Bureau of Mineral Resources, Geology & Geophysics

RECORD

Record 1989/28

GOVERNMENT PETROLEUM DATABASES WORKSHOP

ADELAIDE, 11-12 OCTOBER, 1988

EDITED TRANSCRIPT OF PROCEEDINGS

AND

PAPERS PRESENTED

Volume 1

Compiled by S.G. RADKE

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FOREWORD

Australia is one of the few countries that have legislative requirements for petroleum exploration companies to report on their exploration activities to government. These reports represent a major source of information for government policy-making and as they eventually become publicly-available they represent an invaluable input to company exploration programs. Governments consequently have an important obligation to manage that information so that it is readily available to those who need it.

The workshop was initiated by the South Australia Department of Mines & Energy and sponsored by the Government Geoscience Database Policy Advisory Committee (GGDPAC). The objective of the workshop was to bring together government and industry representatives engaged in managing or developing petroleum databases to:

* identify the key elements and applications of petroleum databases;
* share experiences, problems and solutions in the development of petroleum databases;
* establish procedures and communication links for the sharing and exchange of petroleum data;
* encourage the development and implementation of the necessary standards to facilitate this exchange.

The proceedings of the workshop - in the form of an edited transcript and some written papers - have been published by BMR to record the interactions that occurred during the workshop and to stimulate further action.

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WORKSHOP ON GOVERNMENT PETROLEUM DATABASES

TUESDAY 11 OCTOBER 1988

Maurie Bridgwood, Chairman

MR LAWS: Welcome, everybody, to this workshop on petroleum databases. My name is Bob Laws from the South Australian Department of Mines and I will give a quick introduction before handing the meeting over to our chairman for today, Maurie Bridgwood.

Introduction

The idea of holding this workshop came out of discussions between people, particularly from the Government Geoscience Database Policy Advisory Committee, who are looking into these issues, and also the AMEC standing committee on onshore legislation, who have the responsibility of trying to get uniformity between the states on a lot of issues in petroleum. From discussions with those people it was thought that a workshop would be a good idea; with the purpose of sharing experiences, common solutions to problems we have and, most important, to meet each other in the various states and learn what we are all doing, so we will have a name and a face that we can ring up when we need to.

Another reason for a workshop is to encourage the development and implementation of standards. One of our roles in the departments is to store information and to make it readily available for industry and the more efficiently we do that, the better. Also it is easier for industry to provide us data if we have the same systems or similar systems existing in all the various states. I am not suggesting all the states have to go down the same path, but at least we can attempt to go down parallel paths, so that we do not have a different requirement for industry in each state they work.

We have some court reporters here to record everything that is said today and Paul Shelley of the BMR has kindly offered to arrange the editing and publication of all the talks given.

Just in conclusion, I would like to thank Lorraine Gerdes who has done a lot of work to organise and get this together and Don Vinall, on my left, is our whip, so if anybody has any problems or needs anything, ask Don. Okay, I will now hand things over to Maurie.

THE CHAIRMAN: Thanks Bob. I will just make a few small points too, before we get under way. Perhaps just tell you very briefly about myself.

I am a consultant in the computing industry. I have been consulting for about 10 years and off and on over the last 18 months have worked with the Department of Mines and Energy here in South Australia. I am, at the present time, putting together an overall computing plan for the department. I am certainly not an expert in the petroleum industry, but have, as I indicated, spent a lot of time in the computing industry.

Introduction

As you will notice from the programme, today's session is pretty tight. I think we have allowed something like 5 minutes per session for questions and discussion. Now, that obviously is not very long, so what we have got on day two is an open forum session. If you have any questions or wish to discuss things in greater detail than we can today, then please make a note of them and keep them and bring them up again in tomorrow's open forum session.

We also have a workshop tomorrow afternoon. At the first break this morning I will hand out the topics that we have come up with for the workshop sessions. There are four separate topics. We are suggesting that unless people have very strong feelings that they want additional topics discussed as a workshop topic, we will leave the topics as we have currently got them.

This evening's demonstrations are from SAS and Geological Modelling Systems and there will be one from Kestrel at 12 o'clock tomorrow.

PRESENTATIONS - GOVERNMENT

MR CHAIRMAN: I will hand over to Paul Shelley for the first session.

MR SHELLEY: Thank you Mr Chairman. We see in the program another one of these strange acronyms, although it is not really an acronym because it does not really mean anything in particular, but in the business we call it GGDPAC, and of course inevitably everyone says, "What is that?" And we then have to spell it all out.

GGDPAC

It is the Government Geoscience Database Policy Advisory Committee. This was set up about 15 months ago as a subcommittee of the Government Geologists'Conference. The latter is itself a committee of the Australian Minerals and Energy Council which is, of course, the federal ministerial council. GGDPAC was set up as a consequence of both AMEC's and GGC's agreement that BMR ought to have responsibility for co-ordinating, as much as possible, government geoscience database activity. Because we felt that that was not something that we could do quite in isolation, this co-ordination or policy advisory committee was set up to help us in that task.

Broadly, the terms of reference of the Policy Advisory Committee are to promote the development and use of data standards; to promote data exchange between government organisations; and as a consequence of both that and the data standards, of course, to encourage and promote data exchange between government and industry. It was also formed to promote the use of government databases by industry and researchers; to identify gaps in the coverage of geoscience databases in its broadest sense and to make some recommendations as to how they might be filled; to avoid duplication wherever possible; and to generally monitor developments - the technological developments - in database activity in Australia and overseas.

The membership of the Police Advisory Committee is BMR and one person from each of the states and territories. BMR provides the chairman for the committee and also the secretariat.

But most importantly, what has it been doing? Well, as I said earlier, it has only been set up for 15 months and there has not been a great deal of time to get any major programs under way. We have only had two meetings and a large part of both of those meetings has been exchanging ideas and views and reporting to each other what we have all been up to.

We are planning to get a quarterly newsletter organised and I have already sent out requests to each of the state representatives asking them to provide me with some material. We have not yet decided what distribution this newsletter might have, but I would like to see that in due course it should have a fairly wide distribution. What is going on in government circles in the geoscience database area is not only of interest to each government organisation; it is very important for industry to keep up with that type of activity also.

The other area of activity that we think there is a lot of potential for is workshops. For that reason GGDPAC lent its support to this particular workshop when it was first suggested by SADME. We proceeded to get in touch with all our members and get them to work hard within their own state organisations to encourage people to come, and I know that has happened. We have not yet firmed up what we might do in terms of supporting future workshops, but one topic that was raised at our Hobart meeting at the beginning of August was in the area of the digitisation of geological maps and the computerisation of geological data.

GGDPAC

Geophysicists have had their act together for quite some years in this area because it is numerically oriented. Geological data, being very much observation and interpretation oriented, has been a bit late into this sort of area. By late I mean within the past 10 years, whereas geophysicists have been recording data in computer form for 25 years or more.

We have a number of projects that are going on both in BMR and the states in this particular area and it has been agreed that we will leave organising a workshop until we have got some experience with those projects, two of them in particular. One is BMR's project in the Leonora area of Western Australia and the other is the Queensland Department of Mines' project in the Charters Towers region. Each is looking at an integrated picture of the data in those areas. I am sure other states are moving along those tracks as well. So we will probably wait about a year until we have got some experience in those projects, and then see who might be the best group to co-ordinate and pull together a workshop in that particular field.

I would welcome any ideas people here might have regarding other possible workshops aimed at getting the specialists together, not just top management in departments, but the people that actually have got the hands-on experience and are making things operate - get those sorts of people together in different subject or subdiscipline areas, to share ideas, share experiences and problems and solutions.

That is all I have really got to say about GGDPAC and am happy to answer any questions.

MR WRIGHT: I am Denis Wright from the BMR. How does the National Resource Information Centre fit into the council?

MR SHELLEY: Yes, it is probably fair enough to make mention of the National Resource Information Centre, or NRIC as we are now starting to call it. This particular initiative came out of the federal government's May economic statement and what is currently being set up is a joint facility between the Bureau of Mineral Resources and the Bureau of Rural Resources which are both within the federal Department of Primary Industries and Energy.

GGDPAC

They are still very much at the early stages of developing a structure and defining their role and activities, but they are looking to provide a focus at the federal level for land-related data that impinge on resource management and, in particular, the competing claims for land use. Largely they will provide input to federal policy making, but as we see with most of these systems, there is a natural spin-off in providing data to other organisations and industry.

NRIC

It will not be an organisation that will hold large amounts of data. We firmly believe that the people that currently own the "data" are the best people to maintain those particular databases. What we do see is it facilitating a reference point for data, in other words, a directory function of what data there is, where it is and how it can be obtained; and in due course, establishing a networking function to enable various systems, certainly those within close physical proximity, to be networked. It is also hoped to provide more contact between state and federal systems. I guess they are looking at the New South Wales' information system hub concept as a model in which a federal system could provide a networking arrangement between the various state systems and various federal systems that exist nationwide.

It is fairly early days in that area and we are hoping to have a more definitive statement on NRIC in the first issue of the newsletter that I spoke about earlier.

THE CHAIRMAN: Thanks, Paul. So far we are running pretty well to time. I would be a bit worried if we were not. I will hand over now to Sandy Radke and Denis Wright from the BMR.

Bureau of Mineral Resources

MS RADKE: Thank you, Mr Chairman. For many people it is considered that PEDIN is the only petroleum database in the BMR; PEDIN being the Petroleum Exploration Data INdex. This is quite understandable because PEDIN is probably the longest running, the most publicised and probably the most costly petroleum database that the BMR currently administers.

I certainly know it better than other petroleum datbases because a little less than a year ago, I was employed by the BMR to be the PEDIN database co-ordinator. Previous to that I was working with mineral exploration information in the Central Information Services of CRA Exploration, so getting into a petroleum environment has been a bit of a learning curve for me.

I will be talking primarily about PEDIN this morning, however, I do hope that during this talk and during the course of the workshop, Denis Wright, who will be adressing you shortly, and I will present a broader perspective of database applications at the BMR.

In fact, the BMR is going through a growth period with respect to database developments. This is not necessarily just in petroleum. In mineral exploration, hydro-geology, palaeogeography, through to geochemistry there are a number of database developments in progress. In 1987 the BMR purchased Oracle as its main database management system and a lot of information is currently being transferred to this system. In addition to new databases being developed, many data sets which have been previously established on PC's and other systems are being converted over to an Oracle environment.

As such the ability and need to share common data sets and co-ordinate between database applications is becoming very important. In the Petroleum Branch, we are also endeavouring to co-ordinate our data sets in terms of the relationships between the data and the standards and the use of these data sets, but this was not really the original plan. I would like to start by discussing PEDIN - its origins and developments and show how we are trying to evolve towards an integration with other data sets.

PEDIN database

PEDIN was originally conceived as an idea in the early 1980's, to capture Petroleum Search Subsidy Act (PSSA) information, and Petroleum (Submerged Lands) Act (PSLA) information on a computerised system to facilitate current research and ensure access to this data in the future.

Bureau of Mineral Resources PEDIN database history and background data sources

Unlike a lot of the other aims of the databases you will hear later today, the BMR is not involved in regulatory activities to the extent that the States are, so a lot of the reasons for initially establishing PEDIN were purely as a data repository.

