A.R.I.S.

Assessment Report Indexing System

British Columbia

Mineral Assessment Report

Database

BC

Province of British Columbia
Ministry of Energy, Mines and Petroleum Resources

GEOLOGICAL SURVEY BRANCH

Information Circular 1990-16

ARIS - A Mineral Assessment Report Database for the Public

by T.E.Kalnins, A.F.Wilcox, L.deGroot, J.G.McArthur,
C.McPeek, S.Morrison, A.Guilbault and D.Edgecombe
B.C. Geological Survey Branch,
525 Superior Street, Victoria, B.C. V8V 1X4

Abstract:

The British Columbia Geological Survey Branch manages and maintains a library of almost 19 000 assessment reports dating from 1947. More than 1200 new reports are submitted by the industry annually. The information contained in the reports is a valuable reference and research tool for mineral exploration, academic studies and resource management. The ARIS (Assessment Report Indexing System) has been designed to assist data management.

ARIS is a relational database programmed for a VAX computer. Access to this powerful analytical tool is by using third and fourth generation languages and will provide information-output in response to specific queries.

The database design uses an 'entity-relationship' model comprised of codes (entities), with interrelated tables of data containing common assessment report numbers. Aris uses ULTRA*, a directory driven database management system (DBMS), which was designed for VAX computers using the VMS operating system. The user interacts with the database either by input screens or through the Logical User Views (LUVS). LUVS insulate programs written in COBOL, FORTRAN, BASIC or MANTIS* from the physical data sets.

1.0 Introduction:

The province of British Columbia in recent years has experienced a three-fold (averaging to $160 million per year) increase in mineral exploration and data accumulation. To enable timely data processing and distribution, the British Columbia Geological Survey Branch developed computer-assisted systems, in this case the Assessment Report Indexing System or ARIS.

British Columbia is Canada's westernmost province with a total area of nearly 1 million square kilometres, or 9.5 per cent of the area of Canada. Figure 1 provides a size comparison of British Columbia to Western Europe.

There are 29 precious and base metal mines in British Columbia, and approximately 2000 companies and individuals are exploring for additional mineral deposits. Results of mineral exploration programs by industry are submitted to the provincial government in compliance with the Mineral Tenure Act Regulations, and provide an invaluable record of exploration work in British Columbia. Assembling, maintaining and distributing geoscience data fulfills a portion of the Geological Survey Branch's mandate.

The British Columbia Geological Survey Branch manages and maintains a library of over 20 000 assessment reports dating from 1947. More than 1200 new reports are submitted by the mineral industry annually. In 1989, this represented $61 million dollars of exploration work submitted. The information contained in these reports is

a valuable reference and research tool for mineral exploration, academic studies and resource management.

The Assessment Report Indexing System (ARIS) was designed to assist the Branch in processing a rapidly mounting volume of assessment report administration and data management.

The first attempt at computerizing the database occurred in 1981 when a simple retrieval system was written in Mark IV for an IBM 3760 mainframe computer. In 1984 the Ministry acquired several NTS mini computers and the data was downloaded from the IBM mainframe to the NTS mini computer. The programs were converted from Mark IV to COBOL. The NTS mini computer rapidly became obsolete and in 1987 the Assessment Report Indexing System design began. ARIS became fully operational in mid-1988 and moved from the development to production stage on a VAX 8650. The VAX is owned by the British Columbia Systems Corporation (BCSC) and the Ministry leases time on the computer.

2.0 ARIS Database:

2.1 Framework:

ARIS is a relational database programmed for a VAX computer using the VMS operating system. The ARIS system was modelled after MINFILE, British Columbia's computerized mineral inventory database. ARIS was able to utilize the Ministry's existing technology in both hardware and software and was thus able to avoid some of the problems encountered when redesigning databases.

ULTRA (now referred to as SUPRA) by CINCOM Systems of Canada was the database management system (DBMS) selected for ARIS. ULTRA is a directory-driven database and information management system designed for the VAX environment that uses the VMS operating system. ULTRA provides data management for database administrators, application programmers, and end-users.

The ULTRA Directory is the central point of control for the system (figure 2). Its integration with the Logical User View (LUV) insulates all users from the physical structure of the database which is maintained by the ULTRA DBMS. The Database Administrator (DBA), with access to the directory, controls how data is used as well as user access. For example, LUV allows the DBA to define logical views to the database for particular users. These logical views may then be used by an application programmer in a number of programs. A subsequent change to the logical view usually does not require programs to be changed or recompiled. The Directory stores the updated logical view so that wherever it is used, data are accessed in the current format.

