geoscience element consists of the newly-formed Canada/Yukon Geoscience Office with five contract geologists, an office coordinator, a draftsman, and an administrative assistant. Field assistance is provided by six seasonal geological assistants.

The annual review of mineral exploration and department activities ("Yukon Exploration") has been merged with the "Yukon Geology" series, which was the previous EGSD vehicle for publishing the results of Yukon geological research. The new publication, "Yukon Exploration and Geology", is published in cooperation with the Geoscience Office of the Canada/Yukon MRCA, and consists of three parts: 1) Yukon mining and exploration overview, 2) summary of staff and affiliated activities of EGSD and the Canada/Yukon MRCA and Geoscience Office, and 3) technical papers documenting the results of geological research by EGSD and the Canada/Yukon Geoscience Office.

EGSD maintains the Yukon outlet of the Canada Map Office and sells topographic, geological (surficial and bedrock), aeromagnetic, aeronautical and land use maps. Geological Survey of Canada publications and other government publications related to Yukon Territory and Northern British Columbia are also available. A complete publications list is available from the Canada Map Office, Indian and Northern Affairs Canada, 200 Range Road, Whitehorse, Yukon, Y1A 3V1. In addition a library containing geological texts and journals and selected air photos covering the Yukon from latitude 60° to 65°N is available to the public.

The projects described below were funded either by EGSD, or through the Canada-Yukon Economic Development Agreement (EDA).

GEOLOGY DIVISION PROJECTS - 1992

STEVE MORISON - CHIEF GEOLOGIST

Responsible for supervising and coordinating the activities of the Geology Division, and is involved in the planning and implementation of the activities of staff at the new Geoscience office set up through the Mineral Resources Sub-agreement of the Canada/Yukon Economic Development Agreement. Represented the Mineral Resources Directorate on several national and local committees, and chaired the committee which planned and organized the 22nd Annual Yukon Geoscience Forum. Continues to use his placer sedimentology expertise to advise client groups and support related geological studies.

GRANT ABBOTT - SENIOR GEOLOGIST

Grant Abbott (Senior Geologist) is chiefly responsible for 1:50 000 scale mapping projects and this year worked on Hart River 116 A/10 and 11 sheets. He is currently located at the MDA Geoscience office where he has taken on the role of scientific advisor. Reviewed numerous geological publications for Exploration and Geological Services Division.

TREVOR BREMNER - MINERAL DEPOSIT GEOLOGIST

Trevor Bremner (Mineral Deposit Geologist) updated the YUKON MINFILE and carried out fieldwork in the Brewery Creek area and the Kluane Range (115G) west of Whitehorse, with the assistance of Dr. Peter Reed.

ROBERT DEKLERK - STAFF GEOLOGIST

Robert Deklerk replaces William LeBarge for the period September 1991 to September 1993. Approved, catalogued and indexed assessment reports from the Mayo and Dawson Mining Districts and all Yukon placer reports. Field work included visiting several actively explored mining properties in the Dawson and Mayo Mining Districts.

WILLIAM LEBARGE - STAFF GEOLOGIST

Remained on educational leave in 1992, completing Msc. thesis fieldwork in the Mount Nansen area (NTS 115I3). The masters thesis describes the sedimentology and stratigraphy of the gold-bearing placer gravels of the Nansen and Victoria Creek drainages in central Yukon.

DENNIS OUELLETTE - STAFF GEOLOGIST

Approved, catalogued and indexed assessment reports from Watson Lake and Whitehorse Mining Districts. Visited active exploration projects in the Whitehorse and Watson Lake Mining Districts. Coordinated the compilation and dispersion of exploration and development data collected by staff geologists.

AFFILIATED PROJECTS

Dennis Brown, University of London - PhD detailed structural analysis of the Vangorda deposit, Faro mining area (completed in 1992).

John Knight - Study of the trace element chemistry and morphology of placer gold.

RECENT PUBLICATIONS

Yukon Minfile updates - 28 of the 38 sheets available required updates in 1992. Ten maps were also updated.

95D	105G*	105N*	115I
105A	105H	105O*	115J
105B	105I	106C*	115O&N*
105C*	105J	106D	115P
105D*	105K	115A	116A*
105E	105L	115F&G*	116B&C*
105F*	105M	115H	117A

*DENOTES UPDATED MAPS

INAC, (1992 a). **Yukon Exploration 1991**; Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada.