In 1984 and 1985, a NERDDP grant was provided and used to design and implement a database using an IMAGE database management system on the BMR's previous main frame, an HP1000. During this grant period entry of backlog data, predominently PSSA wells and aeromagnetic, gravity and some seismic survey data, was undertaken. There was a request for additional funding at the end of this grant period but it was unsuccessful and during 1985 and 1986, entry of additional backlog data was accomplished via part-time contract work through the BMR. At this time there were problems entailed in the database itself. The reporting software that IMAGE provided was inadequate and it was logistically difficult to get data out of the system. Current data was not being entered so the database was not kept up to date and only retrospective information was added.

Also at that time, the BMR was deciding on a new computer and database management system and things were in a state of flux. In 1987, the BMR installed a Data General MV20000, and bought the Oracle relational database management system. In 1987 and 1988, a second NERDDC grant was provided for the purpose of transferring the original PEDIN database from the IMAGE system to Oracle, for the development of software to enable access and reporting of the data and to document and demonstrate PEDIN. A consultant, Bruce Wyatt, was engaged to perform most of these tasks. Equipment was purchased to provide access to PEDIN and there was additional technical support provided in the petroleum branch. I joined, in December 1987, as the PEDIN database co-ordinator and we now have several people engaged part-time or full-time on PEDIN or related activities.

So what is PEDIN? PEDIN really has two components, namely Wells and Surveys, which hold basic and detailed drilling data and information on geophysical surveys througout Australia. The source of information is largely from PSSA and PSLA reports, however, the BMR routinely collects other company data in the form of telexes received, APEA and PEX information. BMR staff conducting their own research also obtain and generate data. While some of this is obviously confidential, a lot is open file and we are endeavouring to compile all these data in PEDIN in a systematic way and, depending on confidentiality, make them available to BMR staff and the public.

Another significant historical source of PEDIN information has been the AUSTCO file. This is an ASCII file which was maintained by the

Petroleum Branch and used for input into various modelling programs. Basic drilling data and data related to undiscovered resource assessment was captured on this file for a substantial number of wells and this was subsequently down-loaded into PEDIN with the aim of using PEDIN to capture additional data instead of just adding to an ASCII file. The basic data (well names, location, operator etc) were added directly to the PEDIN Wells table and two other Oracle tables, NFW and Reserves were created and linked to PEDIN to store the other AUSTCO information. This special set of data, which includes some of the basic WELLS table and the NFW and RESERVES tables, became a conceptual database known as AUSTRES. I will talk a bit more about AUSTRES and its relationship to the PEDIN Wells database later.

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PEDIN

data sources

Geophysical data has been added to PEDIN with a similar history. Contractors and BMR staff were engaged in entering PSSA and PSLA information and data files maintained by the BMR Airborne group were bulk loaded into the system. The Airborne group actively uses PEDIN and keeps airborne information up to date. Unfortunately much seismic data is missing from the database and this side of PEDIN has not received the attention that Wells has had so far. Current information is added quarterly for all seismic surveys in Australia but this is very basic data.

If we look now at the data models of PEDIN we can get a feel for its structure and the relationships of the Oracle tables.

Survey data model

Looking first at Surveys (figure 1), you will see that we have a large block called the Basic Survey Data, which includes the general reference to the location of the survey, its specifications and the operator of the contractor, and that sort of thing. There is a table for general remarks, a table for the titles covering the survey, a BASINS table, a MAPS table and another table on COSTS which really deals with the PSSA estimate costs and so forth.

For each survey, there is one basic Survey data record, but there may be one or more of any of the other tables; for example there usually are several Remarks or Basin records associated with a particular survey.

There are also a number of what we call validation tables - I will be coming back to validation at the end of the talk. For example, we have a map index table called MINDEX which is closely related to the MAPS table. MINDEX holds information on 1:250000 and 1:1000000 maps, in particular, the name, map code, boundary lats and longs etc. and it is not in itself associated with geophysical surveys. The MAPS table stores the map code and unique PEDIN number for a specific survey

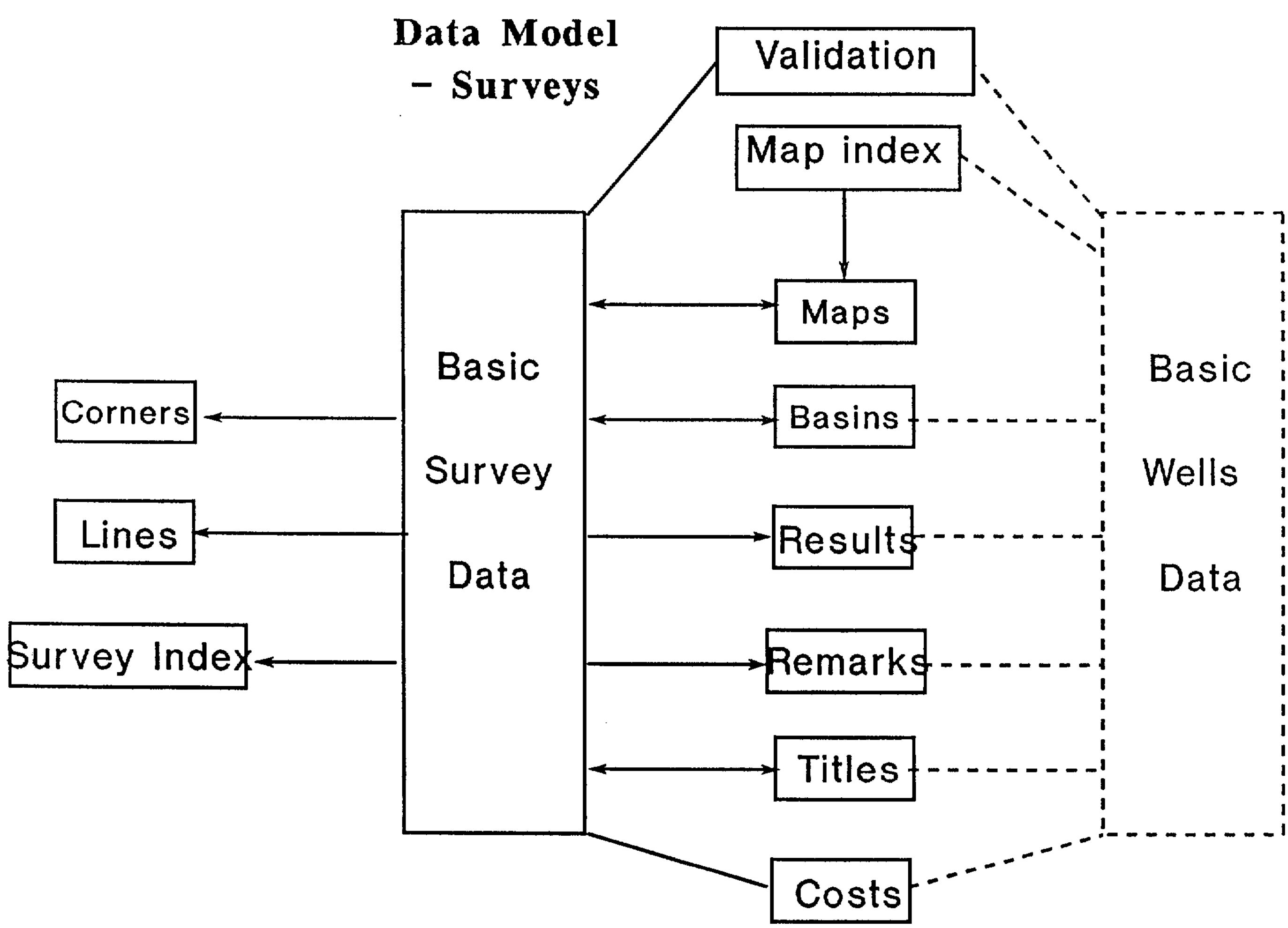
Data Model
– Surveys
Validation
Map index
Basic
Survey
Data
Maps
Basins
Results
Remarks
Titles
Costs
Corners
Lines
Survey Index
Basic
Wells
Data

figure 1

and is linked to the SURVEY table through the unique number and to the MINDEX table through the map code. In this way the MINDEX table can be used as a check for valid map codes and to display or look up the map name. MINDEX is also used for the Wells data as we will see later.

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Data entry/query screens have been designed and each data table is represented by a "block" on the screen. The survey block (figure 2) handles basic information and specifications of each survey: the name; the unique number which, links all data for a particular survey together; the BMR Project number; the operator; contractor; the types of vessels and dates - basic data that describes the survey.

PEDIN

The Results block allows for recording of the type of result, ie. whether there is a seismic line or a report or a contour map; and where it is stored. There can be many RESULTS records for a given survey.

Survey data entry screens

The Basins block is available to record any basins or structures which are identified with the survey. Again we can have any number of basins which are identified with the survey. The 1:250000 map sheet identified with the survey is entered in the Maps block.

The last part of the Surveys screen includes the Titles block, and a block for recording seismic lines (Lines). The Corners block is for precise recording of corners of the survey. Other index numbers, kept for example by the Geological Survey of WA, can be recorded in the Other Index block.

An important component of PEDIN data is the unique number which is entered once in the Survey block. As the user enters data on subsequent screens, the unique number is copied by the system to the equivalent table, thereby avoiding repetitive entry and ensuring that the same unique number is applied to all data records associated with the survey. On retrieval it serves as a link to all the data.

Survey report

Once data is put into the system we can generate a report such as presented in figure 3. There are other types of reports that can be generated but this comprehensive format is most commonly used. It is basically structured like the screens in that the basic survey data is followed by basins, results and the remarks. The remarks, you will notice are formatted into paragraphs to allow a more readible form of the report. Finally after the remarks, the map sheets and the petroleum titles are listed.

Basic Survey Data

Name____
Unique #________ Permit Operator____________________________
Proj.#____ confidO Contractor____________________________
Processed by____________________________

Legislation____ States__________ File no________ Types____

Vessel type__ Vessel______________________________ ____-shore

DATES: Begin_________ Finish_________ RptRcd_________ Rpt_OK_________
LIMITS: W_long__________ E_long__________ N_lat__________ S_lat_________
(deg)
SPACING: line______m tie______m station______m group_____m
DISTANCE: line______km ties______km total______km
NUMBERS: lines_____ stns_______ channels____
line_dir___deg. format________ area_______s.

A'BORNE:height____masl height____magl XT_vol_______l XT_vup_____l
SEISMIC: fold____ source__________ s.depth____m ph.depth____m

Updated_________ By_user_________ page 1 of

RESULTS

Type __________ Reference __________ Location __________ Rel.date __________ Title or description __________

Basins & Structures
Basin or Structure name

1:250000 Map sheets
Map_no Map name M number

page 2 of

Titles or license no. | Lines (seismic)

Corners: Seq# Latitude Longitude
Enter corners in clockwise direction. Start at northwest.