ULTRA allows standard application programs written in COBOL, FORTRAN, or BASIC to access the DBMS without including logic to physically navigate the DBMS. The programmer simply accesses a logical view of the data needed. LUV performs the database navigation to retrieve the data. MANTIS, another CINCOM product, is a fourth generation language that is able to interact directly with the LUV and DBMS. Most of the programs used in ARIS were written in MANTIS. FORTRAN sub-routines are used for latitude/longitude conversions to UTM's and COBOL routines are used for reports.

The database design uses an "entity-relationship" model (figure 3) comprised of codes (entities), with interrelated tables of data containing common assessment report numbers and is similar in design to MINFILE. The complete data dictionary is available by writing to either of the two senior authors at the address noted.

2.2 Data Capture:

ARIS is continuously updated on-line by two clerks who catalogue the reports and enter information as owner/operator, claim names, location, etc. Two staff geologists check the reports for compliance with the Mineral Tenure Act Regulations (the legislative act which governs assessment reports) and complete the data entering, by proofing the existing data and adding geological keywords, amount of work performed, indicating the scale and number of maps included in the report, and adding cross-references to MINFILE.

If a report is deemed to be incomplete or have significant discrepancies, some of the data is not input and the amendment/rejection screen is completed instead.

2.3 Data Searches:

The most important aspect of the ARIS system is its ability to search the database (figure 4). Since ARIS is a relational database it can have an infinite number of fields, especially text fields, and the only restrictions are those imposed by the database manager.

All search programs are case sensitive and an exact match is required. The Range of Dates field is common to all searches. The searcher has the option of choosing a starting date, an ending date, or any range of dates. The default in all cases is the complete database. A maximum of 100 records per search may be retrieved. If more than 100 records are involved, the search should be divided into smaller segments using the date range field.

2.3.1 Claims Inquiry:

The claims search criteria can consist of up to six characters. The resulting hit list of values returns not only reports containing the word "Golden" but all reports that also have the word "Golden" as the first six letters in the name.

A drawback to this search is that the program does not recognize trailing blanks. If the word "Gol <space>" was entered the <space> would be ignored and all reports that started GOL would be returned ie. Gol, Gold, Golda etc. The claim search returns the following fields: claim name, assessment report number, affidavit date (for confidentiality), NTS, and general type of work performed.

2.3.2 Owner/Operator/Author Inquiry:

The Owner/Operator/Author Inquiry allows three to seven characters to be entered. The Name and Address Report is useful for determining the correct spelling and punctuation of names in the database. In this search if blank spaces form part of the proper name they must be included.

In addition to the range of dates a search may be further narrowed by choosing any combination of owner, operator, or author. The default value is all of them. The resulting search returns the following fields: name, whether the name is an owner, operator or author, assessment report number, affidavit date and NTS.

2.3.3 Property Name Inquiry:

The Property Name Inquiry is similar to the Claim Name Inquiry but instead of the claims, the search deals with the name of the property or group of claims. This may be an historical name of an established mining property or it may be the name that the project is known as to the operator.

Property names were not recorded prior to 1985. The fields returned include: property name, assessment report number, affidavit date and NTS.

2.3.4 Mining Division Inquiry:

There are twenty four mining divisions in British Columbia and these are represented by four letter codes in the database; both ARIS and MINFILE use the same codes. The list of fields returned by this search include: assessment report number, affidavit date, the first claim name in the database and the general work types associated with the assessment report.

2.3.5 NTS Inquiry:

The National Topographic System or NTS map sheet designation is a system established by Energy, Mines and Resources Canada Survey and Mapping Branch for dividing Canada into quadrangles of equal latitude and longitude. The NTS Inquiry allows searches to be performed at 1:250 000 or 1:50 000 scale. The following fields are returned: NTS, assessment report number, affidavit date, general work types, and the property name.

2.3.6 MINFILE Inquiry:

MINFILE is British Columbia's premier mineral inventory database. The assessment reports are one of the primary sources of information for MINFILE and cross references are listed in both databases. In reviewing the assessment reports the geologist checks the MINFILE occurrence maps to see if the report deals with an existing MINFILE occurrence or has enough information documented to establish a new MINFILE number. If a new MINFILE number is warranted this information is passed onto the MINFILE team by flagging the MINFILE field.

