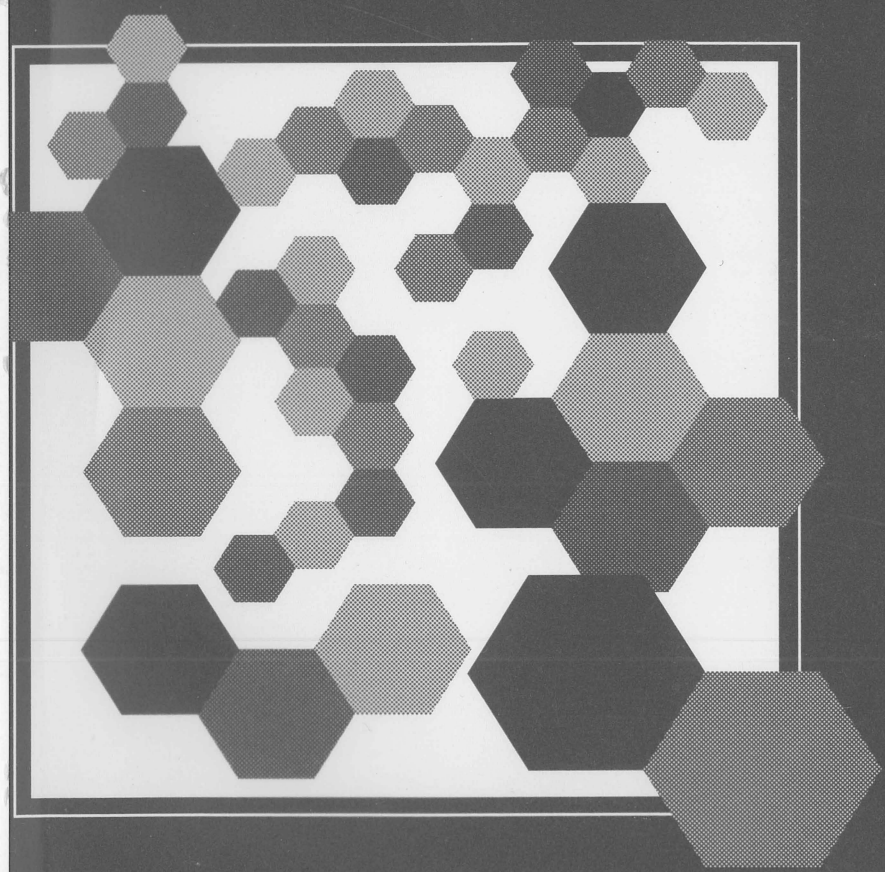
ALKALINE ROCKS OF AUSTRALIA ROCKCHEM DATA SET DOCUMENTATION

RECORD 1992/36



by A.L.Jaques, L.A.I. Wyborn and R.J. Ryburn

Resources, Geology and Geophysics

BMR
GEOLOGY AND
GEOPHYSICS
AUSTRALIA

Alkaline Rocks of Australia Rockchem Data Set Documentation

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and R.J. Ryburn

Minerals and Land Use Program

DEPARTMENT OF PRIMARY INDUSTRIES AND ENERGY

Minister: The Hon. Alan Griffiths

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BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

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ABSTRACT

ROCKCHEM is the whole rock geochemical data storage system of BMR's Minerals and Land Use Program, and utilises the relational database management system ORACLE. This data set contains 834 analyses (both major and trace elements) of kimberlites and lamproites from the Kimberley Region of Western Australia, as well as data from a review of Alkaline Rocks of Australia. Most of the kimberlite and lamproite samples are located by AMG grid references and/or decimal latitude and longitude. This record describes tables used in ROCKCHEM, defines the fields used within these tables, and gives a short description of the data. Also listed are references to the main scientific reports generated from the data.

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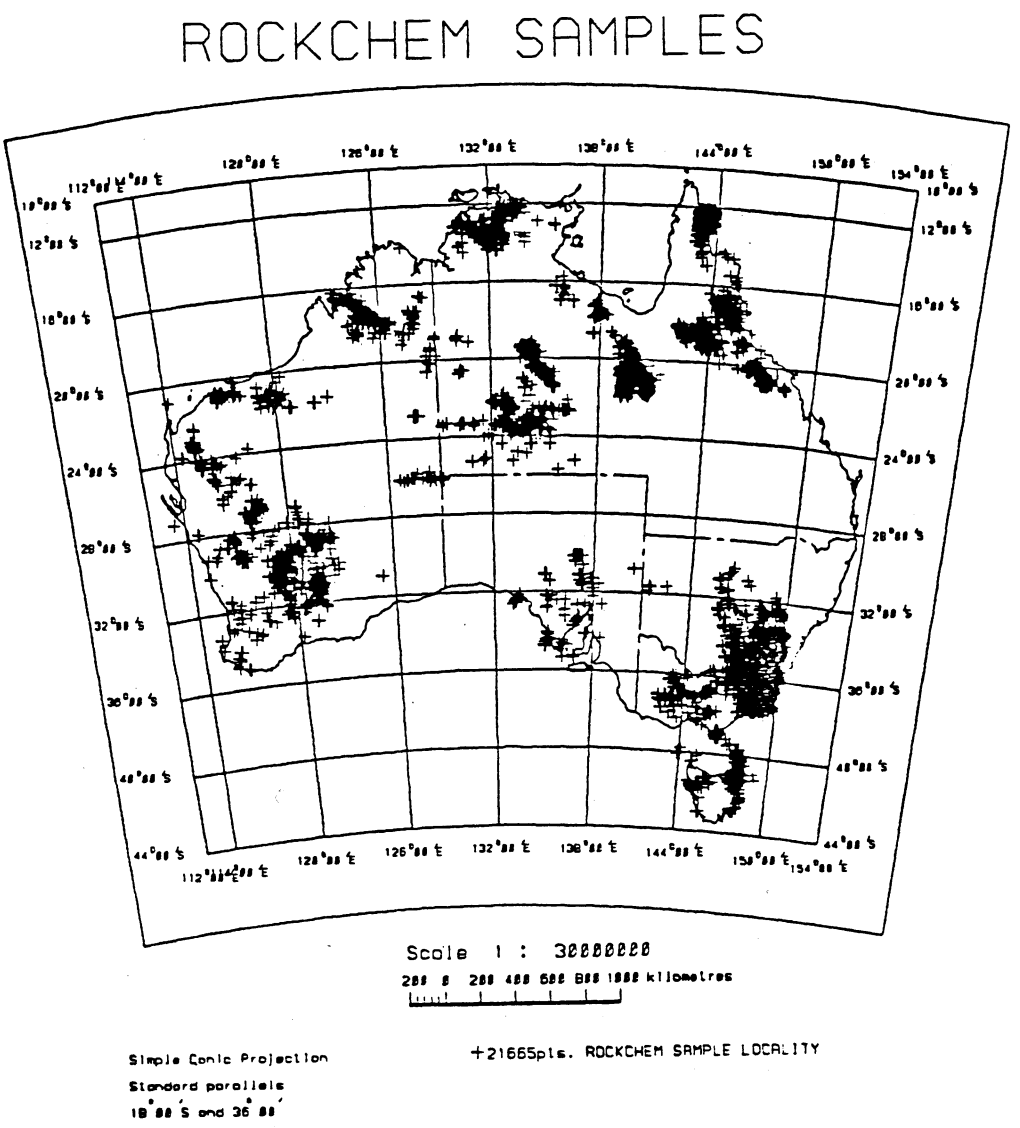

Figure 1. Distribution of ROCKCHEM samples in Australia.

1. INTRODUCTION

ROCKCHEM is the whole-rock geochemical data storage system of the Minerals and Land Use Program of the BMR Geology and Geophysics, Australia. It is based on the commercial relational database management system ORACLE. The complete database contains approximately 21665 analyses from Australia (see Figure 1), Antarctica and Papua New Guinea and can be divided into either regional or thematic data sets. The data are currently subdivided into the data sets as listed in Table 1.

Subset	Areas Covered	No. of Analyses	Coordinator
Regional Databases			
Antarctica	Antarctica	1318	J.W. Sheraton
Arunta	Arunta Block	1793	R.G. Warren,
Lachlan	Lachlan Fold Belt NE Tasmania NW Tasmania	1149 300 40	D. Wyborn
McArthur	McArthur Basin Murphy Tectonic Ridge	533 74	K. Plumb, L. Wyborn
Mount Isa	Mount Isa Inlier	2296	L. Wyborn
New Guinea	New Guinea Manus Island New Georgia	1000	R.W. Johnson
NE Queensland	Georgetown Inlier NE Queensland	1940	D.E. Mackenzie
Pilbara	Pilbara Block	1386	A.Y. Glikson
Pine Creek	Pine Creek Inlier	2056	L. Wyborn
South Australian Proterozoic	Stuart Shelf, Adelaide Geosyncline	232	J. Knutson
Tennant Creek	Tennant Creek Inlier Davenport Province	1431 170	L. Wyborn
West Australian Proterozoic	Capricorn Province Granites Tanami Block Halls Creek Block	227 56 164	L. Wyborn
Yilgarn	Yilgarn Block	2274	J.W. Sheraton
Thematic Databases			
Alkaline	Kimberlites Alkaline Rocks	557 277	A.L. Jaques

Table 1. List of Data Sets in ROCKCHEM.

2. THE ALKALINE ROCKS OF AUSTRALIA DATA SET

This ROCKCHEM data set is a release of approximately 834 analyses (both major and trace elements) of kimberlites and lamproites from the Kimberley Region of Western Australia, as well as data from a review of Alkaline Rocks of Australia. Figure 2 shows the distribution of the analyses within the region. Appendix 1 contains listings of the individual components of the data set.