Other index#

figure 2

S6610047 Exmouth Gulf & Cuvier Project

S6610047 Exmouth Gulf & Cuvier Project Survey
Operator West Australian PetroleumVessel MV Tamona,Necede
P/L
Contractor Seismograph Services Processed by
PSSA File 62/1563 Off shore States WA Types S

Begin 15-JUL-61	Finish 20-AUG-61		
W.Longitude	E.Longitude	N.Latitude	S.Latitude
113.500000	115.000000	21.000000	25.000000
1212 line km.		3029 stns	402 m.apart
	Gp.spg. 46	hydrophone depth -3	source depth 2
-3 m.a.s.l.	2 m.a.g.l.		
24 channels	1 fold	Geophex	MT format

Basins and structures
Carharvon Basin

Results and Publications — Location

PSSA File Report 62/1563 — BMR
Observations,Results,Interpretation,Contour maps,Cross sect,Location map

Remarks

Location
This survey was divided into two separate projects, the Exmouth Marine Project and the Cuvier Marine Project. The Exmouth Marine Project covered the Exmouth Gulf, the waters immediately to the north and east and also the coastal waters from Frazer Island south to Point Maud. The Cuvier Marine Project covered the coastal waters from Point Maud south as far as South Bejaling, 19km to the north of Carnarvon.

Equipment
AAZ amplifiers, G.C.F Gulf pressure geophones, Electro-Tech DS-7 tape recorder.

Navigation
Positioning of the survey within and to the north of Exmouth Gulf was controlled by a Lorac radio navigational system. The remainder of the survey was related to shore beacons from which the position of the ship was determined by sextant angle measurements.
The purpose of the Exmouth Marine Project was to obtain by economical methods information on the regional geology of the North West Cape area.

Objective
The purpose of the Cuvier Marine Project was to obtain further regional assessment of structural conditions in that part of the Carnarvon Basin, with particular attention to the off-shore portion of the Cape Cuvier anomaly.

Summary
Two horizons were mapped. The reflection quality in the Exmouth Gulf was generally fair. Along the West Coast the shallow reflections showed fair continuity but the deeper events were of poor quality and were not continuous. The Exmouth project indicated that Exmouth Gulf is essentially synclinal in character in the Cretaceous and Tertiary sediments. The Cuvier project resulted in several structural leads being mapped as well as the major faults.

1:250000 Map Sheets

SF 50-02	M06500200	DAMPIER
SF 50-05	M06500500	ONSLOW

S6610047 Exmouth Gulf & Cuvier Project

SF 50-06	M06500600	YARRALOOLA

Petroleum titles
LP 52H
PE 27H

End of report .... 1 SURVEYs were selected for report

figure 3

If we look at the data model for Wells (figure 4) you will note a similarity in that we have a Basic Wells block or table for recording basic information for a well and a set of related tables to document other specific data.

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PEDIN

A number of tables are either shared by the Survey data or have an equivalent table and structure. For example, both sets of data have a REMARKS, BASIN, and RESULTS table. Where we have chosen to have a separate but equivalent table, rather than share the data it has been for security or database management reasons. Otherwise we try to share tables containing data common to both and these include tables used for validation such as MINDEX for map data.

Wells data model

The data sets on the right side of the diagram are specific to the wells information, for example STRATIGRAPHY, LITHOLOGY, WDATA1 and WDATA2 (which reference downhole sampling and logs), POOLS and TESTS (for production, drill stem tests, etc). The HORIZONS table is for referencing the seismic horizons penetrated by the well. The New Field Wildcat (NFW) and RESERVES tables are part of the AUSTRES database and are linked to the WELLS table (or any other table if required) via the unique well number.

Wells data entry screens

The data entry/query screens for Wells are more complex than the Survey screens, largely because Wells has several more tables, and also because more data validation has been imposed. The Basic Well Data block (figure 5) includes information which describes or identifies a well. There is the unique number which identifies the well and links all data for a particular well, the title, operator, contractor, the lat and long, total depth, datum, spud and total depth dates, well classifications etc. It is the type of data that most people are recording in a lot of these databases.

The Results, Basins and Remarks blocks (figures 6 and 7) are equivalent to the Survey screens. The Costs block (figure 6) accepts data on the drilling costs and subsidy payments. The Seismic block references seismic horizons interpreted in the well. Not many wells contain Cost or Seismic data.

The Stratigraphy block (figure 7) allows recording of stratigraphic units known to be intersected by the well. Ideally this is a complete stratigraphy as obtained from a well completion report or other source of geologic interpretation. However, where a full stratigraphy is not available but it is known, for example, that a hole bottommed in or was tested in a particular unit or age, this information is now being recorded. The "Picked" field identifies a particular stratigraphic interpretation and differentiates company stratigraphy from an individual

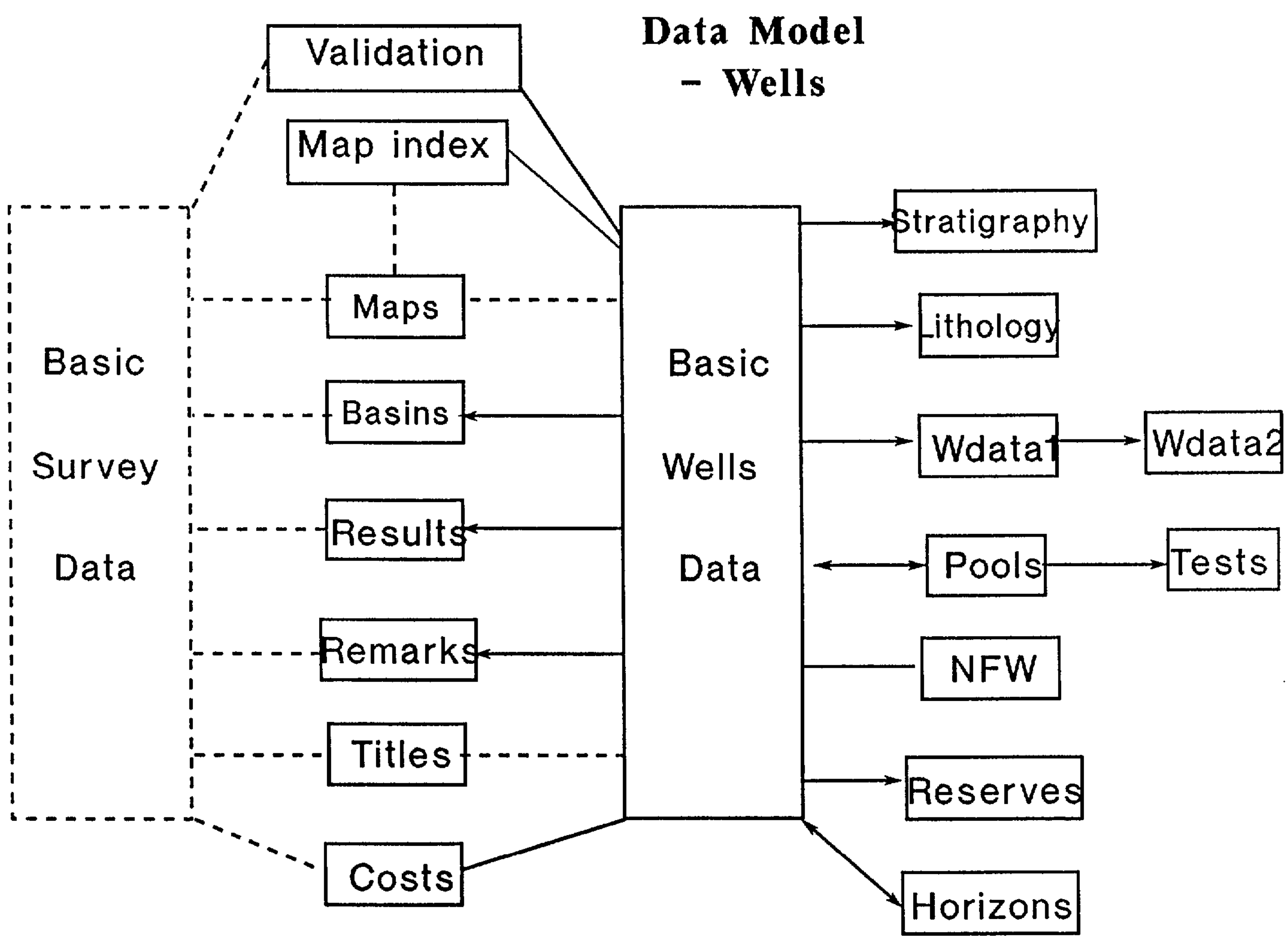
Data Model
- Wells
Validation
Map index
Basic
Survey
Data
Maps
Basins
Results
Remarks
Titles
Costs
Basic
Wells
Data
Stratigraphy
Lithology
Wdata1
Wdata2
Pools
Tests
NFW
Reserves
Horizons

figure 4

PEDIN   Petroleum Exploration Data Index

C.2 WELLS Forms

```
/------------------------- Basic WELL data --------------------------------\
|Unique #________                            Name_____________________________|
|                                        Operator_____________________________|
| Legsln.____  Title______________     Contractor_____________________________|
|   State____     File_no________          ___-shore       Field_______________|
|                                                                              |
|Platform____________                 Welltype_____________  Status____________|
|HC shows____________________         Classn: Pre-drill____     Post-drill____ |
|                                                                              |
| Longit.__________   ___ ___'____" Map sheet number & name   GL/WD Datum KB/RT|
|  Latit.__________    __ __'____" ________ __________________  ____m _____m __ |
|                                                                              |
|Dates:Sp_________  TD_________     R.Rel_________ RptRcd_________ RptOK_______|
|                                                                              |
|TD:Drllr_____m  vert._____m       Devn.__  Long.__________  Dirn.___          |
|    logs_____m                    from vert  Lat.__________  Dist.____m Temp.___|
|                                                                              |
|Rig:Make______________             Type______     Name________________________|
|   Model______________          Number__                                     |
|                                              Confid._   Updated__________   |
|Seafloor______   Redrill__      Remark____________________   By_user_________|
\-----------------------------------------------------------------page 1 of 7/

 Form: WELLS          Block: WELLS          Page: 1   SELECT:     Char Mode: Replace
```

figure 5

```
            PEDIN    Petroleum Exploration Data Index

/---------- Results ------------------------for:________ ____________________ _\
|Type                     Reference Location Rel.date                           |
|_________________________ __________ __________ ___________ Title or description|
|       _________________________________________________________________________|
|_________________________ __________ __________ ___________                     |
|       _________________________________________________________________________|
|_________________________ __________ __________ ___________                     |
|       _________________________________________________________________________|
\-------------------------------------------------------------------------------/
/---------- Basins ------------\                  /--- Seismic correlation ------\
|Name of Basin or Structure    |---- Costs -----|Horizon name         Depth (m) |
|______________________________|         ($)    |____________________ ________ _|
|______________________________|   Total _______|____________________ ________ _|
|______________________________| Estimtd _______|____________________ ________ _|
|______________________________|   Drill _______|____________________ ________ _|
|______________________________|    Test _______|____________________ ________ _|
|______________________________| Subsidy _______|____________________ ________ _|
|______________________________| Repaymt _______|____________________ ________ _|
|______________________________| ----------------|____________________ ________ _|
\------------------------------/                 \-------------------page 2 of 7/
 Form: WELLS        Block: WELLS        Page: 2   SELECT:     Char Mode: Replace
```

figure 6

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PEDIN

Wells data entry screens

who has re- interpretated the well, or data from telexes or press releases. We can record a geologic age either as a single age in the "Age1" field or an age range using both the "Age1" and "Age2" fields. Any age that is entered is validated by a lookup table we have called MASTER_AGE. The stratigraphic unit is semi-validated by another lookup table called UNITS; in this case, if an unkown unit is entered a warning message is displayed to alert users to check the spelling. This allows entry of informal stratigraphy as recorded in well completion reports while providing an aid to the user. The depth, elevation and thickness are recorded in metres with respect to the datum. The unique number, as with all the blocks other than Basic Wells is copied to the table by the system.