A MINFILE number consists of nine alpha-numeric characters. The first four digits represent the appropriate 1:250 000 map sheet designation; the next two characters represent a 1:127 700 scale map designation (these fields are optional and are only applicable in the southern part of the province where there is a greater number of known mineral occurrences); and the last three numbers are a sequential number to uniquely identify the occurrence. The fields returned from this search include the following: MINFILE number, assessment report number, NTS, affidavit date, general work types and property name. MINFILE data was not captured on assessment reports received before 1982.

2.3.7 Latitude/Longitude Inquiry:

The Latitude - Longitude Inquiry searches on a range of values. The latitude can vary from one to fifteen minutes and the longitude can vary from one to fifty minutes. The fields include: latitude, longitude, UTM zone, northing, easting, and property name.

More complicated searches can be conducted using an SQL-like search product called SPECTRA. At the present time SPECTRA searches have not been performed for the general public but have been used internally to generate reports and provide information for various Open File publications.

2.4 Data Output and Products:

2.4.1 Internal Reports:

ARIS generates a series of standard reports and letters for administrative purposes. Assessment report approval letters are generated and mailed periodically. Request for amendment letters are generated and mailed if the report contravenes Regulations. A series of reports, mainly for internal government use with the exception of the NTS Index are also generated from ARIS. Other custom ad-hoc reports are designed using COBOL and run as required. Having ARIS perform these routine administrative tasks has resulted in the saving of one person-year worth of manual typing.

2.4.2 Exploration in B.C.:

Prior to 1989, ARIS was used as the major source of information for the publication *"Exploration in British Columbia"*. Part C of that publication was devoted to a review of the previous year's assessment reports received by the Ministry as well as statistical tables concerning expenditures on claims. These statistical tables are now the only assessment report information included in this volume.

2.4.3 Index Maps:

The assessment report numbers that are plotted on mylar index maps show the approximate centre of exploration reported. These 90 index maps are at a scale of 1:250 000 (1:127 700 in Southern British Columbia). The Index Maps are available on microfiche as 35 mm images and as paper copies.

2.4.4 Assessment Report Index:

The Assessment Report Index is available in three formats: paper, microfiche and computer diskettes. In the paper format, this basic bibliographic index is sorted by NTS mapsheet. For each report the index provides latitude, longitude, UTM co-ordinates, claim names, operator, author, type of work reported and report year. A duplicate version of the paper index is also available as COMfiche. On floppy diskettes the data fields have been organized as a series of nine ASCII files to facilitate access by a variety of commercial software programs.

2.4.5 Data Distribution:

The Geological Survey Branch Assessment Report office will perform searches to interested clients free of charge. Complete assessment report libraries on microfiche

are available for viewing in Victoria, Vancouver and the District Geologist offices in Smithers, Prince George, Kamloops and Nelson. Partial sets are available in all other Gold Commissioners/Government Agents offices throughout the Province. Copies of reports can be ordered from the Victoria office.

British Columbia is also a contributor to GEOSCAN, Canada's Bibliographic Geoscience Database. The largest portion (over 18 000 of our records) are the assessment reports, the remainder of our data in GEOSCAN comes from Open Files, Papers, Bulletins and maps.

3.0 Data Use:

ARIS is used by explorationists as a reference in planning new exploration programs; land use planners refer to ARIS to help define areas of mineral potential; and statisticians find data in ARIS that help predict exploration data and expenditure trends in various economic regions of the province.

4.0 Future Plans:

Future plans under consideration for ARIS include more integration with MINFILE, graphics development, integration with GIS, possibly dial-in access to the public and possibly conversion to a pc/lan environment.

5.0 Summary:

The Geological Survey Branch maintains a library of approximately 20 000 mineral assessment reports. More than 1200 reports are added annually.

ARIS - A Mineral Assessment Report Indexing System was designed and introduced in 1987 to assist in timely administration of assessment reports and data management.

New data is entered on-line and either administrative reports are printed, or various data searches are made.

ARIS has enabled 2 assessment report clerks and 2 staff geologists to administer and manage an increasing work load and database and to improve public service.