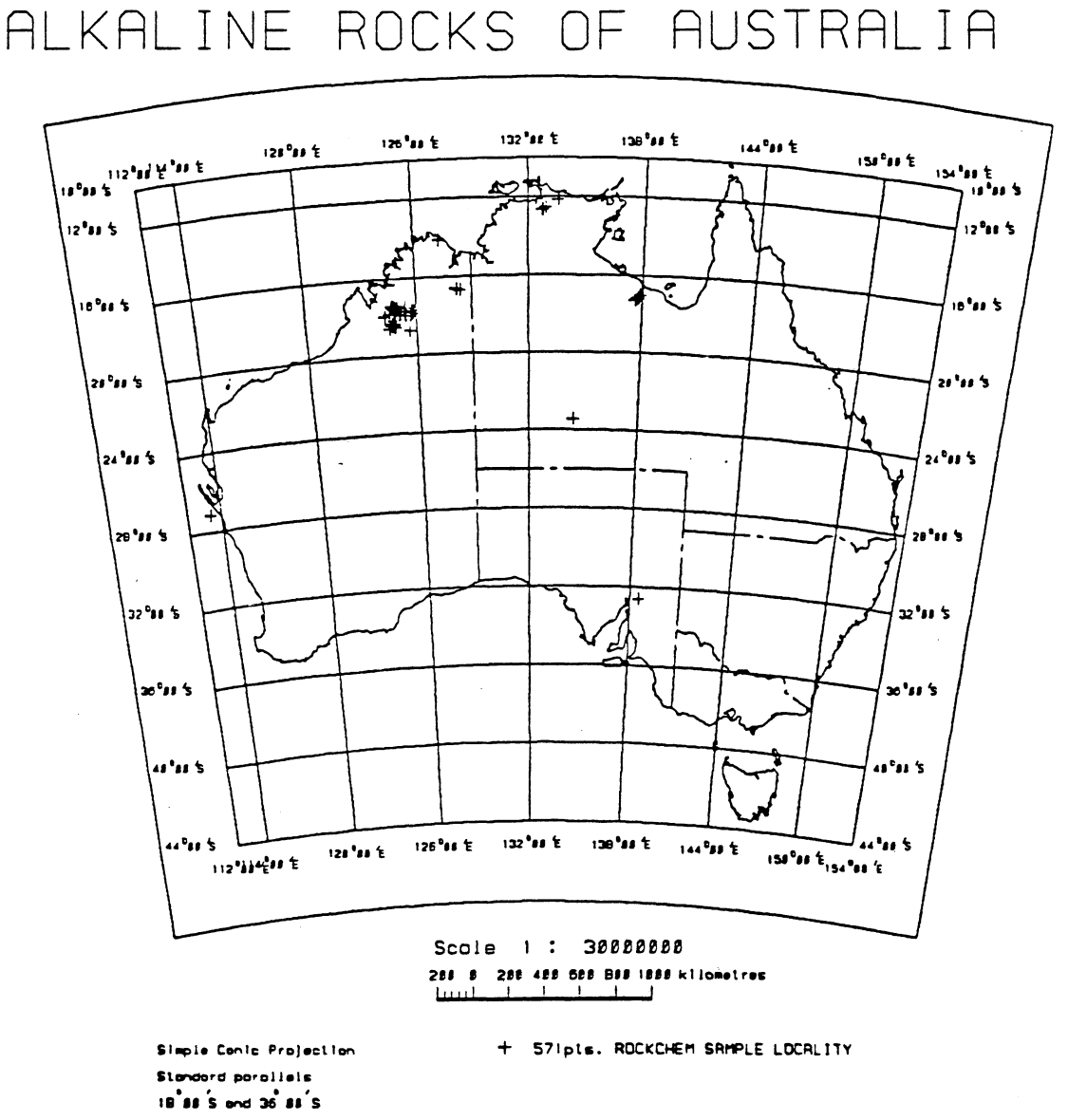

Figure 2. Sample localities for the Alkaline Rocks of Australia Data Set.

Alkaline rocks of Australia Database.

Database type:

thematic

General Selection Criteria:

See individual data groups.

Data description:

This database comprises 834 analyses of alkaline rocks in Australia obtained from unpublished BMR data and from two data groups previously published in microfiche form.

- Group 1 contains 557 analyses of kimberlites and lamproites from Western Australia and features data from the diamond-bearing lamproites of Argyle and the West Kimberley region, including both the Ellendale pipes and the better known lamproites of the Noonkanbah field (Fitzroy Lamproites). This group includes previously unpublished BMR analyses as well as 496 analyses published as a microfiche Appendix to GSWA Bulletin 132 (Jaques & others, 1986).

  Specific Selection Criteria:

  Field = group ***Entry*** = Fitzroy Lamproites (524 analyses)

  Entry = Argyle Lamproite (33 analyses)

- Group 2 is a compilation of 277 previously published analyses from the literature of alkaline rocks of all ages from Australia, published as a microfiche Appendix to a review of the alkaline rocks of Australia by Jaques & others (1985). Many of these samples do not have geographical coordinates as they were not listed in the literature from which they were compiled.

  Specific Selection Criteria:

  Field = other data ***Entry*** = Alkaline rocks review.

Future work:

No further expansion of this database is planned under the current program.

Bibliography:

Jaques, A.L., Creaser, R.A., Ferguson, J., and Smith, C.B. 1985. A review of the alkaline rocks of Australia. *Transactions of the Geological Society of South Africa*, 88, 311-334.

Jaques, A.L., Lewis, J.D., and Smith, C.B. 1986. The kimberlites and lamproites of Western Australia. *Geological Survey of Western Australia, Bulletin*, 132, 268pp.

3. STRUCTURE OF ROCKCHEM DATA SETS

The Rockchem database contains seven main tables of data and eleven associated 'authority' tables. The names of the tables are as follows and full definitions are listed in Appendix 2.

Table Name	Contents
Main Tables	
SAMPLES	Samples and their locations and provenance
SAMPLESPLITS	Sample splits and their storage
MAJORS	Major element analyses in weight percentages of oxides
TRACES	Trace element analyses in parts per million
PPB	Trace element analyses in parts per billion
ROCKPROPS	Density and magnetic rock properties
REFERENCES	Bibliographic references
Authority tables	
ORIGINATORS	List of valid contributors
COUNTRIES	List of valid countries
STATES	List of valid Australian States
REGIONS	List of valid regions
HMAPS	List of valid 1:100 000 maps
ROCKTYPES	List of valid rock types
STOREBOXES	List of valid boxes in BMR Museum
SOURCES	List of valid analytical laboratories
METHODS	List of valid analytical methods
MAXNOS	Table for highest index number in the database

The fields in the main tables are described in section 4. The authority tables are described in section 5. They generally consist of a number and a text field. For example, the REGIONS table consists of a region number and a region name (see Appendix 2). The region names in this table are unique. Each region appears once, and only once, in this table, and nowhere else in the database. The SAMPLES table refers ('relates') to the region name via its associated number.

4. DESCRIPTION OF THE MAIN TABLES

4.1 THE SAMPLES TABLE

This table contains information about samples and their provenance. The Samples Block contains the following relational fields - ORIGINATORS, ROCKTYPES, COUNTRIES, STATES, REGIONS, HMAPS, and REFERENCES (up to 5 different references can be entered for each sample). With each authority field, there is an associated table containing the value pointed to by a number or in the case of COUNTRIES, a 3-letter mnemonic. The number (or mnemonic) is the only information stored in the SAMPLES table, the values are stored separately in the relevant authority table.

All fields are either mandatory or optional. All BMR users must enter the mandatory fields before the geochemical data can be entered.

Description of Fields:

Origno - Mandatory relational field of 5 digits. The originator is represented by a number and the full name is recorded in the relational 'ORIGINATORS' table. The originator is generally the person or organization that collects the sample and/or submits it for laboratory work. The main purpose of this field is to ensure a unique combination of originator and sample number.

Sample Number - Mandatory field of 16 characters. Any combination of letters and numbers may be entered, provided that it is unique to the originator. All BMR samples should have registered 8 digit numbers, which should be unique. The first two digits in the BMR sample number refer to the year in which the sample was collected, the next two digits refer to a region in Australia (e.g. Arunta, Pine Creek), and the remaining four numbers are used by individuals belonging to that project at their discretion.

Field Number - Optional field of 16 characters. This field is designed to accommodate any alternative numbering systems that might apply to a sample or group of samples. For example, some samples are given field numbers that differ from the final registered numbers.

Group or Batholith - Optional field of 64 characters, giving the name of the stratigraphic group or igneous batholith from which the sample was collected.

Subgroup or Suite - Optional field of 64 characters, giving the name of the stratigraphic subgroup or igneous suite pertaining to the sample.

Stratigraphic Formation - Optional field of 64 characters, giving the relevant stratigraphic unit at formation level.

Stratigraphic Member - Optional field of 64 characters for the name of a stratigraphic member, if appropriate.

Stratigraphic Height - Optional number field with up to two decimal places. Designed for samples from measured stratigraphic sections.

Map Symbol - Optional field of 10 characters: the letter symbol used on 1:100 000 or 1:250 000 geological maps for the rock unit from which the sample was collected.

Rock Type - Mandatory relational field of 5 digits. See the description of the authority tables for the list of 18 permissible rock types, 1 being 'unknown'.

Lithology - Optional field of 64 characters for a full lithological description.

Grouping - Optional field of 22 characters to allow the user to supply other divisions for samples, for example, the alteration zones of an ore body.

Age - Optional field of 64 characters for the geological age, e.g., late Ordovician. If known, the absolute age is included in brackets, e.g., early Proterozoic (1860 Ma).

References - 5 optional relational numeric fields of 5 digits each. The full reference is listed in the REFERENCES table.

Country - Mandatory relational field of 3 capital letters. The default value is 'AUS'.

State - Relational field of 3 capital letters, mandatory if country is Australia. Only the standard capital letter abbreviations for Australian states can be entered in this field, and it cannot be used for other countries.