Lithology (figure 7) is similar in that there are 72 character records which are related by the unique number. The top and bottom of the lithologic boundaries are recorded in metres and there is a a free text description of the lithology. The "Code" field is used to differentiate between two types of lithology data : LI for the major lithotypes (entered in upper case and without abbreviation), and SU for any available descriptive summary. The "Sequence" field is for preserving order on output. Unfortunately we have only started entering significant lithology on PEDIN and there is very little data in this table.

Well Data 1 and Well Data 2 (figure 8) are for recording information on downhole sampling and logging. Well Data 1 records a summary for any particular type of downhole data, for example if core is taken one Well Data 1 record is entered to summarise the entire interval and indicate the number of cores in the well. The specifics of each core are detailed in the Well Data 2 block; one record entered for each core. Similarly if geophysical logs were run, one record for the log type (if this is known) is entered in Well Data 1 and the details of each run can be recorded in Well Data 2.

Finally, in the POOLS and TESTS blocks (figure 9) we can record production and test information. The POOLS block is designed to highlight named stratigraphic units which are either discovery units, producing units, or have a hydrocarbon show. The "Formation" field is validated against the UNITS table and upon entering a valid unit, the age and basin are copied to the screen. The latter may be overwritten if the user has more specific information (Portlandian vs Jurassic). If known, the hydrocarbon pool or biostratigraphic zone can be be recorded, as can the completion interval and formation limits. "Classification" indicates whether the unit is a discovery or a producing interval, or whether it has a show that is unmeasured or untested. Other data include the hydrocarbon types, best test, etc.

```
PEDIN     Petroleum Exploration Data Index

/-- REMARKS ----------------------------- for:________ ____________________-_--\
type seq Remarks                                                                |
_______  _______________________________________________________________________
_______  _______________________________________________________________________
_______  _______________________________________________________________________
_______  _______________________________________________________________________
_______  _______________________________________________________________________
_______  _______________________________________________________________________
_______  _______________________________________________________________________
\-------------------------------------------------------------------page 3 of 7/
________________________________________________________________________________
 Form: WELLS       Block: WELLS       Page: 3   SELECT:    Char Mode: Replace
```

```
PEDIN     Petroleum Exploration Data Index

/------- STRATIGRAPHY -------------------- for:________ ____________________ _\
|Picked  Age1       Age2          Unit (indent)            Depth  Elev'n Thickns |
|__ ____________ ____________ _________________________ ______ ______ ______ __ |
|__ ____________ ____________ _________________________ ______ ______ ______ __ |
|__ ____________ ____________ _________________________ ______ ______ ______ __ |
\-------------------------------------------------------------------page 4 of 7/
________________________________________________________________________________
 Form: WELLS       Block: WELLS       Page: 4   SELECT:    Char Mode: Replace
```

```
PEDIN     Petroleum Exploration Data Index

/ LITHOLOGY ------------------------------ for:________ ____________________ _\
|Top    Bottom     Description                                                  |
|_____ _____ _________________________________________________________________ _|
|_____ _____ _________________________________________________________________ _|
|_____ _____ _________________________________________________________________ _|
|_____ _____ _________________________________________________________________ _|
\-------------------------------------------------------------------page 5 of 7/
________________________________________________________________________________
 Form: WELLS       Block: WELLS       Page: 5   SELECT:    Char Mode: Replace
```

figure 7

PEDIN   Petroleum Exploration Data Index

```
/- WELL DATA 1 ---(summary)---------------- for:________ ____________________ _\
|Code   Type              Top (m) Bottom #samples    Top (ft) Bottom           |
| __  ________________  _______ _______   ___      _______ _______             |
|commnt_________________________________________________________________________|
|                                                                              |
| __  ________________  _______ _______   ___      _______ _______             |
|     __________________________________________________________________________|
\-----------------------------------------------------------------------------/
/- WELL DATA 2 ---(detail)----------------------------------------------------\
| CO   Sequence  Top (m) Bottom      Recovery       Top (ft) Bottom     Recovery|
| __   ________  _______ _______     _______   _    _______ _______     _______ |
| __   ________  _______ _______     _______   _    _______ _______     _______ |
| __   ________  _______ _______     _______   _    _______ _______     _______ |
| __   ________  _______ _______     _______   _    _______ _______     _______ |
| __   ________  _______ _______     _______   _    _______ _______     _______ |
| __   ________  _______ _______     _______   _    _______ _______     _______ |
| __   ________  _______ _______     _______   _    _______ _______     _______ |
| __   ________  _______ _______     _______   _    _______ _______     _______ |
| __   ________  _______ _______     _______   _    _______ _______     _______ |
| __   ________  _______ _______     _______   _    _______ _______     _______ |
| __   ________  _______ _______     _______   _    _______ _______     _______ |
\---------------------------------------------------------------page 6 of 7/
_______________________________________________________________________________
 Form: WELLS      Block: WELLS       Page: 6   SELECT:    Char Mode: Replace
```

figure 8

```
              PEDIN    Petroleum Exploration Data Index

/----------- Discovery/Production Pools ----for:________ ____________________ _\
|Formation                      Pool/paly zone Basin            Age            |
|______________________________ ______________ _________________ ______________|
|Formatn.limits Compl.interval Classification Prodn.status HC type   BestTst FP|
|______-______m _______-______m ______________ ____________ _________ _______ __|
|Remark______________________________________________________________________ _|
|                                                                              |
|_________________ ______________ ________________________________ ____________|
|Formatn.limits Compl.interval Classification Prodn.status HC type   BestTst FP|
|______-______m _______-______m ______________ ____________ _________ _______ __|
|Remark______________________________________________________________________ _|
\-----------------------------------------------------------------------------/
/------------------------TESTS-----------------------------------------------\
|Formation                     Test type & no    Top      Bottom  Hydrocarbons |
|_____________________________ _______________ ______-______m ________________|
|Recovery_____________________________________________________________________|
|Remark_____________________________________________________________________ _|
|                                                                             |
|_____________________________ _______________ ______-______m ________________|
|        _____________________________________________________________________|
|      ______________________________________________________________________ _|
\-------------------------------------------------------------------page 7 of 7/
 Form: WELLS          Block: WELLS          Page: 7   SELECT:     Char Mode: Replace
```

figure 9

Bureau of Mineral Resources

PEDIN

Wells Report

If there is a record in POOLS, there usually is a record in TESTS to record drill stem, production or repeat formation test data. If known the formation that was tested is recorded and validated using the UNITS table. Other data include the test number, interval in metres, and the hydrocarbons reported. The test results are recorded in a free text field; flow rates are given in metric units but, if the original data used imperial, these are recorded in parentheses. Remarks may also be entered. Any number of TEST records can be entered.

An example of a Wells report output is presented in figures 10a-d.

standards and validation

I would like to focus on the standards and validation used in PEDIN which have been touched on in the previous discussion. One of the advantages of Oracle is the ease that validation can be implemented in the database. Initially there was no software control on PEDIN data and consequently a variety of non-standard values have been added to the database. Since transferring to Oracle we have imposed validation on a number of fields and have been able to standardise much of the existing data.

One way of implementing validation is through the SQL*Forms software which drive the data entry screens. the SQL*Forms software can be designed to tests such things as numeric ranges, manditory data fields, upper and lower case or a list of acceptable values (eg. on-shore or off-shore, PSSA or PSLA).

The second type of validation involves checking the entered data against a standard list of values in a lookup table such as UNITS and MASTER_AGE which were discussed previously.

The UNITS table (figure 11) has three columns, one for the stratigraphic unit, one for the age and one for the geologic basin that it is associated with. In some cases it is used only as a spelling check; a warning is given that the name entered is not a standard stratigraphic name and the user should check the spelling. Elsewhere it is mandatory to enter the stratigraphic unit as is listed in the UNITS table.

The MASTER_AGE table (figure 12)is was originally sourced from the Elsevier 1975 chart, however other sources have been added since. The table contains the geologic age (in several different formats - Upper or U, Lt or Late) the eldest and youngest absolute ages, the parent, and the classification (period, stage, etc), and the source (not listed in the figure). The table is used primarily as a control on geologic age names, to prevent incorrect spelling or sloppy entry (eg. " L Pal " - it has happened !). However it also provides an alternative to a character string search as one can search for all ages falling within a lower and

W6640004 Yardarino 1

Well name: Yardarino 1		WA		Number W6640004	
Operator WAPET		PSSA		File 64/4035	
Contractor Oil Drilling and Explor		On shore		Title LIPI11H	

Platform
Field Yardarino
Shows gas,oil

Type Exploration
Status Suspended

Pre-drill classn NFW
Postdrill classn NFD

Spud date 07-APR-64
Report rcvd 29-DEC-64

Reached T.D. 04-JUN-64

Rig released 16-JUN-64

Map SH 50-05 DONGARA
Ground level 43.00

Datum RT
47.00 metres a.h.d.

Latitude 29 13 13.0008
Longitude 115 03 09.9972

Total depth and TD position
Drilled 2377.00

Temperature 93 deg C

Rig National number
Redrills 0

Basins and structures

Dandaragan Trough
North Dandaragan Trough
Perth Basin

Results and Publications	Location
PSSA WCR File 64/4035	BMR

Remarks

Location

Yardarino 1 is located about 11km east of Dongara and about 48km NW of Eneabba 1 and 40km SSW of Wicherina 1, Perth Basin, Western Australia.

Objective

The well was drilled to examine the hydrocarbon potential and stratigraphy of the Mesozoic and Permian rocks on a structurally high area where a favourable porous & permeable facies could be expected.Sandstones in the Cretaceous-Jurassic section were expected to provide potential reservoir rocks on a closed anticline.

Summary

Considerable amounts of methane,ethane,propane and butane were detected in the Kockatea Shale.The upper 21m of the Wagina Sandstone were found to be coarse, moderately sorted sandstones with moderate porosity and permeability, and containing hydrocarbons throughout. Good fluorescence was noted in cores from 2301-2307m. One DST produced gas flows of up to 0.4 MMcm/day accompanied by a light, kerosene-like condensate and small quantities of a heavy, waxy, paraffin-based crude oil. The lower part of the Wagina Sandstone had low permeability but contains methane with traces of propane and butane.Traces of oil were also noted. The well was suspended due to the lack of production testing equipment.

figure 10a

W6640004 Yardarino 1

Stratigraphic table

Picked by: BS

Age	Unit	Depth	Elev	Thick.
Quaternary	Unnamed alluvium	0.0	43.3	8.5
U Jurassic- Lw Cretaceous	Yarragadee Fm	12.2	31.1	1063.4
M Jurassic	Cadda Fm	1075.6-1032.4		80.2
U Triassic- Lw Jurassic	Cockleshell Gully Fm	1155.8-1112.5		783.9
Lw Jurassic	Cattamarra Coal Measures Mbr	1155.8-1112.5		398.7
Lw Triassic	Eneabba Mbr	1554.5-1511.2		385.3
E M Triassic	Woodada Fm	1939.7-1896.5		69.8
Lw Triassic	Kockatea Sh	2009.5-1966.3		275.2
U Permian	Wagina Sst	2281.8-2241.5		74.7
U Permian	Yardarino Sst Mbr	2284.8-2241.5		74.7
Lw Permian	Carynginia Fm	2359.5-2319.2		11.9
Lw Permian	Carynginia Fm T.D.	2371.3-2328.1		0.0

Picked by: WAP WAPET

Age	Unit	Depth	Elev	Thick.
Quaternary	Alluvium	3.7	43.3	8.5
U Jurassic- Lw Cretaceous	Yarragadee Fm	12.2	34.7	1063.4
M Jurassic	Cadda Fm	1075.6-1028.7		80.2
U Triassic- Lw Jurassic	Cockleshell Gully Fm	1155.8-1108.9		783.9
Lw Triassic- M Triassic	Woodada Fm	1939.7-1892.8		69.8
Lw Triassic	Kockatea Shale	2009.5-1962.6		275.2
U Permian	Wagina Sst	2284.8-2237.8		74.7
Artinskian	Carynginia Fm	2359.5-2312.5		18.0
	TD	2377.4-2330.5		

Downhole data

Conventional : From to metres 18 samples
64 m cored, 54.7 m recovered. Recovery 85%.