6.0 Acknowledgements:

I would like to thank my co-authors for their support in reviewing this paper and contributing to the design and success of ARIS. Special acknowledgements go to the staff of the GSB and to Dr. Stephen Smith for providing the map comparing British Columbia with Western Europe.
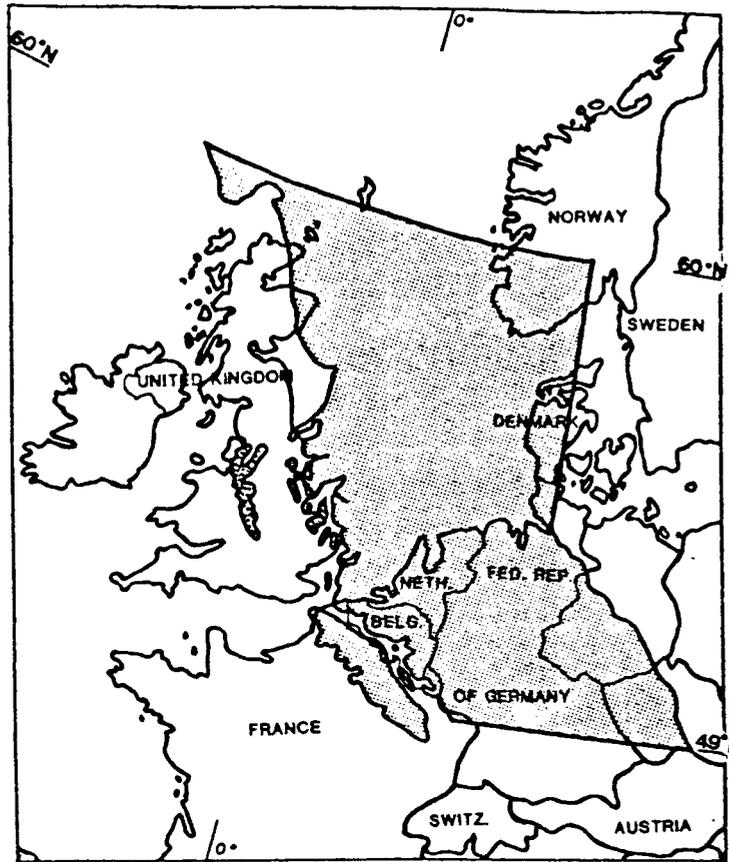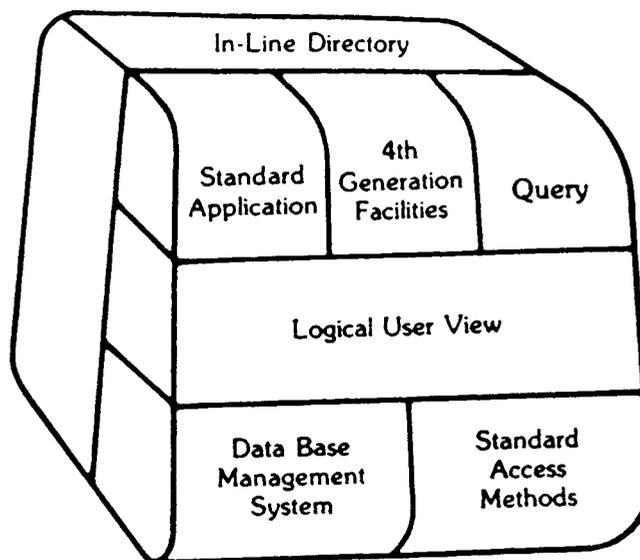
FIGURE 1

FIGURE 2 ULTRA's integrated architecture.