Region - Mandatory relational field of 5 digits. Only those regions in the REGIONS table may be entered. A region is a recognised geological province or area such as the Lachlan Fold Belt, Mount Isa Inlier, or Carnarvon Basin. As regions may overlap one another, the region that is entered is dependent on the purpose for which the sample was collected.

Geographic Area - Optional 64 character field for the name of the geographic area (e.g., valley, plain, mountain range) from which the sample comes. Examples are 'Newcastle Range' and 'Tuggeranong Valley'. Another purpose for which this field is used is for subprovinces of major regions (e.g., the Leichhardt River Fault Trough of the Mount Isa Inlier).

Locality - Optional 64 character field for a description of the sample site to aid in its relocation in the field. For example, '5.5km NW of Brown's Bore, on east bank of dry creek'.

1:100 000 Map - Relational field of 4 digits, mandatory if country is Australia. The number supplied must identify one of the standard series 1:100 000 maps in the HMAPS table. In insert or update mode, the name may be entered and the number retrieved automatically. Only the map number is stored in the SAMPLES table.

Grid Reference - Field of 6 digits, mandatory if 1:100 000 map name is given. The 6 digit reference required is that described on the face of Australian 1:100 000 maps. The grid reference given must be metric and on the Australian National Spheroid.

Decimal Latitude - Field of 8 digits, mandatory if sample is not from Australia. Up to 6 digits may follow the decimal point. For most samples this field has been entered using a BMR program called 'GetLat', which calculates latitudes and longitudes from the 1:100 000 maps and metric grid references.

North or South - Single character field, 'S' by default. Only 'N' or 'S' may be entered.

Decimal Longitude - Field of 9 digits, 7 of which may follow the decimal point. Otherwise as for latitude.

East or West - Single character field 'E' by default. Only 'E' or 'W' may be entered. Make sure this field is correctly filled in for samples from outside Australia (e.g.

Antarctica). It must be given as 'W' for latitudes measured west of the Greenwich Meridian.

Drill Hole - Optional field of 22 characters. If the sample is from a drill hole, its name, or some other identification, is required.

Depth in Metres - Optional field of 10 characters. The depth of the sample from within the drill hole. A character field is used here to enable depth ranges to be entered, e.g., '112- 115' - as some samples are collected from finite depth intervals.

Other Data - Optional field of 64 characters. May be used for any data not covered by the above fields that the originator feels are relevant.

Entry Date - Invisible date field. This field automatically assumes the date that the sample data is inserted into the SAMPLES table via the form.

4.2 THE SAMPLE SPLITS TABLE

This table indicates the sample type (whole rock geochemistry, geochronology, thin section, hand specimen etc.) and the number of the box that the sample is stored in within the BMR museum.

Description of Fields:

Origno - Mandatory relational field of 5 digits. The originator is represented by a number and the full name is recorded in the relational 'Originator Table'. The originator is generally the person or organization that collects the sample and/or submits it for laboratory work. The main purpose of this field is to ensure a unique combination of originator and sample number.

Sample Number - Mandatory field of 16 characters. Any combination of letters and numbers may be entered, provided that it is unique to the originator. All BMR samples should have registered 8 digit numbers, which should be unique. The first two digits in the BMR sample number refer to the year in which the sample was collected, the next two digits refer to a region in Australia (e.g. Arunta, Pine Creek), and the remaining four numbers are used by individuals belonging to that project at their discretion.

Sample Type - Mandatory relational field of 5 digits. The sample type entered must be one of those in the SAMPLETYPES table, e.g., 'whole-rock analysis' or 'geochronology'.

Storebox - Optional numeric field of up to 5 digits. This number must correspond to a Storebox number already in the STOREBOXES table. Although most existing samples do not yet have a storebox number, it is a requirement for all new samples housed in the BMR museum to have a storebox number.

4.3 THE MAJORS TABLE

The majors table contains all of the major element data with all values expressed as weight percentages of oxides.

Description of Fields:

Sample Number - Mandatory field of 16 characters. Any combination of letters and numbers may be entered, provided that it is unique to the originator. All BMR samples should have registered 8 digit numbers, which should be unique. The first two digits in the BMR sample number refer to the year in which the sample was collected, the next two digits refer to a region in Australia (e.g. Arunta, Pine Creek), and the remaining four numbers are used by individuals belonging to that project at their discretion.

Analysis Number - Mandatory field of up to 5 digits. Primary key field assigned by the system; it cannot be inserted or updated. It may be used to query the tables.

Origno - Mandatory relational field of 5 digits. The originator is represented by a number and the full name is recorded in the relational 'Originator Table'. The originator is generally the person or organization that collects the sample and/or submits it for laboratory work. The main purpose of this field is to ensure a unique combination of originator and sample number.

Source Number - Mandatory relational field of up to 5 digits. The 'source' of an analysis is normally the laboratory that performed the analysis or the person or organization that provided the data (e.g., BMR, BMR restricted, BHP, B.W. Chappell). The SOURCES table contains the authority list of all sources.

Method Number - Mandatory relational field of up to 5 digits describing the method by which the laboratory analysis was performed. The details of the analytical techniques used are in the METHODS table.

Major Elements - Optional numeric fields of up to 4 digits, two after the decimal point. Automatically right justified. Detection limit values are entered as negative numbers and it is impossible to enter '<' or 'n.d.'.

**Fe_2O_3* - This field is reserved for total iron as Fe_2O_3. It should be entered only for analyses in which the oxidation state of iron has not been determined. Where this field is entered, the fields for FeO and Fe_2O_3 should be left empty.

Rest - Trace elements are converted to oxide percent, summed and then added to the total.

Total - Optional numeric field of up to 5 digits. This is for an entered total.

Calculated Total - The value in this field is automatically calculated from the data in the major element fields. It cannot be entered and is not a database field. Except where detection limit values are involved, this field provides a check on the entered total;

the two should coincide. Because detection limit values are entered as negative numbers, they are subtracted from the calculated total.

4.4 THE TRACES TABLE

This table includes all trace elements in ppm.

Description of Fields:

Sample Number - Mandatory field of 16 characters. Any combination of letters and numbers may be entered, provided that it is unique to the originator. All BMR samples should have registered 8 digit numbers, which should be unique. The first two digits in the BMR sample number refer to the year in which the sample was collected, the next two digits refer to a region in Australia (e.g. Arunta, Pine Creek), and the remaining four numbers are used by individuals belonging to that project at their discretion.

Analysis Number - Mandatory field of up to 5 digits. Primary key field assigned by the system; it cannot be inserted or updated. It may be used to query the tables.

Origno - Mandatory relational field of 5 digits. The originator is represented by a number and the full name is recorded in the relational 'Originator Table'. The originator is generally the person or organization that collects the sample and/or submits it for laboratory work. The main purpose of this field is to ensure a unique combination of originator and sample number.

Source Number - Mandatory relational field of up to 5 digits. The 'source' of an analysis is normally the laboratory that performed the analysis or the person or organization that provided the data (e.g., BMR, BMR restricted, BHP, B.W. Chappell). The SOURCES table contains the authority list of all sources.

Method Number - Mandatory relational field of up to 5 digits describing the method by which the laboratory analysis was performed. The details of the analytical techniques used are in the METHODS table.

Trace Elements - Optional numeric fields of up to 8 digits, two of which may be after a decimal point. The fields are automatically right justified and as is the case for major elements, a negative entry signifies a detection-limit value.

4.5 THE PPB (parts per billion) TABLE

This table includes all trace elements in ppb.

Description of Fields:

Sample Number - Mandatory field of 16 characters. Any combination of letters and numbers may be entered, provided that it is unique to the originator. All BMR samples should have registered 8 digit numbers, which should be unique. The first

two digits in the BMR sample number refer to the year in which the sample was collected, the next two digits refer to a region in Australia (e.g. Arunta, Pine Creek), and the remaining four numbers are used by individuals belonging to that project at their discretion.

Analysis Number - Mandatory field of up to 5 digits. Primary key field assigned by the system; it cannot be inserted or updated. It may be used to query the tables.

Origno - Mandatory relational field of 5 digits. The originator is represented by a number and the full name is recorded in the relational 'Originator Table'. The originator is generally the person or organization that collects the sample and/or submits it for laboratory work. The main purpose of this field is to ensure a unique combination of originator and sample number.

Source Number - Mandatory relational field of up to 5 digits. The 'source' of an analysis is normally the laboratory that performed the analysis or the person or organization that provided the data (e.g., BMR, BMR restricted, BHP, B.W. Chappell). The SOURCES table contains the authority list of all sources.

Method Number - Mandatory relational field of up to 5 digits describing the method by which the laboratory analysis was performed. The details of the analytical techniques used are in the METHODS table.

Trace Elements - Optional numeric fields of up to 8 digits, 3 of which may be after a decimal point. The fields are automatically right justified and as is the case for major and trace elements, a negative entry signifies a detection-limit value.

4.6 THE REFERENCES TABLE

The bibliographic References Form accesses the REFERENCES table. The authors and year fields are spanned by a concatenated unique index. This means that no two references can have the same values in the author(s) and year fields.

Description of Fields:

Reference Number - Mandatory field of up to 5 digits. A monotonically increasing primary key field assigned by the system. The reference number in the fields in the samples table refer to this field.

Other ID - Optional field of up to 16 characters. Any other identifying sequence that the user may care to apply.

Username - Mandatory field of up to 16 characters.

Authors - Mandatory field of up to 128 characters.

Year - Mandatory field of up to 16 characters.

Title - Optional field of up to 240 characters.

Source - Optional field of up to 240 characters - the journal name, volume and page numbers.

5. DESCRIPTION OF AUTHORITY TABLES

5.1 THE 1:100 000 MAPS FORM

The 1:100 000 maps form table has the underlying HMAPS table as an important table in its own right.

Description of Fields:

100K Map Number - The unique four digit number for any 1:100 000 map sheet from Australia.