Sequence	From	To	Recovery
1	533.10	537.10	2.60
2	721.10	725.10	3.90
3	1049.90	1054.10	2.00
4	1344.20	1345.10	1.00
5	1368.10	1492.10	1.30
6	1575.10	1576.10	1.30
7	1748.00	1751.00	1.00
8	1941.90	1944.90	2.30
9	2056.10	2058.10	2.30
10	2232.90	2234.90	2.00
11	2291.00	2291.00	0.30
12	2291.00	2294.00	2.30
13	2294.00	2300.90	5.60
14	2300.90	2307.10	5.60
15	2307.10	2314.00	6.90
16	2314.00	2317.90	4.60
17	2323.20	2326.10	1.60
18	2366.10	2373.00	7.20

figure 10b

W6640004 Yardarino 1

Ditch Cuttings : From 0.00 to 2377.00 metres
Collecting interval 3 m, 1.5 m when coring.

Gas Analysis : From to metres 5 samples
Analysis of DST No's 1A, 2, 3 by BP Refinery. Appendix 7.

Gas Detector : From 7.90 to 2377.00 metres

Oil Analysis : From to metres 3 samples
Analysis of PT1 and DST No. 2 by QLD Govt Chemical Lab. Appendix 7.

Geolograph : From 7.90 to 2377.00 metres

Water Analysis : From to metres 2 samples
Analysis of DST No'. 3 and PT1 by QLD Govt Chemical Lab. Appendix 8.

Sonic GR : From 8.90 to 2371.10 metres
5 runs. Gamma from Ow.

IES : From 15.10 to 2373.00 metres
6 runs.

ML Caliper : From 211.90 to 2373.00 metres
5 runs.

Dipmeter : From 211.90 to 2371.10 metres
3 runs.

Temperature : From 319.90 to 2366.10 metres

Neutron : From 1233.90 to 2373.00 metres
2 runs.

LL : From 1252.00 to 2372.00 metres
2 runs.

Hydrocarbon pool data

Formation: Kockatea Sh Zone/Pool:
to m Basin: Perth Age: Triassic
Completion int: to m Classn: UNM Status:
Type: gas Best-test:
Methane, ethane, propane and butane detected.

Formation: Wagina Sst Zone/Pool:
to m Basin: Perth Age: Permian
Completion int: to m Classn: NFD Status: Oil and Gas
Type: cond,gas,oil Best-test: Future production planned

Tests in Wagina Sst

DST 1 from 2285.10 to 2291.00 m.
Misrun.

DST 1A from 2284.10 to 2291.00 m. cond

figure 10c

W6640004 Yardarino 1

Recovered 5 m condensate.

DST 2 from 2280.80 to 2294.00 m. cond,gas
Gas to surface 380 Mcm/day and recovered approximately 6 m condensate.

DST 3 from 2298.90 to 2323.20 m.
mud and water.

DST 3 from 2298.90 to 2323.20 m. gas,oil
Gas to surface 283 Mcm/day,recovered 5 m clean oil and 265 m oil and ?

Prod. test 1 from 2304.10 to 2307.10 m. gas,oil
Average 35 barrels/day oil, 3 barrels/day water and 68 Mcm/day gas.

End of report .... 1 WELLS were selected for report

figure 10d

PEDIN Validation - Stratigraphic UNITS

(Ordered by basin and age)

UNIT	AGE	BASIN
Unknown Fm		
Unnamed Fm		
Carlton Gp	Camb-Ord	Bonaparte Basin
Antrim Plateau Volcanics	Cambrian	Bonaparte Basin
Keep Inlet Fm	Carb-Perm	Bonaparte Basin
Kulshill Fm	Carb-Perm	Bonaparte Basin
Langfield Gp	Carboniferous	Bonaparte Basin
Milligans Fm	Carboniferous	Bonaparte Basin
Weaber Gp	Carboniferous	Bonaparte Basin
Bathurst Island Fm	Cretaceous	Bonaparte Basin
Cockatoo Gp	Devonian	Bonaparte Basin
Ningbing Gp	Devonian	Bonaparte Basin
Petrel Fm	Jur-Cret	Bonaparte Basin
Fossil Head Fm	Permian	Bonaparte Basin
Hyland Bay Fm	Permian	Bonaparte Basin
Londonderry Fm	Triassic	Bonaparte Basin
Malita Fm	Triassic	Bonaparte Basin
Mount Goodwin Fm	Triassic	Bonaparte Basin
Timbury Hills Fm	Dev-Carb	Bowen Basin
Aldebaran Sst	Permian	Bowen Basin
Back Creek Gp	Permian	Bowen Basin
Bandanna Fm	Permian	Bowen Basin
Black Alley Sh	Permian	Bowen Basin
Blackwater Gp	Permian	Bowen Basin
Boggabri Volcanics	Permian	Bowen Basin
Buffel Fm	Permian	Bowen Basin
Camboon Andesite	Permian	Bowen Basin
Catherine Sst	Permian	Bowen Basin
Cattle Creek Fm	Permian	Bowen Basin
Colinlea Sst	Permian	Bowen Basin
Freitag Fm	Permian	Bowen Basin
Ingelara Fm	Permian	Bowen Basin
Kianga Fm	Permian	Bowen Basin
Lizzie Creek Volcanics	Permian	Bowen Basin
Mantuan Fm	Permian	Bowen Basin
Maules Creek Fm	Permian	Bowen Basin
Muggleton Fm	Permian	Bowen Basin
Peawaddy Fm	Permian	Bowen Basin
Reids Dome Beds	Permian	Bowen Basin
Tinowan Fm	Permian	Bowen Basin
Cabawin Fm	Triassic	Bowen Basin
Clematis Sst	Triassic	Bowen Basin
Moolayember Fm	Triassic	Bowen Basin
Rewan Fm	Triassic	Bowen Basin
Showgrounds Sst	Triassic	Bowen Basin
Snake Creek Mdst Mbr	Triassic	Bowen Basin
Wandoan Fm	Triassic	Bowen Basin
Grant Fm	Carb-Perm	Canning Basin
Grant Gp	Carb-Perm	Canning Basin

figure 11

PEDIN Validation

MASTER_AGE TABLE

AGE	ELDEST	YOUNG	PARENT	CLASS
Upper Holocene	.003	0	Quaternary	Series
Late Holocene	.003	0	Quaternary	Epoch
Holocene	.01	0	Quaternary	Series
Recent	.01	0	Quaternary	Series
Quaternary	1.8	0	Cainozoic	System
Late Cainozoic	32.5	0	Phanerozoic	Era
Cainozoic	65	0	Phanerozoic	Erathem
Phanerozoic	570	0		Eon
Early Recent	.01	.005	Quaternary	Epoch
U Tyrrhenian	.04	.01	Tyrrhenian	Substage
Tyrrhenian	.1	.01	Upper Pleistocene	Stage
Tyrrhenian	.1	.01	U Pleistocene	Stage
Upper Pleistocene	.7	.01	Pleistocene	Series
U Pleistocene	.7	.01	Upper Pleistocene	Series
Late Pleistocene	.7	.01	Pleistocene	Epoch
U Pleistocene	.7	.01	U Pleistocene	Series
Pleistocene	1.8	.01	Quaternary	Series
Middle Holocene	.07	.03	Quaternary	Series
M Tyrrhenian	.07	.04	Tyrrhenian	Substage
Lw Tyrrhenian	.1	.07	Tyrrhenian	Substage
Early Holocene	.1	.07	Quaternary	Epoch
Lower Holocene	.1	.07	Quaternary	Series
U Milazzian	.22	.1	Milazzian	Substage
Milazzian	.45	.1	Upper Pleistocene	Stage
Milazzian	.45	.1	U Pleistocene	Stage
U Werriloonian	.73	.1	Werriloonian	Substage
Werriloonian	2	.1	Pleistocene	Stage
M Milazzian	.33	.22	Milazzian	Substage
Lw Milazzian	.45	.33	Milazzian	Substage
U Sicilian	.53	.45	Sicilian	Substage
Sicilian	.7	.45	Upper Pleistocene	Stage
Sicilian	.7	.45	U Pleistocene	Stage
M Sicilian	.62	.53	Sicilian	Substage
Middle Pleistocene	1.2	.6	Quaternary	Series
Lw Sicilian	.7	.62	Sicilian	Substage
U Emilian	.8	.7	Emilian	Substage
Emilian	1	.7	Lower Pleistocene	Stage
Emilian	1	.7	Lw Pleistocene	Stage
Lower Pleistocene	1.8	.7	Pleistocene	Series
Lw Pleistocene	1.8	.7	Lower Pleistocene	Series
Early Pleistocene	1.8	.7	Pleistocene	Epoch
Lw Pleistocene	1.8	.7	Lw Pleistocene	Series
M Werriloonian	1.37	.73	Werriloonian	Substage
M Emilian	.9	.8	Emilian	Substage
Lw Emilian	1	.9	Emilian	Substage

figure 12

upper absolute age bracket. This means it is possible to retrieve wells that have reported Maastrictian sediments even though the search criteria only specified Cretaceous.

Bureau of Mineral Resources

Another of these tables, PICK_CODE (figure 13) is comprised of a code for each company, an abbreviated company name and a full company name. This table is used both for a validation check at data entry and for outputting data in various formats (full or abbreviated company name).

There are several other look up tables designed to facilitate data standardisation. Some contain data relevant to other applications and are, or can be, shared by other BMR databases.

PEDIN

PEDIN was the first petroleum database to be developed on Oracle but other data sets have been either converted to or created on Oracle since. Figure 14 summarises the database applications currently in place in the Petroleum Branch. In a sense, PEDIN is the hub of these data sets, containing the basic data common to and used by the other applications which can be regarded as specialists information, that builds on the basic data. Therefore, instead of duplicating information other databases can utilise PEDIN directly through the PEDIN unique number. These other data sets incorporate the unique number in their tables allowing relevant PEDIN data to be queried, displayed, reported or manipulated with the specialist data. Having said that, we do restrict the abiltity to modify the data to certain users and only some people can update, add or delete PEDIN data.