Entity Relationship Model

Commodity Table

Commodity

Keyword

Mineral Act

Date code

ASMT Commodities

ASMT Keywords

Date MARS

ASMT MF Numbers

ASMT Dates

ASMT Claims

Camp

ASMT Camps

ASMT MDS

Mining Division

MA Mail List

Assessment Report

ASMT NA-Codes

Names

Name Type

Private Lines

Letter Lines

ASMT Works

ASMT Title

ASMT NTS Mapsheets

Work Type

Work Category

ASMT MF-Numbers

NTS

FIGURE 3
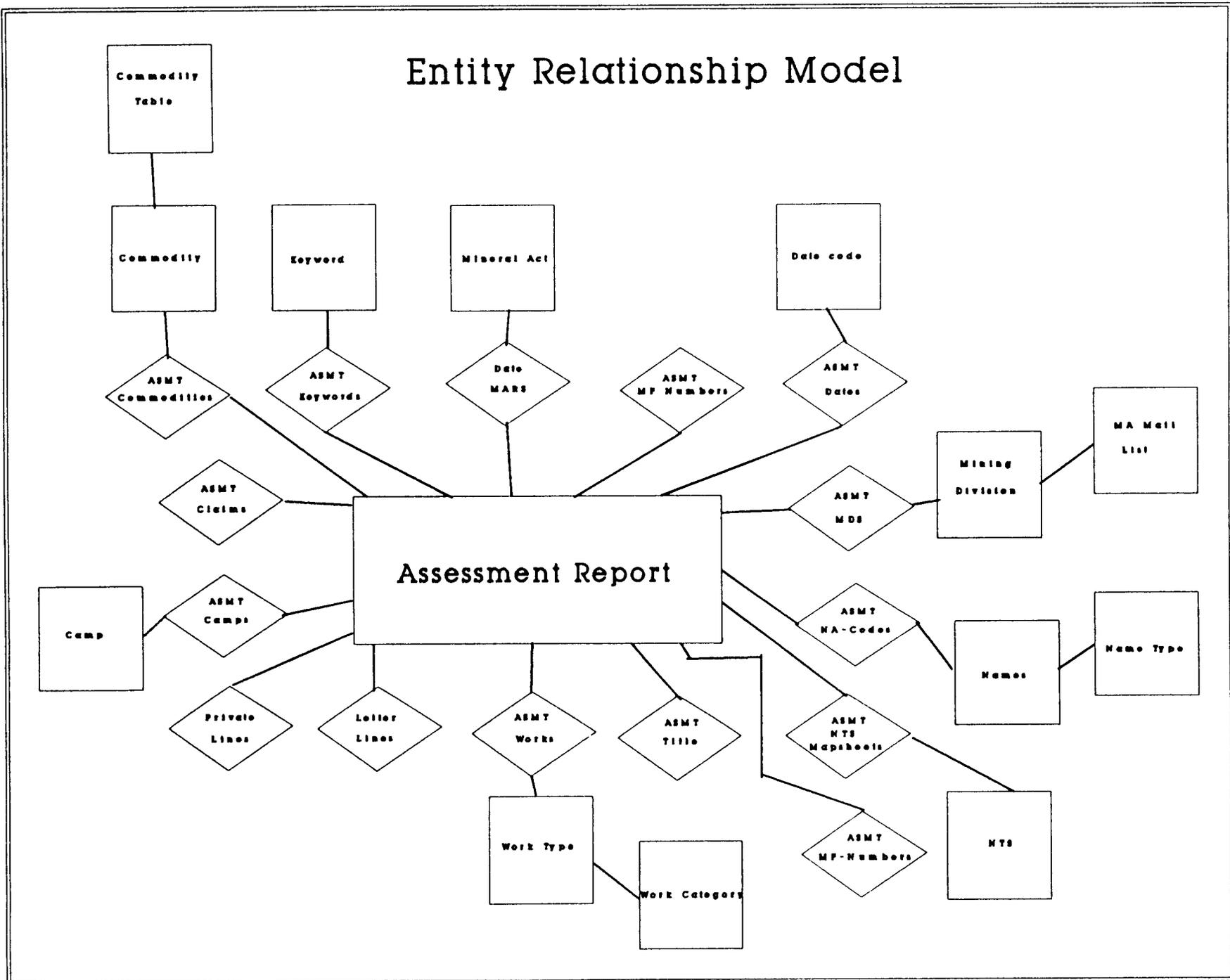
Panel 1: ARIS Inquiries Menu

```
          Geological Survey Integrated Data Base
                  ARIS Inquiries Menu

     01  >   Claim Name
     02  >   Owner/Operator Author Name
     03  >   Property Name
     04  >   Mining Division
     05  >   NTS Mapsheet
     06  >   MINFILE Number
     07  >   Latitude - Longitude
     08  >
     09  >

     CANCEL  >  Return to Previous Menu
     X       >  Exits the System

              Option Number :
```

Panel 2: Claim Name Inquiry

Assessment Report Indexing System (ARIS)
Claim Name Inquiry

Enter First 1 to 6 Characters : Golden
Enter Range of Dates: 000000 to 900207

CLAIM NAME	A/R	AFF-DATE	NTS	WORK
Golden	16288	870624	082F15W	GEOC
Golden	18828	890607	082K08E	GEOP
Golden Age	17273	880405	082E09W	DRIL
Golden Bear	18709	890201	104K08E	GEOL
Golden Bell	15928	861027	092H10W	GEOC
Golden Cat	17791	880429	092H09E	GEOL
Golden Crown	18661	890120	103H15E	GEOC