1M Map ID - The 1:1 000 000 map sheet in which the 1:100 000 sheet lies. This is identified by two capital letters followed by two numbers, e.g., 'SF54'. The two digits are the UTM zone, which is needed to convert metric references to latitude and longitude.

250K Map Number - Up to 2 digits identifying the 1:250 000 map sheet from the 16 within each 1:1 000 000 map area. The full 1:250 000 map ID is obtained by joining the 1:1 000 000 map ID to this number, e.g., SF54-12, which is the Winton 1:250 000 map sheet, in Queensland. Note that the 1:250 000 map sheets in Tasmania are the theoretical ones, not the shifted ones actually published.

100K Map Name - Up to 22 upper case characters for the name of the 1:100 000 map sheet identified by the 100K Map Number. There are many offshore sheets which are named 'UNNAMED'.

100K Map NW Corner Lat. & Long. - The decimal latitude and longitude of the northwest corner of the 1:100 000 map sheet. It is possible, using a single SQL*Plus command, to make use of this field to select a 1:100 000 map name for any given latitude and longitude.

100K Map AMG Ref. SW Corner Easting and Northing - The metric easting and northing of the southwest corner of the 1:100 000 map sheet. These values are necessary to convert a 6-digit grid reference obtained from a 1:100 000 map to the full Australian Map Grid metres east and metres north.

5.2 COUNTRIES TABLE

This table is for recognised countries. All have an associated ID.

ID	Country
AUS	Australia
PNG	Papua-New Guinea
SI	Solomon Islands
ANT	Antarctica
UK	United Kingdom
SEA	International Waters

5.3 STATES TABLE

This table is for the states of Australia only and all have a set ID.

ID	STATE
???	unknown
ACT	Australian Capital Territory
NSW	New South Wales
NT	Northern Territory
QLD	Queensland
SA	South Australia
TAS	Tasmania
VIC	Victoria
WA	Western Australia

5.4 ORIGINATORS TABLE

This table refers to the collector of the sample in the field. With some BMR authors, it is possible to refer to original sample note books which are stored within BMR so as to obtain more precise location and/or technical descriptions of any samples that are of interest.

The following list gives the key for the entries in this authority table.

ORIGNO	ORIGINATOR
1	unknown
2	Blake, D.H.
3	Branch, C.D.
4	Bultitude, R.J.
5	Gardner, C.
6	Croxford, W.
7	Cruikshank, B.I.
8	Hoatson, D.M.
10	Dallwitz, W.B.
11	Derrick, G.M.
12	Duff, B.
13	Ellis, D.J.
14	England, R.N.
15	Ewers, G.R.

16	Warren, R.G.
17	Glikson, A.Y.
18	Tanaka, H.
19	Hill, R.M.
20	Holmes, R.D.
21	Hutton, L.J.
22	Lambert, I.
23	Knutson, J.
24	Jaques, A.L.
25	Chapple, K.
27	Lewis, J.D.
28	Etheridge, M.
29	Mackenzie, D.E.
30	McNaughton, N.
31	Mitchell, J.M.
32	Mock, C.M.
33	Higgins, N.C.
34	Oversby, B.S.
35	Cook, P.
36	Stuart-Smith, P.G.
37	Page, R.W.
38	Plumb, K.A.
39	Valenta, R.
40	Needham, R.S.
41	Santul, J.
42	Sheraton, J.W.
43	Smith, S.E.
44	Tunks, A.
45	Wallace, D.A.
46	Willmott, W.F.
47	Wilson, I.H.
48	Withnall, I.W.
49	Wyborn, D.
50	Wyborn, L.A.I.
51	Bain, J.H.C.
52	Johnson, R.W.
53	Williams, P.R.
54	Miller, A.
55	Bettenay, L.
56	Black, L.P.
57	Pederson, C.P.
58	Ferguson, J.
59	Hegge, M.R.
60	Wilkes, P.G.
61	Roberts, W.M.B.
62	Walpole, B.
63	Joplin, G.
64	Crick, I.
65	Hills, J.
66	Rhodes, J.
67	Smart, P.
68	Sweet, I.P
69	Shaw, R.D.
70	Stewart, A.J.
71	Wyche, S.
72	Watchman, A.
73	Stuart, J.E.
74	Stratton, J.
75	Duggan, M.B.

76	Yeates, A.N.
77	ANU RSES
78	Allen, A.R.
79	Bofinger, V.M.
80	Gee, R.D.
81	De Laeter, J.R.
82	Cooper, J.A.
83	Williams, S.J.
84	Windrim, D.P.
85	Gray, C.M.
86	Ludwig, K.R.
87	Currie, K.L.
88	Chin, R.J.
89	Mortimer, G.E.
90	Marjoribanks, R.W.
91	Webb, A.W.
92	Langworthy, A.P.
93	SADME
94	Jagodzinski, E.A.
95	Compston, W.
96	Freeman, M.J.
97	Offe, L.A.
98	Bagas, L.
99	Joklik, G.F.
100	Korsch, R.
101	Dobos, S.K.
102	Foden, J.D.
103	Roarty, M.J.
104	Pidgeon, R.T.
105	W.A. Geological Survey
106	Southgate, P.N.
107	Kralik, M.
108	Richards, J.R.
109	McDougall, I.
110	Turek, A.
111	Collins, W.J.
112	Kinny, P.D.
113	Heinrich, C.A.
114	Hill, R.I.
115	Henderson, G.A.M.
116	Johnston, C.
117	Richards, D.
118	Bailey, J.
119	Blewett, R.S.
120	Chappell, B.W.C.
121	Adams, C.J.
122	Turner, N.J.
123	Perason, P.J.
124	Rao, C.P.
125	McCulloch, M.T.
126	Vanderhor, F.
127	Rattenbury, M.S.
128	Young, D.N.
129	Arriens, P.A.
130	Grew, E.S.
131	Shibata, K.
132	Barton, J.M.
133	Sandiford, M.
134	Edgoose, C.

135	O'Beirne, W.
136	Wakelin-King, G.
137	Cassidy, K.F.
138	Ogasawara, M.
139	Fletcher, I.R.
140	Perring, C.S.
142	Compston, D.M.
143	Maas, R.
145	CSIRO-Yilgarn data
146	Netherway, N.M.
147	Price, R.
149	Giles, C.W.
150	Tyler, I. M.
151	Griffin, T. J.
152	Ojala, J.
153	Taylor, W.R.
154	Connors, K.A.
155	Hancock, S.L.
156	Pieters, P.E.
157	Creaser, R.A.
158	Whalen, J.B.
159	Hamlyn, P.R.
160	Hine, R.
161	Mason, D.R.
162	Kjolle, I.
163	Lanyon, R.
164	Trail, D.S.
165	Johnson, J.P.
166	Knight, J.
167	Gunther, M.
168	Rienks, I.P.
170	Champion, D.
171	Zhao, J.-X.

5.5 REGIONS TABLE

The following list of regions was initially compiled from all the existing databases. However, for the purpose of database management, only a select number of major regions are now used for the Australian section of this data set. Those that have been used with the regional databases are marked * in the list below. Most of those Australian regions listed below are now entered in the field "Geogarea"; Antarctic regions used are marked +.

REGIONO	REGION
1	unknown
2	Adelaide Fold Belt
3	Albany-Fraser Province
4	Arunta Block *
5	Bunger Hills +
6	Cape York Peninsula
7	Carnarvon Basin
8	Commonwealth Bay +
9	Cummins Range
10	Davenport Province *
11	Denman Glacier +
12	East Kimberley

13	Enderby Land +
14	Gawler Craton
15	George V Land +
16	Georgetown Inlier
17	Halls Creek Inlier *
18	Kemp Land +
19	Lachlan Fold Belt *
20	Lawn Hill Platform
21	Mawson Coast +
22	McArthur Basin *
23	Mount Isa Inlier *
24	Northern Prince Charles Mountains +
25	NE Queensland *
26	NE Tasmania
27	NW Tasmania
29	North Victoria Land +
30	North Kimberley
31	Pilbara Block *
32	Pine Creek Inlier *
33	Prydz Bay Coast +
34	Southern Prince Charles Mountains +
35	Stuart Shelf *
36	Granites-Tanami Block *
37	Tasman Fold Belt
38	Tasmania
39	Tennant Creek *
40	Turee Creek
41	Tuross
42	Vestfold Hills +
43	West Kimberley
44	Wilhelm II Land +
45	Wilkes Land +
46	Willyama Block
47	Yilgarn Block *
48	Hamersley Basin
49	SE Tasmania
50	SW Tasmania
51	New Georgia Island
52	Eastern Goldfields
53	Capricorn Orogen *
54	Ashburton Trough
55	Gascoyne Province
56	Glengarry Sub-basin
57	Earaheedy Sub-basin
58	Murphy Tectonic Ridge *
59	South Nicholson Basin
60	Westmoreland Region
61	New England Fold Belt
62	Sydney Basin
63	Admiralty Islands
64	Birrindudu Basin
65	Bangemall Basin
66	Musgrave Block
67	Paterson Province
68	Amadeus Basin
69	Ammaroodinna Inlier
70	Peake Denison Inlier
72	Georgina Basin
73	Curnamona Inlier

74	Carpentaria Province
75	Northampton Block
76	Houghton Inlier
77	Bougainville
78	Tabar-Feni
79	New Britain
80	St. Andrews Strait
81	Fly Highlands
82	Manus Basin
83	Eastern Papua
84	Officer Basin
85	Woodlark Basin
86	Princess Elizabeth Land
87	MacRoberston Land
88	Dronning Maud Land
89	Rabaul
90	North Coast New Guinea
91	Perth Basin
92	Arnhem Block
93	Mullingarra Block
94	Leeuwin Block
95	South Victoria Land

5.6 ROCK TYPES TABLE

This table provides a coarse subdivision of samples based on broad rocktypes. It was initiated primarily for database management and block retrieval, and for future online extraction of data. This table can be used, for example, to extract all mafic extrusive rocks from the database or all alkaline rocks. The following gives a list of the 18 permitted rock types:

ROCKNO	ROCKTYPE
1	unknown
2	felsic intrusive
3	intermediate intrusive
4	mafic intrusive
5	felsic extrusive
6	intermediate extrusive
7	mafic extrusive
8	ultramafite
9	alkaline igneous
10	clastic sediment
11	chemical sediment
12	metabasite
13	felsic gneiss
14	metasediment
15	metasomatite
16	ore
17	regolith
18	mixed clastic/chemical sediment

5.7 SAMPLE TYPES TABLE

This table gives an indication of the nature of work that has been carried out on each individual sample.