AUSTRES database

Denis will be talking about EOR and RESERVES and I have said quite enough about PEDIN. I have only mentioned AUSTRES briefly, however, in its relation to PEDIN. AUSTRES originated to manage data collected and used in the study of undiscovered resources. Primarily this came from an ASCII file called the Austco file which was maintained by BMR Petroleum Branch and used as input to Forman and Hinde's modelling programs. Data from this file was bulk loaded into PEDIN to provide basic well data not previously captured on PEDIN. Two Oracle tables, NFW and RESERVES were designed to store other data from these files. As a result the conceptual database AUSTRES (figure 15) is comprised the NWF table, the RESERVES table (not to be confused with the RESERVES database that Denis will discuss) and part of the PEDIN WELLS table. Therefore, AUSTRES replaces the Austco file, being used in the study of undiscovered resources and for data input to modelling software.

As with Wells and Surveys, a data entry/query screen (figure 16) has been developed for AUSTRES. The top block is a subset of the

PEDIN Validation - PICK CODE Table

COD	ABBREVIATION	NAME
AGI	AGIP	AGIP
ABR	Abrolhos	Abrolhos Oil NL
AOD	Alliance Oil	Alliance Oil Dev Aust
APA	Alliance Pet	Alliance Petroleum Aust
AMA	Amalgamated Pet	Amalgamated Petroleum
AMX	Amax	Amax Petroleum
APC	Amerada	Amerada Petroleum Corp of Aust
ABO	American Beach	American Beach Oil Company
AOP	Amer Overseas	American Overseas Petroleum
AMO	Amoco	Amoco Aust
AMP	Ampol	Ampol Explor Ltd
APX	Apex	Apex Oil NL
ARC	Arco	Arco Aust Ltd
ARG	Argonaut	Argonaut Inter Corp
ASH	Ashburton	Ashburton Oil NL
AAO	AAO	Associated Aust Oilfields NL
AAR	AAR	Associated Aust Resources NL
AFO	AFO	Associated Freney Oil Fields
	ATCO	Atco-APM Drilling Co
AQT	Aquitaine	Aust Aquitaine Petroleum
AGL	AGL	Aust Gas Light Co
AGO	AGO	Aust Gulf Oil Co
AIS	AIS	Aust Iron and Steel Ltd
AOC	AOP	Aust Occidental Petroleum
AUO	AOC	Aust Oil Corp
AOE	AOE	Aust Oil Explor Ltd
AOG	AOG	Aust Oil and Gas Corp
AGE	AOG/Exoil	Aust Oil and Gas and Exoil
APM	APM	Aust Paper Manufacturers Dev
AUP	APC	Aust Petroleum Co
ARO	ARO	Aust Roma Oil Ltd
ASO	ASO	Aust Sun Oil Co
ACS	Aust-Cities	Aust-Cities Service
AAP	APC	Australasian Petroleum Co
BHP	BHP	BHP Petroleum
BPP	BP	BP Petroleum Dev Aust P/L
BAL	Balmoral	Balmoral Resources NL
BAR	Barkley	Barkley Oil Co P/L
BRK	Barrack	Barrack Energy
BAS	Basin	Basin Oil
BEP	Beach	Beach Petroleum NL
BBC	Beaudesert	Beaudesert Boring Co
BEA	Beaver	Beaver Explor Aust NL
BEX	Beaver/Pexa	Beaver Explor and Pexa
BEL	Belford	Belford Dome Ltd
	Benenden	Benenden
BIS	Bishops	Bishops
BBT	BBT Synd	Blacker, Brady and Turner Synd
BOC	Bocal	Bocal
BON	Bond	Bond Corp Holdings Ltd

figure 13

BMR ORACLE PETROLEUM DATABASE RELATIONSHIPS

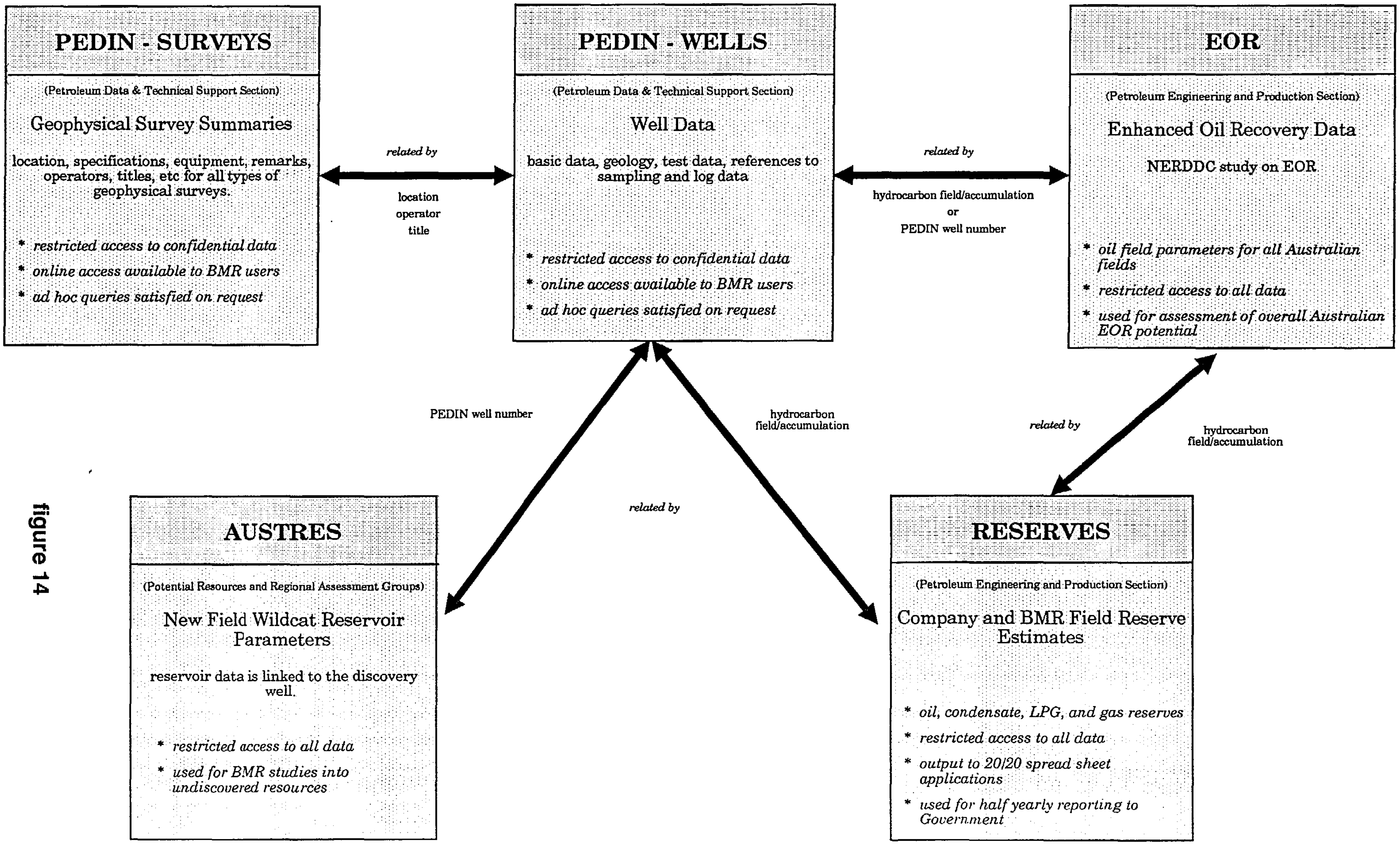


figure 14

AUSTRES

Relationships between tables

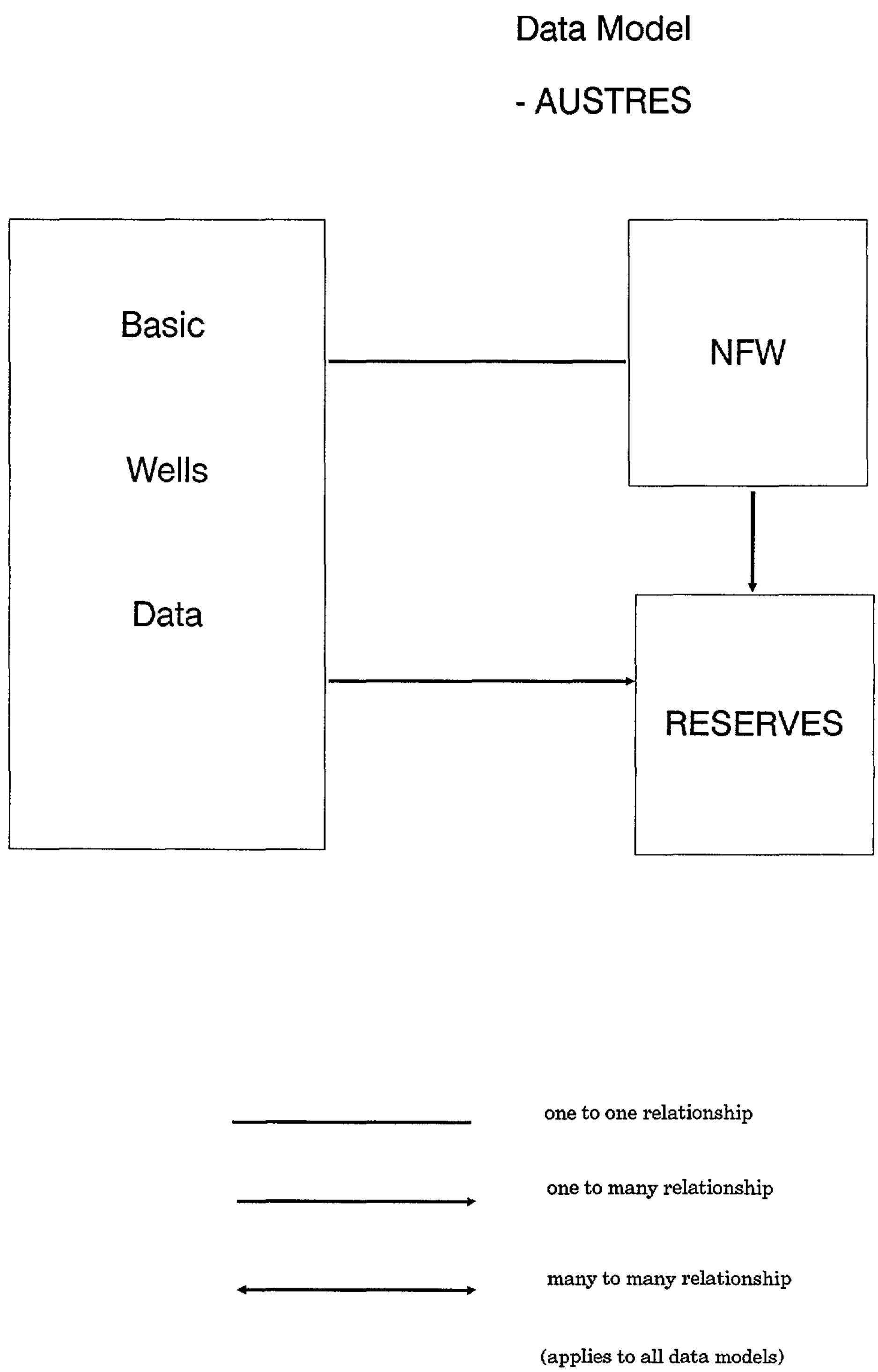


figure 15

C.3 AUSTRES Form

```
/-------------------------------- Basic WELL data ---------------------------\
|     Name_______________________________ Operator____________________________|
|   Legsln____      State____ ___-shore   Classn: pre-drill____  post-drill____|
|    Long.__________      Lat.__________  G.levl____m. TD_date_________        |
|  TD(drl)_____m.    TD(log)_____m.       W.dpth            Unique #________ _ |
|------------------------------------ NFW -------------------------------------|
| Pipeline/market dist.    Discovery dates    Production dates    Classn.      |
|     Oil____km.            Oil_________        Oil_________        ____       |
|     Gas____km.            Gas_________        Gas_________                   |
|------------------------------------------------------------------------------|
|   Basin____________________         RESERVES: Oil_______mcm Cond.______mcm   |
|SubBasin____________________                   LPG_______mcm  Gas ______bcm   |
|    Play____________________                                                  |
|                                Gas-oil conv.f_______                         |
| Spill Y/N _  Type_________     Seal thickness ____m.                         |
| Trap type code   ______        G.V.F.____                    Min. M.L. Max.  |
| Strat. objective _________     F.V.F.____  Nett pay          ____ ____ ____  |
|    Pool area      _____sq.km.              Average porosity  ____ ____ ____  |
|    Drainage area  _____sq.km.  code _      Hydrocarbon satur'n____ ____ ____ |
|    Closure area   _____sq.km               Oil recovery factor____ ____ ____ |
|    Closure height_____m.                   Gas recovery factor____ ____ ____ |
\------------------------------------------------------------------------------/
 Form: reserves     Block: WELLS       Page: 1   SELECT:     Char Mode: Replace
```