INAC, (1992 b) **Yukon Geology Volume 3**; Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada.

EGSD Open File 1992-1, **GEOLOGY OF THE OGILVY MOUNTAINS BRECCIAS, COAL CREEK INLIER**, (NTS 116B/11, 13, 14) Yukon Territory. By R.A. Lane and C.I. Godwin.

EGSD Open File 1992-2, **GEOLOGICAL MAP OF PART OF MAP SHEETS 116A/10 & 116A/11**, by J.G. Abbott (Exploration & Geological Services Division, INAC) and C.F. Roots (Geological Survey of Canada).

EGSD Open File 1992-3, **GEOLOGICAL MAP OF KENO HILL AREA (105M/14)**, by D. Murphy and C. Roots (Geological Survey of Canada).

EGSD FIELD WORK IN 1992

Larsen Creek 116 A

Kluane Lake 115 G

H.S. BOSTOCK CORE LIBRARY

The H.S. Bostock Core Library houses approximately 120,000 metres of diamond drill core from 177 Yukon properties. The facility is located across the street from the Northern Affairs building at 200 Range Road. The core is stored in its original boxes, with no sample reduction. Confidentiality is maintained on the same basis as mineral claim assessment reports; a letter of release from the company owning the property must accompany a request to view confidential core. Status of specific core can be checked and arrangements to view or submit new core can be made by contacting the core librarian at 6673202. Diamond saws, a core splitter and microscopes are available for use in heated examination rooms.

CANADA/YUKON ECONOMIC DEVELOPMENT AGREEMENT (EDA)

The Mineral Resources Cooperation Agreement (MRCA) is funded under the 1991-1996 Canada/Yukon Economic Development Agreement (EDA). Within this cooperation agreement are three elements; 1) Geoscience, 2) Mining Technology and 3) Information. The Energy and Mines Branch, Department of Economic Development, Government of Yukon is the prime administrative agency for the Mineral Resources Cooperation Agreement.

1. GEOSCIENCE ELEMENT

The long-term objective of the 1:50 000 scale geological mapping program is to develop locally-based expertise in the regional geological setting of Yukon Mineral deposits. An active and successful hardrock

and placer exploration industry can be realized by the development of a comprehensive, modern geoscience information base.

Geoscience Office staff includes D. Murphy (Senior Geologist), T. Fuller (Placer Geologist), C. Hart (Project Geologist), S. Johnston (Project Geologist), D. Thorkelson (Project Geologist), J. Kowalchuk (Coordinator), W. Van Randen (Draftsperson), and D. Carruthers (Administrative Assistant). Seasonal geological assistance was provided by F. Andersen, D. Brent, N. Hachey, D. H  on, J. Hunt, and C. Wallace. C. Roots from the Geological Survey of Canada and G. Abbott from Exploration & Geological Services Division, Northern Affairs Program are being supported by the Geoscience Program.

GEOSCIENCE OFFICE STAFF ACTIVITIES

The following mapping programs were begun in the most economically important geological provinces:

- a) C. Hart and D. Brent in the Whitehorse Trough near Whitehorse (105D/13).
- b) S. Johnston and N. Hachey in the Yukon-Tanana terrane in the Mt. Pitt area (115I/13)
- c) D. Murphy and D. H  on in Western Selwyn Basin in the Clear Creek area (115P/14).
- d) D. Thorkelson and C. Wallace in the Wernecke Supergroup in map area 106D/16. and
- e) T. Fuller and F. Andersen in surficial deposits of Black Hills Creek (115O/7 & 115O/10).
- f) C. Roots and J. Hunt carried out 1:250 000 scale mapping in western Selwyn Basin in the Mayo area (105M), and J. Hunt completed a 1:50 000 scale compilation of the Mount Haldane area (105M/13).
- g) G. Abbott continued 1:50 000 scale mapping in the Hart River area (116A/10&11), along the boundary between Ogilvie-Mackenzie Platform and Selwyn Basin.