No. of Recs 64

Panel 3: Owner/Operator/Author Inquiry

Assessment Report Indexing System (ARIS)
Owner/Operator/Author Inquiry

Enter 3 to 7 Characters of Name :Minnova
Enter Range of Dates : 000000 to 900207
Enter 'X' For Type : Owner # Operator # Author #

NAMES	OW/OP/AU	A/R	AFF-DATE	NTS
Minnova	x x	16357	870730	092C15E
Minnova	x x	15908	870402	082M04W
Minnova	x x	16805	871005	092C15E
Minnova	x x	16812	871119	092P08E
Minnova	x x	16871	871106	092B13W
Minnova	x	16653	871005	082E03E
Minnova	x x	16996	880212	082M05W
Minnova	x x	17052	871106	082M04W

No. of Recs 53

Panel 4: Property Name Inquiry

Assessment Report Indexing System (ARIS)
Property Name Inquiry

Enter 1 to 6 Characters of Name : Big
Enter Range of Dates   : 000000 to 900207

PROPERTY NAME	A/R	AFF-DATE	NTS
Big Bull	16983	871120	104K12E
Big Bull	18428	881124	104K12E
Big Missouri	16806	870930	104B01E
Big Onion	16784	870918	093L15W
Big P	17984	881108	082E15E
Big R	17099	871125	082K13W
Big Rock	17353	880511	082E12W
Big Springs	18446	890221	082K04W
Bigfoot	18789	890505	092H05W

No. of Recs 9

Panel 5: Mining Division Inquiry

Assessment Report Indexing System (ARIS)
Mining Division Inquiry

Enter Mining Division Code   : SKEE
Enter Range of Dates : 880101 to 090207

A/R	AFF-DATE	NAME	WORK TYPES
16860	880112	J 1-2	GEOL
16858	880104	Iliad 1-4	GEOL GEOC
16888	880113	AM 1	PHYS GEOC
16905	880113	McFadden	GEOL GEOP GEOC
17055	880204	Bliss 1-4	GEOC
17058	880204	Drivel 1-4	GEOC
17015	880127	Bre 1-50	GEOC PHYS
17051	880302	Vancouver 1-3	DRIL
17180	880311	Keech	GEOL GEOC DRIL
17205	880208	Cumberland	GEOL GEOC DRIL
17275	880114	Surf 1	DRIL PHYS GEOC

No. of Recs MAX 100

Panel 6: NTS Inquiry

Assessment Report Indexing System (ARIS)
NTS Inquiry

Enter 4, 6 or 7 Characters of NTS : 104B 08 W
Enter Range of Dates   : 880101 to 900207

NTS	A/R	AFF-DATE	WORK	PROP NAME
104B08W	17055	880204	GEOC	Bliss
104B08W	17056	880204	GEOC	Divel
104B08W	17205	880208	GEOL GEOC	Cumberland
104B08W	17404	880208	GEOC	Corey
104B08W	18106	881006	GEOC	Doc
104B08W	16708	880331	GEOL DRIL	Doc
104B08W	18285	881215	GEOL GEOC	Tedray
104B08W	18406	881122	GEOC GEOL	Kerr
104B08W	18306	881027	PROS	Clara

No. of Recs 9

Panel 7: MINFILE Inquiry

Assessment Report Indexing System (ARIS)
MINFILE Inquiry

Enter 3, 4 or 6 Characters :   103 F
Enter Range of Dates : 880101 To 890101

MINFILE	A/R	NTS	AFF-DAT	WORK	NAM
103F 009	17914	103F08W	880908	GEOC PHYS	Golden
103F 022	18131	103F09W	881215	GEOL GEOC	Linda
103F 024	18131	103F09W	881215	GEOL GEOC	Linda
103F 043	17585	103F14E	880114	DRIL	INCON

No. of Recs 4

Panel 8: Latitude - Longitude Inquiry

Assessment Report Indexing System (ARIS)
Latitude - Longitude Inquiry

Enter Lat. Range (degrees, minutes) :   56 15 To   56 30
Enter Long. Range (degrees,minutes) : 130 30 To 131 00
Enter Range of Dates   : 880101   To 890101

LAT	LONG	A/R	UTM	NORTH	EAST	NAME
562011	1304152	17635	09	6244600	395036	Gold Bou
562430	1304400	17630	09	6252662	393040	Gold Unu
563035	1304213	16858	09	6263899	395154	Candored
563052	1305912	17279	09	6264893	377751	Secretar
563155	1305137	17572	09	6266622	385580	Morain

No. of Recs 5

FIGURE 4