figure 16

Bureau of Mineral Resources

AUSTRES database

PEDIN Wells block and is used as a basis for query and linking AUSTRES to PEDIN. This data is for display only and cannot be modified or deleted through AUSTRES. AUSTRES data in the NFW and RESERVES tables are linked to discovery wells in PEDIN. When data is entered the user first queries the Wells block to retrieve and display information on a discovery well. Data entered in either the NFW or Reserves block is linked to PEDIN via the unique number which is never entered in AUSTRES but is copied from the Wells block to the other tables.

The NFW block records important dates and distances for a hydrocarbon field/accumulation. The Reserves block records various parameters of the reservoirs in the field/accumulation and therefore there may be several RESERVES records related to the discovery well of a field.

I will now hand over to Denis who will discuss the EOR and RESERVES databases.

EOR database

RESERVES database

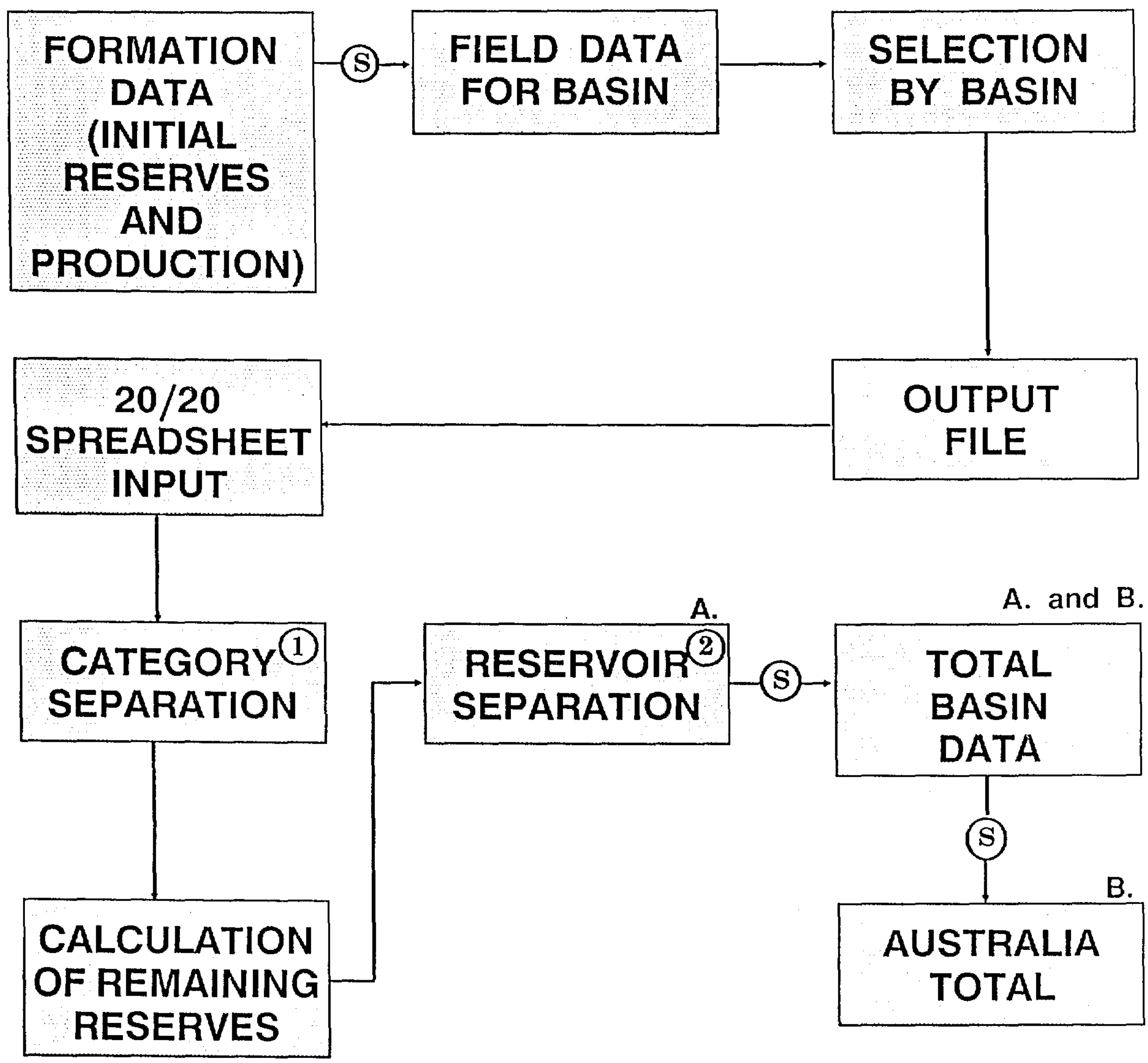
MR WRIGHT: I will just take up this diagram again (figure 14). As Sandy has mentioned PEDIN surveys and PEDIN wells have been around for some time. AUSTRES is a database for recovering information in relation to research on undiscovered resources, developed by Dr David Foreman and his group. Fundamentally they are looking at new field wildcat reservoir information and they focus on the first wells in the new play or a new field and data for those new traps.

The databases I will be talking about are called EOR and RESERVES. They are user driven and they relate back to PEDIN. Rather than capturing a whole lot of data about various wells that we may or may not use - we looked at the kinds of output we need. We develop databases and then related them back to PEDIN. This has resulted in a lot of consistency checking with PEDIN. I think it has improved the value of PEDIN to the user.

I work in the reservoir engineering group in the Petroleum Branch of the BMR. This group is responsible for reserves reporting for basins in Australia, both onshore and offshore. The report that is publicly available is a basin summary which is issued every six months. There is a great deal more detail available on individual fields that is confidential.

This figure here (Figure 17) shows how the reserves reporting works. Basically we have several subtle and not so subtle problems in recording reserves. One is, there are some basins in Australia which cross state boundaries and we like to be able to capture information by state.

RESERVES REPORTING FROM ORACLE



(S) = SUMMATION

(1) = COMMERCIAL, NON-COMMERCIAL

(2) = OIL, GAS

A. SEE OUTPUT EXAMPLE "A"

B. SEE OUTPUT EXAMPLE "B"

figure 17

Bureau of Mineral Resources

Secondly, very rarely there is a single accumulation which has been given different names at either end of the accumulation (we call them areas) and of course there are several wells that go through more than one basin and more than one accumulation. To start right down at the most detailed level, we look at the formation data, which applies to a particular formation in a particular basin. We look at the initial reserves and production. Production data comes from the companies - initial reserves data either come from the companies, the states or from our own studies and simulations.

RESERVES database

We then sum that to get data for for all fields for a given basin. The information goes onto an output file and that's where the output from Oracle ends up. What happens then is that 20/20, which is a 123 type spread sheet, but mainframe orientated, picks up that data. It then separates the data into categories. We have three categories: commercial, non-commercial and inferred. They are probably not ideal categories, but they are what we are running with at the moment. Commercial field are those declared commercial and normally these are the ones that are going to come into production within the next 6 months or a year. Non-commercial fields are fields that are certainly there and would be economic at a given price. Inferred resources, which is the third category, are fields which may or may not be there. We are not completely happy with this category and may revise its name in future.

Production is subtracted from the initial reserves to give remaining reserves, then split out into oil and gas reservoirs (including gas caps as gas reservoirs). We then sum those gas reservoirs or oil reservoirs for the basin and then sum the basins to give the Australian total. This figure (figure 18) shows the format of the output for Australia as a whole.

This shows how the Oracle tables are set up (figure 19). As I said, we have subtle difficulties in defining accumulations and traps. We have an Oracle table for field/accumulation, another one for the basins and another one for each formation of individual reserves.

This shows the type of input for the reserves (figure 20). Basically, the same information that Sandy was talking about - the accumulation, the operator, the area within that accumulation, that is being at risk, location, state, and reserves for each area within the accumulation and each formation, are separately listed, and then production is subtracted to get the remaining reserves. This is what the outputs look like (figure 21). There are about 50 or so pages looking like this. This shows Gippsland commercial reservoirs separated into oil and gas. We had a few debates about how to separate out oil, solution gas and free gas.

figure 18

COMMERCIAL IN CONFIDENCE

SUMMARY OF PROVED AND PROBABLE OIL AND GAS RESERVES AND INFERRED RESOURCES IN AUSTRALIA AS AT 31/12/87

Note : Liquids are reported in MILLIONS of KILCLITRES and gas in BILLIONS of CUBIC METRES

	COMMERCIAL OIL RESERVOIRS									NON-COMMERCIAL OIL RESERVOIRS			OIL RESERVOIRS		
BASIN	INITIAL RESERVES			CUMULATIVE PRODUCTION			REMAINING RESERVES			INITIAL RESERVES			INFERRED RESOURCES		
	Oil	LPG	Sales gas	Oil	LPG	Sales gas	Oil	LPG	Sales gas	Oil	LPG	Sales gas	Oil	LPG	Sales gas
Adavale															
Amadeus	10.000	2.000	20.000	5.000	1.000	10.000	5.000	1.000	10.000				90.000	22.000	320.000
Bass										50.000	9.000	30.000	90.000	22.000	320.000
Bonaparte	10.000	2.000	20.000	5.000	1.000	10.000	5.000	1.000	10.000	50.000	9.000	30.000	90.000	22.000	320.000
Bowen	10.000	2.000	20.000	5.000	1.000	10.000	5.000	1.000	10.000	50.000	9.000	30.000			
Browse															
Canning	10.000	2.000	20.000	5.000	1.000	10.000	5.000	1.000	10.000				90.000	22.000	320.000
Carnarvon	10.000	2.000	20.000	5.000	1.000	10.000	5.000	1.000	10.000	50.000	9.000	30.000	90.000	22.000	320.000
Clarence-Moreton															
Cooper (QLD)										50.000	9.000	30.000	90.000	22.000	320.000
Cooper (SA)	10.000	2.000	20.000	5.000	1.000	10.000	5.000	1.000	10.000	50.000	9.000	30.000	90.000	22.000	320.000
Eromanga (QLD)	10.000	2.000	20.000	5.000	1.000	10.000	5.000	1.000	10.000	50.000	9.000	30.000	90.000	22.000	320.000
Eromanga (SA)	10.000									50.000	9.000	30.000	90.000	22.000	320.000
Gippsland	10.000	2.000	20.000	5.000	1.000	10.000	5.000	1.000	10.000	50.000	9.000	30.000	90.000	22.000	320.000
Gunnedah															
Otway															
Perth	10.000	2.000	20.000	5.000	1.000	10.000	5.000	1.000	10.000	50.000	9.000	30.000	90.000	22.000	320.000
Surat	10.000	2.000	20.000	5.000	1.000	10.000	5.000	1.000	10.000	50.000	9.000	30.000	90.000	22.000	320.000
TOTAL	110.000	20.000	200.000	50.000	10.000	100.000	50.000	10.000	100.000	550.000	99.000	330.000	1080.000	264.000	3840.000