RECENT PUBLICATIONS

MDA Open File 1992-4, GEOLOGICAL MAP OF THE MAYO MAP AREA (105M), by C.F. Roots and D.C. Murphy (Geological Survey of Canada)

2. TECHNOLOGY ELEMENT

The objective is to increase the economic and environmental efficiency of Yukon placer and hardrock mining operations by encouraging innovative exploration, mining and processing technology, as well as projects aimed at reducing or mitigating environmental impacts.

1991-1992 FUNDED PROJECTS

- a) RADAR Remote Sensing Evaluation
- b) Engineering/Economic Study of the Costs of Implementing Fisheries Restoration/Compensation Guidelines
- c) Report and Video on Placer Dredging
- d) Remote Sensing Seminar
- e) Yukon Minerals Industry Bibliography
- f) Industrial Minerals Update
- g) High Pit Wall Stability Analysis in Placer Mines
- h) Evaluation of Yukon Placer Drilling Techniques
- i) Yukon Placer Implementation Review Committee Report Reproduction
- j) Evaluation of Ground Penetrating Radar as a Placer Exploration Tool
- k) Diamond Exploration Seminar
- l) Tailings Reprocessing Study

3. INFORMATION ELEMENT

The objective of the information element is to communicate information about the mining industry to encourage Yukon residents and businesses to take advantage of economic opportunities in the industry.

- a) Binet House Geology Display, Mayo

Completed project reports, maps, and videos are available for purchase or viewing at the Yukon outlet of the Canada Map Office.

NOTES

**SURVEY OF HARD ROCK DRILL CORE PROGRAMS
1992-1993**

NOTES

SURVEY OF HARD ROCK DRILL CORE PROGRAMS IN CANADA
FISCAL YEAR 1992-1993

PROVINCE	B.C.**	ALTA	SASK.	MAN.	ONT.	QUE.	N.B.	N.S.	NFLD. & LAB.	P.E.I.	YUKON	N.W.T.
No. of facilities	---	1	---	4	7	5	3	5	6	---	1	1
Staff-Person Days Work 1992-93	---	70	---	120	2340	55	650	885	590	---	130	40
Capital Cost 1992-93 1992-93 (\$ X 000)	---	---	---	10.0	---	---	---	5.0	40	---	1.125	26.0
Operating Cost 1992-93 (\$ X 000)	---	54	---	5.0	136	125.0	95	25.0	41	---	7	16.0
Core Collected and/or Delivered 1992-93 (in metres)	---	10	---	3 981	85 223	9 725	32 200	26 796	14 464	---	8000	462
Core Reduction*	---	nil	---	nil	nil	nil	nil	nil	nil	---	nil	nil
Use of facilities person days (pd) 1992-93 visits (v)	---	45	---	14 v	1784 v	56 pd	250- 300 pd	320 pd	234	---	25	200 pd
Total Core in Storage (from all years) (in metres)	---	30 732	---	202 698	840 639	275 000	400 600	529 806	865 939	---	120 000	30 517
Total Exploration Drilling 1992-93 (in metres)	---	confidential	---	130 809	(Est.) 152 552	380 000	60 000	13 350	40 000	---	14 684	122 000

* Over last year

**There are no facilities for hard rock core in B.C.

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DISCOVERY METHODS FOR CANADIAN METAL MINES
THAT OPENED IN 1992

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DISCOVERY METHODS FOR CANADIAN METAL MINES THAT OPENED IN 1992

PROVINCE: NEWFOUNDLAND

MINE	HOPE BROOK
DISCOVERY NEW OR OLD	OLD
DATE OF ORIGINAL DISCOVERY (REASSESSMENT)	1983
TECHNIQUE OF ORIGINAL DISCOVERY (REASSESSMENT)	PROSPECTING, GEOLOGICAL
DISCOVERED RESERVES	OPEN PITTABLE: 946,900 tonnes, 6.6 g/t Au UNDERGROUND: 2,226,900 tonnes, 6.3 g/t Au
1992 PRODUCTION	50,693 oz Au from 540,415 tons
MINING TYPE	UNDERGROUND
MIMING RATE	3500 t/d
COMMODITIES	Au
DEPOSIT CLASSIFICATION	EPITHERMAL? SHEAR-RELATED?
KEY REFERENCE	MODS 110/9 AU003

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