SAMPLETYPENO	SAMPLETYPE
1	unknown
2	whole-rock geochemistry
3	geochronology
4	hand specimen
5	thin section
6	geochronology K-Ar
7	geochronology Ar-Ar
8	geochronology Rb-Sr
9	geochronology Sm-Nd
10	geochronology U-Pb minerals
11	geochronology U-Pb SHRIMP
12	geochronology Pb-Pb
13	geochronology Pb-Pb ores
14	geochronology Lu-Hf
15	geochronology Re-Os
16	geochronology fission-track
17	geophysical properties
18	geochemical rock chip samples

5.8 SOURCES TABLE

This table gives the laboratory or organisation which analysed the sample.

SOURCENO	SOURCE
1	unknown
3	ANU
4	Adelaide University
5	AMDEL
6	BMR
7	BMR restricted
8	CSIRO/BMR
9	Macquarie University
10	Melbourne University
11	NTGS (AMDEL)
12	Western Australian Government Chemical Laboratories
13	University of Western Australia
14	University of Queensland
15	James Cook University of North Queensland
16	Tasmanian Department of Mines
17	University of Tasmania
18	Queensland Department of Mines
19	BGR (Bundesanstalt fur Geowissenschaften und Rohstoffe)
20	Labtech Pty. Ltd., WAIT, WA Govt. Chem. Lab., Perth.
21	Institute for Petrology, Copenhagen University, Denmark.
23	ANALABS
24	BMR/CRAE-T.Stachel
25	University of Canterbury New Zealand
26	University of California
27	CSIRO Division of Exploration Geoscience, Floreat Park, WA

5.9 METHODS TABLE

This table describes the analytical methods used in deriving the analyses.

METHODNO	METHOD
1	unknown
2	XRF (Norrish & Hutton, 1969); FeO Vol.; LOI Grav.
3	XRF (Norrish & Hutton, 1969); FeO Vol.; H2O+, H2O-, & CO2 Grav.
4	XRF (Norrish & Chappell, 1977); Ag, Be, Co, Li by AAS
5	XRF (Norrish & Chappell, 1977);Ag, Be, Co, Cu, Li, Ni, Zn by AAS
6	XRF (Norrish & Hutton, 1969); FeO, H2O(total), CO2 by AMDEL
7	XRF (Norrish Chappell 1967); Li Be Cr Co Ni Cu Zn Sn AAS F AMDEL
8	Rb, Sr by XRF (Norrish & Chappell, 1967); Ni, Co, V by AAS
9	XRF (Norrish & Chappell, 1977); FeO vol.; LOI grav.
10	XRF (N & C, 1977); REE Hf Ta Cr Sc Sb Cs INA; Th U Gamma spectrm
11	XRF (N & C, 1977); REE Hf Ta Sb Cs INAA; U delayed neutron count
12	XRF (Norrish & Chappell, 1977).
13	XRF (Norrish & Chappell, 1977); Co Cu Ni Pb Zn by emiss.
14	ICP,AES Inductively Coupled Plasma, Atomic Emission
15	XRF (N & C, 1977) at ANU; Na, K by AAS (JCUNQ).
16	XRF(N&C 1977) UQ; REE Th U Pb Hf Ba Cs Sn Mo Nb Y Bi W MS7 RSES.
17	AMDL 'wet' chem. +/- XRF (N & H, 1969)?
18	Tas. Dept. Mines Assay Labs Launceston: "classical methods".
19	J. Klominsky & D.I. Groves: X-ray spectrography.
20	XRF (Norrish & Chappell, 1977); REE,Sc,Hf,Th,U INAA
21	XRF (N & C, 1977); REE ion-exchange/XRF (Robinson & others,1986)
22	AMACHEM Nickel sulfide assay- neutron activation.
23	XRF (Norrish & Hutton, 1969) on 1:1 purified silica mix
24	AAS
25	ANALABS: fire assay, Pb collection, carbon rod finish (30g samp)
26	ANALABS: fire assay fusion, AAS finish (30g sample)
27	ANALABS: combination of methodno = 25 (Pd & Pt) and 26 (Au)
28	RNAA from Melbourne University
29	ANALABS: fire assay, lead collection; ICP-MS finish
30	Direct-reading optical spectrograph (DROS), BMR.
31	XRF (Norrish & Hutton, 1969), LOI Grav. by University of WA
32	GSWA Government Chemical Laboratories.
33	Isotope dilution mass spectrometry, Sun & Nesbitt (1978)
34	XRF Nesbitt & Stanley (1980); traces
35	XRF (Nesbitt, et al, 1976); traces, by pressed powders
36	XRF (Norrish &Hutton, 1969, Norrish & Chappell, 1977) at ANU; FeO, H2O+, H2O-, CO2 gravimetrically, La-Tb by INAA WA (O'Beirne, 1968)
37	Wet chemistry by University of WA (O'Beirne, 1968)
38	XRF (Mo,Sr,Rb,Pb,As,Zn,Cu,Ni,Cr), AAS (Li),(UWA : O'Beirne, 1968)

APPENDIX 1a. Listings of the components of the Fitzroy Lamproite Data Set.

A1a.1 Samples assigned to Stratigraphic Groups

STRATGROUP	COUNT(*)
Fitzroy Lamproites	524

A1a.2 Samples assigned to Subgroups

SUBGROUP	COUNT(*)
unassigned	524

A1a.3 Samples assigned to Stratigraphic Units

STRATUNIT	COUNT(*)
unassigned	1
Calwynyardah Field	1
Eastern Lennard Shelf Field	47
Ellendale	4
Ellendale Field	225
Fitzroy Valley Field	24
Fitzroy Valley lamproites	1
Mount Percy	1
Noonkanbah Field	220

A1a.4 Samples assigned to Stratigraphic Members

STRATMEMBER	COUNT(*)
unassigned	1
"P" Hill	12
81-Mile Vent	20
? Mount Abbott	1
Big Spring	5
Big Spring No.1	1
Big Spring No.3	1
Brooking Creek	3
Bruten Hill	3
Camarotoechia Creek	1
Djada Hill	11
Ellendale 38 (Palm Spring)	1
Ellendale No. 41	1
Ellendale No. 4E	1
Ellendale No.11	17
Ellendale No.12	1
Ellendale No.14	1
Ellendale No.15	1
Ellendale No.16	6

Ellendale No.17	2
Ellendale No.17 (Winjana)	1
Ellendale No.18	1
Ellendale No.19	2
Ellendale No.2	4
Ellendale No.21	1
Ellendale No.21a	1
Ellendale No.22	3
Ellendale No.23	4
Ellendale No.24	1
Ellendale No.26	1
Ellendale No.27	3
Ellendale No.31	4
Ellendale No.38 (Palm Springs)	2
Ellendale No.39	1
Ellendale No.4	8
Ellendale No.4 Satellite	9
Ellendale No.41	1
Ellendale No.42	1
Ellendale No.46	1
Ellendale No.4E	28
Ellendale No.4Sat	2
Ellendale No.4W	21
Ellendale No.6	1
Ellendale No.7	10
Ellendale No.7(?)	1
Ellendale No.8	1
Ellendale No.9	13
Ellendale No.9(?)	1
Ellendale No.9E	6
Ellendale No.9W	4
Fishery Hill	14
Hansons Bore	1
Hills Cone	13
Hooper West	6
Howes' Hill	3
Machells Pyramid	13
Mamilu Hill	14
McKinrick Hill	2
Mount Cedric	21
Mount Cedric Satellite	1
Mount Gytha	5
Mount Ibis	7
Mount North	17
Mount Percy	19
Mount Rose	4
Noonkanbah Hill	6
Old Leopold Hill	9
Oscar Plug	14
Prairie Hill	7
Prairie Hill East	9
Rice Hill	9
Spieler's Bore	1
The Sisters	2
The Sisters East	2
The Sisters West	3
Walgidee Hills	81
Water Reserve Pipe	3
Water Reserve Sill	2

White Rocks	9

A1a.5 Samples assigned by Rocktype

ROCKNO	ROCKTYPE	COUNT(*)
1	unknown	1
8	ultramafite	1
9	alkaline igneous	522

A1a.6 Samples assigned by Chronological Age

AGE	COUNT(*)
unassigned	63
Miocene	242
Miocene (17 Ma)	3
Miocene (17.8 Ma)	2
Miocene (18 Ma)	12
Miocene (19 Ma)	3
Miocene (20 Ma)	33
Miocene (21 Ma)	15
Miocene (21.9 Ma)	2
Miocene (22 Ma)	121
Miocene (~23 Ma)	4
Miocene (~24 Ma)	24

A1a.7 Samples assigned by Geographic Area

GEOGAREA	COUNT(*)
unassigned	524

A1a.8 Samples assigned to 1:100 000 Map Sheet Areas

MAPNAME	MAPNO	COUNT(*)
BRUTEN	4060	3
CUNNINGHAM	3961	13
ELLENDALE	3862	196
HARDMAN	3861	188
HOOPER	4062	33
KALYEEDA	3860	16
LENNARD	3863	27
LEOPOLD DOWNS	3962	17
RICHENDA	3963	1
WILLUMBAH	3762	9

A1a.9 Samples assigned to Drillholes

DRILLHOLE	COUNT(*)
unassigned	365
11AC12	1
11AC13	2

11AC15	5
11AC16	4
11AC26	1
2AC 3	1
2AC 8	1
2AC4	1
2AC9	1
4AC104	2
4AC105	2
4AC108	1
4AC11	1
4AC112	2
4AC123	3
4AC129	1
4AC137	1
4AC140	1
4AC147	5
4AC162	4
4AC185	1
4AC187	2
4AC188	3
4AC189	3
4AC190	2
4AC191	6
4AC192	1
4AC202	1
4AC203	3
4AC204	1
4AC206	1
4AC209	1
4AC210	1
4AC212	4
4AC214	2
4AC218	1
4AC224	2
4AC228	2
4AC236	2
4AC263	2
7AC17	3
7AC18	1
7AC19	1
9AC 86	1
9AC108	1
9AC110	1
9AC113	1
9AC22	1
9AC29	1
9AC30	2
9AC48	1
9AC49	2
9AC52	1
9AC60	3
9AC63	1
9AC78	1
9AC86	3
E1-S13	1
E2-S14	1
E2-S5	1
E3-S15	1

E4-S16	1
E5-S10	1
LDH2-chips	1
LDH3	1
RAB B0-S14	1
RAB B0-S15A	2
RAB B0-S18	1
RAB B0-S2	1
RAB B0-S3	1
RAB B0-S4	1
RAB B0-S5	1
RAB E1-S2	1
RAB E1-S3	1
RAB E1-S5	1
RAB E2-S6	1
RAB E2-S7	1
RAB E3-E13	1
RAB E3-S19	1
RAB E3-S6	1
RAB E4-S11	1
RAB E4-S12	1
RAB E4-S19	1
RAB E4-S5	1
RAB E4-S7	1
RAB E5-S12	1
RAB E5-S4	1
RAB E6-S10	1
RAB E6-S15	1
RAB E6-S7	1
RAB E7-S10	1
RAB E8-S10	1
RAB E8-S11	1
RAB E9-S11	1
RAB MI100	1
RAB MI101	3
RAB W1-S14	2
RAB W2-S2	1
RAB W2-S3	1
RAB W2-S5	1
Seltrust LDH5	1
Seltrust LH1	1
Unknown	1
W2-S15	1
W3-S14	1
core15	1

APPENDIX 1b. Listings of the components of the Argyle Lamproite Data Set.

A1b.1 Samples assigned to Stratigraphic Groups

STRATGROUP	COUNT(*)
Argyle Lamproite	33

A1b.2 Samples assigned to Subgroups

SUBGROUP	COUNT(*)
unassigned	33

A1b.3 Samples assigned to Stratigraphic Units

STRATUNIT	COUNT(*)
Argyle (AK1) Pipe	33

A1b.4 Samples assigned to Stratigraphic Members

STRATMEMBER	COUNT(*)
unassigned	29
North Smoke Creek	2
ST. 'Sandy Tuff'	1
South Smoke Creek	1

A1b.5 Samples assigned by Rocktype

ROCKNO	ROCKTYPE	COUNT(*)
9	alkaline igneous	33

A1b.6 Samples assigned by Chronological Age

AGE	COUNT(*)
unassigned	29
middle Proterozoic	1
middle Proterozoic (~1178 Ma)	3

A1b.7 Samples assigned by Geographic area

GEOGAREA	COUNT(*)
unassigned	33

A1b.8 Samples assigned to 1:100 000 Map Sheet Areas

HMAPNAME	MAPNO	COUNT(*)
-BOW	4564	33

A1b.9 Samples assigned to Drillholes

DRILLHOLE	COUNT(*)
unassigned	5
AK1 Pipe	5
DDH 106	2
DDH 108	2
DDH 110	1
DDH 113	1
DDH 123	1
DDH 130	1
DDH 153	2
DDH 160	1
DDH 17	4
DDH 22	2
DDH 31	3
DDH 59	1
DDH 82	1
LDC	1

APPENDIX 1c. Listings of the components of the Alkaline Rocks Review Data Set.

A1c.1 Samples assigned to Stratigraphic Groups

STRATGROUP	COUNT(*)
unassigned	141
Alkaline Igneous Complex	8
Cainozoic Alkali Basalts	9
Fitzroy Lamproites	22
Mesozoic Alkali Syenite Complexes	29
North Kimberley Kimberlites	1
Permian-Mesozoic Alkali Basalt Association	37
Permian-Mesozoic Alkali Basalt Diatreme Association	6
Permian-Mesozoic Lamprophyre Association	4
Permian-Mesozoic Shoshonite Association	10
Tawallah Group	10

A1c.2 Samples assigned to Subgroups

SUBGROUP	COUNT(*)
unassigned	191
Alkali Basalt Association	2
Alkali Basalt Diatreme Association	9
Alkali Syenite Complexes	38
Lamprophyre Association	8
Shoshonite Association	29

A1c.3 Samples assigned to Stratigraphic Units

STRATUNIT	COUNT(*)
unassigned	2
Argyle (AK1) Pipe	1
Benambra syenites	14
Black Jack Sill	8
Bobbies Point Alkali Granite	1
Bow Hill Dykes	1
Broken Hill	1
Bruten's Hill	1
Cape Portland Complex	10
Delegate breccia pipe	1
Dubbo syenites	1
Edell No. 1 trachytes	4
Ellendale Field	8
Fitzroy Valley Field	1
Gloucester breccia pipe	2
Gold Creek Volcanics	4
Good Dog Mountain monchiquites	2
Hobblechain Rhyolite	1

Hornsby diatremes	2
Jingera Alkaline Complex	8
Jugiong breccia	8
Kangaroo Valley syenites	5
Kellys Point dolerite	4
Kiama dyke	1
Lake Shaster Monzonite	4
Maningkorrirr Phonolite	2
Milton monzonite	15
Minchinbury diatremes	2
Mittagong syenites	22
Mordor Igneous Complex	12
Mount Dromedary Complex	19
Mount North	5
Mount Rose	1
Mount Woolooma lamprophyre	3
Mudginberri Phonolite	3
Murrumburrah Monchiquite	2
Myalla Road Syenite	9
Nebo Sills	4
Noonkanbah Field	14
Old Leopold Hill	2
Orroroo Kimberlites	9
Oscar Plug	1
Packsaddle Microgranite	1
Port Cygnet Complex	10
Prairie Hill East	1
Prospect Intrusion	10
Redbank Formation	3
Settlement Creek Volcanics	5
Skerring pipe	1
Square Top Intrusion	9
Tanja Alkaline Intrusion	6
Termeil Essexite	2
Wallaya	1
Wandagee Picritic Monchiquites	1
West Coast	3
White Cliffs	1
Wollar - Rylstone syenites	2
lamprophyre dyke	1

A1c.4 Samples assigned to Stratigraphic Members

STRATMEMBER	COUNT(*)
unassigned	252
"P" Hill	2
81-Mile Vent	1
Djada Hill	2
Ellendale No.11	1
Ellendale No.4	1
Ellendale No.7	3
Ellendale No.9	2
Hills Cone	2
Mamilu Hill	4
Mount Cedric	1
Mount Gytha	1
Mount Ibis	1

Mount Percy	1
Oscar Plug	1
Prairie Hill East	1
Walgidee Hills	1

A1c.5 Samples assigned by Rocktypes

ROCKNO	ROCKTYPE	COUNT(*)
1	unknown	7
2	felsic intrusive	1
3	intermediate intrusive	1
4	mafic intrusive	2
5	felsic extrusive	1
7	mafic extrusive	1
8	ultramafite	8
9	alkaline igneous	256

A1c.6 Samples assigned by Chronological Age

AGE	COUNT(*)
unassigned	46
Eocene	9
Jurassic?	14
Mesozoic	47
Miocene	1
Permian?	4
early Cretaceous (~100 Ma)	19
early Cretaceous (~91 Ma)	10
early Cretaceous (~98 Ma)	10
early Jurassic (194 Ma)	2
early Mesozoic (178 - 187 Ma)	22
early Proterozoic	11
late Cretaceous (85 Ma)	3
late Jurassic (146-155 Ma)	2
late Jurassic (164 Ma)	1
late Mesozoic	1
late Proterozoic	1
late Proterozoic (800 Ma)	1
late Triassic (206 Ma)	14
middle Jurassic (163-174 Ma)	9
middle Jurassic (167 Ma)	1
middle Jurassic (168 Ma)	18
middle Jurassic (170-172 Ma)	9
middle Proterozoic	5
middle Proterozoic (1190 Ma)	1
middle Proterozoic (1210 Ma)	12
unknown	4

A1c.7 Samples assigned by Geographic Area

GEOGAREA	COUNT(*)
unassigned	97
Benambra	14

Dubbo	1
Euralia	9
Gunnedah	8
Hornsby	2
Kangaroo Valley - Jamberoo	5
Lake Shaster	4
Minchinbury	2
Mittagong	22
NE Tasmania	10
New England Fold Belt	5
North east NSW	9
Port Cygnet	10
SE NSW coast	30
Southern Highlands	1
Southern Sydney Basin	27
Southern Sydney Basin, Wollongong	4
Wearyan Shelf	11
Wollar - Rylstone	2
central NSW	2
southern Sydney Basin	2

A1c.7 Samples assigned by 1:100 000 Map Sheet Areas

HMAPNAME	MAPNO	COUNT(*)
BOW	4564	1
CAHILL	5472	3
ELLENDALE	3862	1
GOOMADEER	5673	2
KING GEORGE	4369	1
LAUGHLEN	5751	12
WOLLOGORANG	6463	11

A1c.8 Samples assigned to Drillholes

DRILLHOLE	COUNT(*)
unassigned	264
BMR Cahill No.3	1
BMR Cahill No.5	1
DDH 1	2
DDH 13	1
DDH 3	2
DDH RO21	1
DDH RO30	1
Edell No. 1	4

Appendix 2 - Rockchem Database Definitions

A2.1 Samples Table Description:

```
CREATE SPACE DEFINITION SPACE_GCSAMPLES
        DATAPAGES    ( INITIAL        2000,
                       INCREMENT      500,
                       MAXEXTENTS     9999,
                       PCTFREE        25    )
        INDEXPAGES   ( INITIAL        200,
                       INCREMENT      100,
                       MAXEXTENTS     9999  )
        PARTITION C;

CREATE TABLE SAMPLES (
        ORIGNO                  NUMBER          (5,0)           NOT NULL,
        SAMPNO                  CHAR            (16)            NOT NULL,
        FIELDNO                 CHAR            (16),
        STRATGROUP              CHAR            (64),
        SUBGROUP                CHAR            (64),
        STRATUNIT               CHAR            (64),
        STRATMEMBER             CHAR            (64),
        STRATHEIGHT             NUMBER          (8,2),
        MAPSYMBOL               CHAR            (10),
        ROCKNO                  NUMBER          (5,0),
        LITHOLOGY               CHAR            (64),
        GROUPING                CHAR            (22),
        AGE                     CHAR            (64),
        REFNO1                  NUMBER          (5,0),
        REFNO2                  NUMBER          (5,0),
        REFNO3                  NUMBER          (5,0),
        REFNO4                  NUMBER          (5,0),
        REFNO5                  NUMBER          (5,0),
        COUNTRYID               CHAR            (22),
        STATE                   CHAR            (10),
        REGIONO                 NUMBER          (5,0),
        GEOGAREA                CHAR            (64),
        LOCALITY                CHAR            (64),
        MAPNO                   NUMBER          (5,0),
        AIRPHOTO                CHAR            (22),
        GRIDREF                 CHAR            (10),
        DLAT                    NUMBER          (8,6),
        NS                      CHAR            (1),
        DLONG                   NUMBER          (9,6),
        EW                      CHAR            (1),
        DRILLHOLE               CHAR            (22),
        DEPTH                   CHAR            (10),
        OTHERDATA               CHAR            (64),
        ENTRYDATE               DATE                                    )
SPACE SPACE_GCSAMPLES;
CREATE UNIQUE INDEX ORIGSAMP ON SAMPLES ( ORIGNO, SAMPNO );
CREATE        INDEX SAMPLENO ON SAMPLES ( SAMPNO );
CREATE        INDEX REGIONS ON SAMPLES ( REGIONO );
```

```
CREATE          INDEX HMAPS ON SAMPLES ( MAPNAME );
```

A2.2 Samplesplits Table Description:

```
CREATE SPACE DEFINITION SPACE_GCSPLITS
      DATAPAGES     ( INITIAL          500,
                      INCREMENT        250,
                      MAXEXTENTS       9999,
                      PCTFREE          25     )
      INDEXPAGES    ( INITIAL          150,
                      INCREMENT        100,
                      MAXEXTENTS       9999   )
      PARTITION C;

CREATE TABLE SAMPLES (
      ORIGNO                    NUMBER          (5,0)          NOT NULL,
       SAMPNO                   CHAR            (16)           NOT NULL,
      SAMPTYPENO                NUMBER          (5,0)          NOT NULL,
      STOREBOXNO                NUMBER          (5,0)          )
SPACE SPACE_GCSPLITS;

CREATE INDEX SAMPORIG ON SAMPLESPLITS   (  ORIGNO, SAMPLENO   ) ;
CREATE INDEX SPLITYPE ON SAMPLESPLITS   (  SAMPTYPENO   ) ;
```

A2.3 Majors Table Description:

```
CREATE SPACE DEFINITION SPACE_GCMAJORS
      DATAPAGES     ( INITIAL          1000,
                      INCREMENT        400,
                      MAXEXTENTS       9999,
                      PCTFREE          10     )
      INDEXPAGES    ( INITIAL          200,
                      INCREMENT        100,
                      MAXEXTENTS       9999   )
      PARTITION C;

CREATE TABLE MAJORS (
      ORIGNO                    NUMBER          (5,0)          NOT NULL,
      SAMPNO                    CHAR            (16)           NOT NULL,
      ANALNO                    NUMBER          (5,0)          NOT NULL,
      SOURCENO                  NUMBER          (5,0),
      METHODNO                  NUMBER          (5,0),
      SIO2                      NUMBER          (4,2),
      TIO2                      NUMBER          (4,2),
      AL2O3                     NUMBER          (4,2),
      FE2O3TOT                  NUMBER          (4,2),
      FE2O3                     NUMBER          (4,2),
      FEO                       NUMBER          (4,2),
      MNO                       NUMBER          (4,2),
      MGO                       NUMBER          (4,2),
      CAO                       NUMBER          (4,2),
      NA2O                      NUMBER          (4,2),
      K2O                       NUMBER          (4,2),
      P2O5                      NUMBER          (4,2),
      H2OPLUS                   NUMBER          (4,2),
```

```
    H2OMIN                  NUMBER      (4,2),
    CO2                     NUMBER      (4,2),
    LOI                     NUMBER      (4,2),
    REST                    NUMBER      (4,2),
    TOTAL                   NUMBER      (5,2),
    ENTRYDATE               DATE                    )
SPACE SPACE_GCMAJORS;

CREATE UNIQUE INDEX MANALNO ON MAJORS ( ANALNO );
CREATE INDEX MORIGSAMP ON MAJORS ( ORIGNO, SAMPNO);
CREATE INDEX MSAMPLENO ON MAJORS ( SAMPNO );
```

A2.4 Traces Table Description:

```
CREATE SPACE DEFINITION SPACE_GCTRACES
    DATAPAGES   ( INITIAL       1200,
                  INCREMENT     400,
                  MAXEXTENTS    9999,
                  PCTFREE       30    )
    INDEXPAGES  ( INITIAL       200,
                  INCREMENT     100,
                  MAXEXTENTS    9999  )
    PARTITION C;


CREATE TABLE TRACES     (
    ORIGNO                  NUMBER      (5,0)       NOT NULL,
    SAMPNO                  CHAR        (16)        NOT NULL,
    ANALNO                  NUMBER      (5,0)       NOT NULL,
    SOURCENO                NUMBER      (5,0),
    METHODNO                NUMBER      (5,0),
    AG                      NUMBER      (8,2),
    AL                      NUMBER      (8,2),
    ARS                     NUMBER      (8,2),
    AU                      NUMBER      (8,2),
    B                       NUMBER      (8,2),
    BA                      NUMBER      (8,2),
    BE                      NUMBER      (8,2),
    BI                      NUMBER      (8,2),
    BR                      NUMBER      (8,2),
    C                       NUMBER      (8,2),
    CA                      NUMBER      (8,2),
    CD                      NUMBER      (8,2),
    CE                      NUMBER      (8,2),
    CL                      NUMBER      (8,2),
    CO                      NUMBER      (8,2),
    CR                      NUMBER      (8,2),
    CS                      NUMBER      (8,2),
    CU                      NUMBER      (8,2),
    DY                      NUMBER      (8,2),
    ER                      NUMBER      (8,2),
    EU                      NUMBER      (8,2),
    F                       NUMBER      (8,2),
    FE                      NUMBER      (8,2),
    GA                      NUMBER      (8,2),
```

```
    GE                      NUMBER      (8,2),
    GD                      NUMBER      (8,2),
    HF                      NUMBER      (8,2),
    HG                      NUMBER      (8,2),
    HO                      NUMBER      (8,2),
    IR                      NUMBER      (8,2),
    K                       NUMBER      (8,2),
    LA                      NUMBER      (8,2),
    LI                      NUMBER      (8,2),
    LU                      NUMBER      (8,2),
    MG                      NUMBER      (8,2),
    MN                      NUMBER      (8,2),
    MO                      NUMBER      (8,2),
    NA                      NUMBER      (8,2),
    NB                      NUMBER      (8,2),
    ND                      NUMBER      (8,2),
    NI                      NUMBER      (8,2),
    OS                      NUMBER      (8,2),
    P                       NUMBER      (8,2),
    PB                      NUMBER      (8,2),
    PD                      NUMBER      (8,2),
    PR                      NUMBER      (8,2),
    PT                      NUMBER      (8,2),
    RB                      NUMBER      (8,2),
    S                       NUMBER      (8,2),
    SB                      NUMBER      (8,2),
    SE                      NUMBER      (8,2),
    SC                      NUMBER      (8,2),
    SI                      NUMBER      (8,2),
    SM                      NUMBER      (8,2),
    SN                      NUMBER      (8,2),
    SR                      NUMBER      (8,2),
    TA                      NUMBER      (8,2),
    TB                      NUMBER      (8,2),
    TE                      NUMBER      (8,2),
    TI                      NUMBER      (8,2),
    TH                      NUMBER      (8,2),
    TL                      NUMBER      (8,2),
    TM                      NUMBER      (8,2),
    U                       NUMBER      (8,2),
    V                       NUMBER      (8,2),
    W                       NUMBER      (8,2),
    Y                       NUMBER      (8,2),
    YB                      NUMBER      (8,2),
    ZN                      NUMBER      (8,2),
    ZR                      NUMBER      (8,2),
    ENTRYDATE               DATE        )
SPACE SPACE_GCTRACES;

CREATE UNIQUE INDEX  TANALNO   ON  TRACES ( ANALNO );
CREATE         INDEX  TORIGSAMP  ON TRACES ( ORIGNO, SAMPNO );
CREATE         INDEX  TSAMPLENO  ON  TRACES ( SAMPNO );
```

A2.5 ppb Tables Description (elements in parts per billion):

```
CREATE SPACE DEFINITION SPACE_GSMALL
      DATAPAGES    ( INITIAL        50,
                     INCREMENT      50,
                     MAXEXTENTS     9999,
                     PCTFREE        25     )
      INDEXPAGES   ( INITIAL        20,
                     INCREMENT      12,
                     MAXEXTENTS     9999   )
      PARTITION C;

CREATE TABLE PPB     (
      ORIGNO                        NUMBER          (5,0)           NOT NULL,
      SAMPNO                        CHAR            (16)            NOT NULL,
      ANALNO                        NUMBER          (5,0)           NOT NULL,
      SOURCENO                      NUMBER          (5,0),
      METHODNO                      NUMBER          (5,0),
      SE                            NUMBER          (8,3),
      RB                            NUMBER          (8,3),
      RU                            NUMBER          (8,3),
      RH                            NUMBER          (8,3),
      PD                            NUMBER          (8,3),
      AG                            NUMBER          (8,3),
      CS                            NUMBER          (8,3),
      LA                            NUMBER          (8,3),
      CE                            NUMBER          (8,3),
      PR                            NUMBER          (8,3),
      ND                            NUMBER          (8,3),
      PM                            NUMBER          (8,3),
      SM                            NUMBER          (8,3),
      EU                            NUMBER          (8,3),
      GD                            NUMBER          (8,3),
      TB                            NUMBER          (8,3),
      DY                            NUMBER          (8,3),
      HO                            NUMBER          (8,3),
      ER                            NUMBER          (8,3),
      TM                            NUMBER          (8,3),
      YB                            NUMBER          (8,3),
      LU                            NUMBER          (8,3),
      RE                            NUMBER          (8,3),
      OS                            NUMBER          (8,3),
      IR                            NUMBER          (8,3),
      PT                            NUMBER          (8,3),
      AU                            NUMBER          (8,3),
      ENTRYDATE                     DATE                            )

CREATE UNIQUE INDEX  PPBANALNO      ON PPB    ( ANALNO );
CREATE         INDEX  PPBORIGSAMP   ON PPB    ( ORIGNO, SAMPNO );
CREATE         INDEX  PPBSAMPLENO   ON PPB    ( SAMPNO );
```

A2.6 Rocktypes Table Description:

```
CREATE SPACE DEFINITION SPACE_GSMALL
      DATAPAGES    ( INITIAL        50,
                     INCREMENT      50,
```

```
                    MAXEXTENTS  9999,
                    PCTFREE     25    )
    INDEXPAGES  (   INITIAL     20,
                    INCREMENT   12,
                    MAXEXTENTS  9999  )
    PARTITION C;

CREATE TABLE ROCKTYPES  (
    ROCKNO                  NUMBER      (5,0)       NOT NULL,
    ROCKTYPE                CHAR        (64)        NOT NULL
SPACE SPACE_GCSMALL
```

A2.7 References Table Description:

```
CREATE SPACE DEFINITION SPACE_GSMALL
    DATAPAGES   (   INITIAL     50,
                    INCREMENT   50,
                    MAXEXTENTS  9999,
                    PCTFREE     25    )
    INDEXPAGES  (   INITIAL     20,
                    INCREMENT   12,
                    MAXEXTENTS  9999  )
    PARTITION C;

CREATE TABLE REFERENCES(
    REFNO                   NUMBER      (5,0)       NOT NULL,
    OTHERID                 CHAR        (16)
    USERNAME                CHAR        (16)
    AUTHORS                 CHAR        (128)
    YEAR                    CHAR        (16)
    TITLE                   CHAR        (240)
    SOURCE                  CHAR        (240)       )
SPACE SPACE_GCSMALL;

CREATE UNIQUE INDEX REFNUMBER  ON REFERENCES  ( REFNO );
CREATE UNIQUE INDEX REFUNIQUE  ON REFERENCES  ( AUTHORS, YEAR );
```

A2.8 Originators Table Description:

```
CREATE SPACE DEFINITION SPACE_GSMALL
    DATAPAGES   (   INITIAL     50,
                    INCREMENT   50,
                    MAXEXTENTS  9999,
                    PCTFREE     25    )
    INDEXPAGES  (   INITIAL     20,
                    INCREMENT   12,
                    MAXEXTENTS  9999  )
    PARTITION C;

CREATE TABLE ORIGINATORS (
    ORIGNO                  NUMBER      (5,0)       NOT NULL,
    ORIGINATOR              CHAR        (22)        NOT NULL  )
SPACE SPACE_GCSMALL;

CREATE UNIQUE INDEX ORIGNOS ON ORIGINATORS ( ORIGNO );
CREATE UNIQUE INDEX ORIGINS ON ORIGINATORS ( ORIGNATOR );
```

A2.9 Regions Table Description:

```
CREATE SPACE DEFINITION SPACE_GSMALL
      DATAPAGES    ( INITIAL        50,
                     INCREMENT      50,
                     MAXEXTENTS     9999,
                     PCTFREE        25     )
      INDEXPAGES   ( INITIAL        20,
                     INCREMENT      12,
                     MAXEXTENTS     9999   )
      PARTITION C;

CREATE TABLE REGIONS (
      REGIONO                  NUMBER          (5,0)          NOT NULL,
      REGION                   CHAR            (64)           NOT NULL )
SPACE SPACE_GCSMALL;

CREATE UNIQUE INDEX REGIONO     ON REGIONS ( REGIONO );
CREATE UNIQUE INDEX REGIONAME ON REGIONS ( REGION );
```

A2.10 HMAPS Table Description:

```
CREATE SPACE DEFINTION HMAPS
      DATAPAGES    ( INITIAL        50
                     INCREMENT      10
                     MAXEXTENTS     9999,
                     PCTFREE        10     )
      INDEXPAGES   ( INITIAL        20
                     INCREMENT      10
                     MAXEXTENTS     9999   )
      PARTITION C;

CREATE TABLE HMAPS (
      HMAPNO                   NUMBER          (4,0)
      HMAPID                   CHAR            (4)
      QMAPNO                   NUMBER          (2,0)
      N_LAT                    NUMBER          (3,1)
      W_LONG                   NUMBER          (4,1)
      MEAST                    NUMBER          (6)
      MNORTH                   NUMBER          (7)
SPACE SP_LOCAL

CREATE UNIQUE INDEX HMAPNO      ON HMAPS  ( HMAPNO );
CREATE        INDEX HMAPNAME    ON HMAPS  ( HMAPNAME );
CREATE        INDEX NLAT        ON HMAPS  ( N_LAT );
CREATE        INDEX WLONG       ON HMAPS  ( W_LONG );
```

A2.11 Sampletypes Table Description:

```
CREATE SPACE DEFINITION SPACE_GSMALL
      DATAPAGES    ( INITIAL        50,
                     INCREMENT      50,
                     MAXEXTENTS     9999,
                     PCTFREE        25     )
      INDEXPAGES   ( INITIAL        20,
                     INCREMENT      12,
                     MAXEXTENTS     9999   )
```

```
    PARTITION C;

CREATE TABLE SAMPLETYPES (
    SAMPLETYPENO            NUMBER          (5,0)       NOT NULL,
    SAMPLETYPE              CHAR            (64)        NOT NULL )
SPACE SPACE_GCSMALL;
```

A2.12 Sources Table Description:

```
CREATE SPACE DEFINITION SPACE_GSMALL
    DATAPAGES    ( INITIAL      50,
                   INCREMENT    50,
                   MAXEXTENTS   9999,
                   PCTFREE      25    )
    INDEXPAGES   ( INITIAL      20,
                   INCREMENT    12,
                   MAXEXTENTS   9999  )
    PARTITION C;

CREATE TABLE SOURCES (
    SOURCENO                NUMBER          (5,0)       NOT NULL,
    SOURCE                  CHAR            (64)        NOT NULL )
SPACE SPACE_GCSMALL;

CREATE UNIQUE INDEX SOURCENOS ON SOURCES ( SOURCENO );
CREATE UNIQUE INDEX SOURCES  ON SOURCE ( SOURCE );
```

A2.13 Methods Table Description:

```
CREATE SPACE DEFINITION SPACE_GSMALL
    DATAPAGES    ( INITIAL      50,
                   INCREMENT    50,
                   MAXEXTENTS   9999,
                   PCTFREE      25    )
    INDEXPAGES   ( INITIAL      20,
                   INCREMENT    12,
                   MAXEXTENTS   9999  )
    PARTITION C;

CREATE TABLE SOURCES (
    SOURCENO                NUMBER          (5,0)       NOT NULL,
    SOURCE                  CHAR            (64)        NOT NULL )
SPACE SPACE_GCSMALL;

CREATE UNIQUE INDEX METHODNO ON METHODS ( METHODNO );
CREATE UNIQUE INDEX METHOD  ON METHODS ( METHOD);
```

A2.14 Storeboxes Table Description:

```
CREATE SPACE DEFINITION SPACE_GSMALL
    DATAPAGES    ( INITIAL      50,
                   INCREMENT    50,
                   MAXEXTENTS   9999,
                   PCTREE       25    )
    INDEXPAGES   ( INITIAL      20,
                   INCREMENT    12,
                   MAXEXTENTS   9999  )
```

```
    PARTITION C;

CREATE TABLE STOREBOXES (
    BOXNO                   NUMBER          (5,0)       NOT NULL,
    ORIGNO                  NUMBER          (5,0),
    FROMSAMPNO              CHAR            (16)
    TOSAMPNO                CHAR            (16)
    PROJECT                 CHAR            (64)        )
SPACE SPACE_GCSMALL;

CREATE UNIQUE INDEX STOREBOXNOS ON STOREBOXES ( BOXNO );
```

A2.15 Maxnos Table Description:

```
CREATE SPACE DEFINITION SPACE_GSMALL
    DATAPAGES   ( INITIAL       50,
                  INCREMENT     50,
                  MAXEXTENTS    9999,
                  PCTFREE       25      )
    INDEXPAGES  ( INITIAL       20,
                  INCREMENT     12,
                  MAXEXTENTS    9999    )
    PARTITION C;

CREATE TABLE MAXNOS (
    IDMAXNO                 CHAR            (16)        NOT NULL,
    MAXNO                   NUMBER          (6,0)       NOT NULL )
SPACE SPACE_GCSMALL;
```