	COMMERCIAL GAS RESERVOIRS									NON-COMMERCIAL GAS RESERVOIRS			GAS RESERVOIRS		
BASIN	INITIAL RESERVES			CUMULATIVE PRODUCTION			REMAINING RESERVES			INITIAL RESERVES			INFERRED RESOURCES		
	Condensate	LPG	Sales gas	Condensate	LPG	Sales gas	Condensate	LPG	Sales gas	Condensate	LPG	Sales gas	Condensate	LPG	Sales gas
Adavale										8.000	4.000	32.000			
Amadeus	5.000	3.000	12.000	2.000	1.000	5.000	3.000	2.000	7.000	8.000	4.000	32.000	4.000	1.000	87.000
Bass										8.000	4.000	32.000	4.000	1.000	87.000
Bonaparte										8.000	4.000	32.000	4.000	1.000	87.000
Bowen	5.000	3.000	12.000	2.000	1.000	5.000	3.000	2.000	7.000	8.000	4.000	32.000	4.000	1.000	87.000
Browse										8.000	4.000	32.000	4.000	1.000	87.000
Canning															
Carnarvon	5.000	3.000	12.000	2.000	1.000	5.000	3.000	2.000	7.000	8.000	4.000	32.000	4.000	1.000	87.000
Clarence-Moreton													4.000	1.000	87.000
Cooper (QLD)	5.000	3.000	12.000	2.000	1.000	5.000	3.000	2.000	7.000	8.000	4.000	32.000	4.000	1.000	87.000
Cooper (SA)	5.000	3.000	12.000	2.000	1.000	5.000	3.000	2.000	7.000	8.000	4.000	32.000	4.000	1.000	87.000
Eromanga (QLD)	5.000	3.000	12.000	2.000	1.000	5.000	3.000	2.000	7.000	8.000	4.000	32.000	4.000	1.000	87.000
Eromanga (SA)	5.000									8.000	4.000	32.000	4.000	1.000	87.000
Gippsland	5.000	3.000	12.000	2.000	1.000	5.000	3.000	2.000	7.000	8.000	4.000	32.000	4.000	1.000	87.000
Gunnedah													4.000	1.000	87.000
Otway	5.000	3.000	12.000	2.000	1.000	5.000	3.000	2.000	7.000	8.000	4.000	32.000			
Perth	5.000	3.000	12.000	2.000	1.000	5.000	3.000	2.000	7.000				4.000	1.000	87.000
Surat	5.000	3.000	12.000	2.000	1.000	5.000	3.000	2.000	7.000	8.000	4.000	32.000			
TOTAL	55.000	30.000	120.000	20.000	10.000	50.000	30.000	20.000	70.000	112.000	56.000	448.000	56.000	14.000	1218.000

RESERVES DATABASE

ORACLE TABLES AND FORM

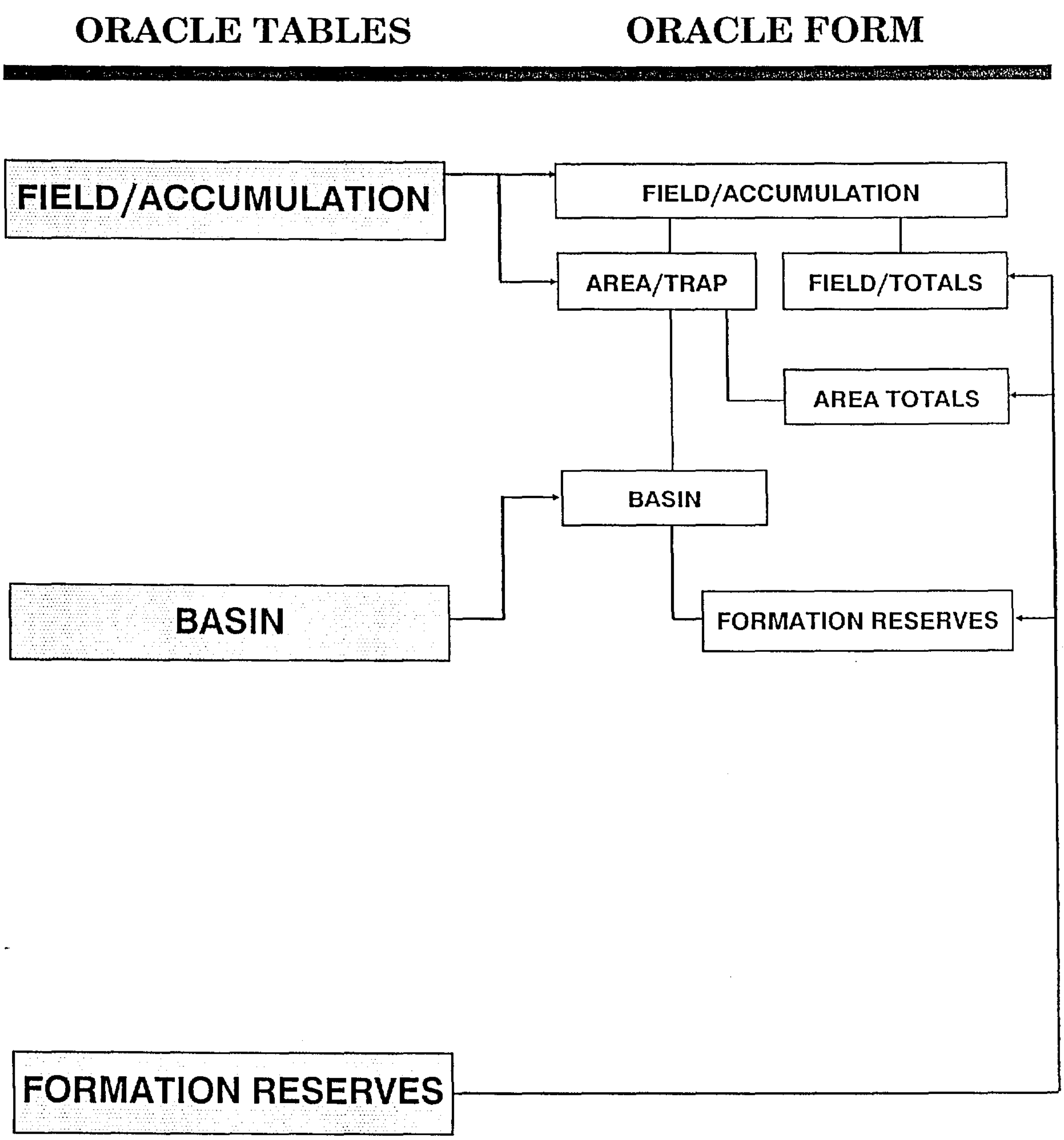


figure 19

RESERVES FORM

Field/Accumulation Operator Area in accumulation

Location State Permit

Area in accumulation Basin(s)

	Oil (Gl)	Condensate (Gl)	LPG (Gl)	Gas (Bcm)

Formation(s) Category: ______ Formation Reserves

Initial				
Last updated ______ Production				
Remaining				

Resources for ______ Total Field/Accumulation

Initial commercial reserves				
Cumulative production				
Remaining commercial reserves				
Non-commercial reserves				
Inferred resources				

figure 20

COMMERCIAL IN CONFIDENCE

GIPPSLAND
COMMERCIAL

SUMMARY OF PROVED AND PROBABLE COMMERCIAL PETROLEUM RESERVES
IN THE GIPPSLAND BASIN AS AT 31-12-87

NOTE: Liquids are reported in MILLIONS of KILOLITRES and gas in BILLIONS of CUBIC METRES

	INITIAL RESERVES			CUMULATIVE PRODUCTION			REMAINING RESERVES		
OIL RESERVOIRS	Oil	LPG	Sales gas	Oil	LPG	Sales gas	Oil	LPG	Sales gas
Barracouta	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Bream	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Cobia	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Flounder	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fortescue [1]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Halibut	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Kingfish	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mackerel	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Marlin	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Snapper	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
South Mackerel	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tuna	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
West Kingfish	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
West M-1.0.1 HLA/FTA	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

NOTE: Liquids are reported in MILLIONS of BARRELS and gas in BILLIONS of CUBIC FEET as follows:

TOTAL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

GAS RESERVOIRS	Condensate	LPG	Sales gas	Condensate	LPG	Sales gas	Condensate	LPG	Sales gas
Barracouta	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Bream	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Flounder	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Marlin	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Snapper	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tuna	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

NOTE: Liquids are reported in MILLIONS of BARRELS and gas in BILLIONS of CUBIC FEET as follows:

TOTAL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FOOTNOTES : ESSO BMR File 1981/116 31/12/87

1. Includes production from Fortescue off Cobia platform

figure 21

Essentially what we came up with was that gas caps would be grouped with gas reservoirs.

The other feature you notice here is the condensates listed in place of oil for gas reservoirs. This is one of the main reasons why we wanted to separate the oil and gas reservoirs. Non-commercial gas reservoirs are of a great interest because of the very high condensate reserves in them. The output for Australia as a whole (figure 18), is the basis for the six-monthly reporting to the government and to the public. Inferred resources are not reported, they are just basically for back-up information. As you can see, the Cooper and Eromanga are split up by states. this completes my discussion of the RESERVES database.

Bureau of Mineral Resouces

The next database I will talk about is the EOR database (figure 22). This started because a NERDDC project began a couple of years ago to the total potential for enhanced oil recovery right throughout Australia, on-shore and off-shore, and after a lot of discussion, it was decided to try to address all oil fields in Australia. The aim was, first of all, to develop a rationale for determining the potential for enhanced oil recovery and then to go about it in a logical way, given the amount of data we have. First of all, I will talk about the study flow sheet (figure 22), and the Oracle tables and forms which were set up in order to implement that, and I will then show you some examples of data input screen.

RESERVES database

EOR database

This is the way the study was set up. We asked each state for either its own data or permission to approach companies within the state. This was then put into an EOR database. The next step is for technical screening to be done. We are using a program developed by the US Department of Energy for enhanced oil recovery technical screening - it is a very comprehensive program. That will then give the two or three most applicable enhanced oil recovery techniques for each field. After that has been done, and that is in the process of happening at the moment, there will be an economic screening to give the potential for EOR in terms of amount of reserves recoverable for a price of a given number of dollars a barrel.

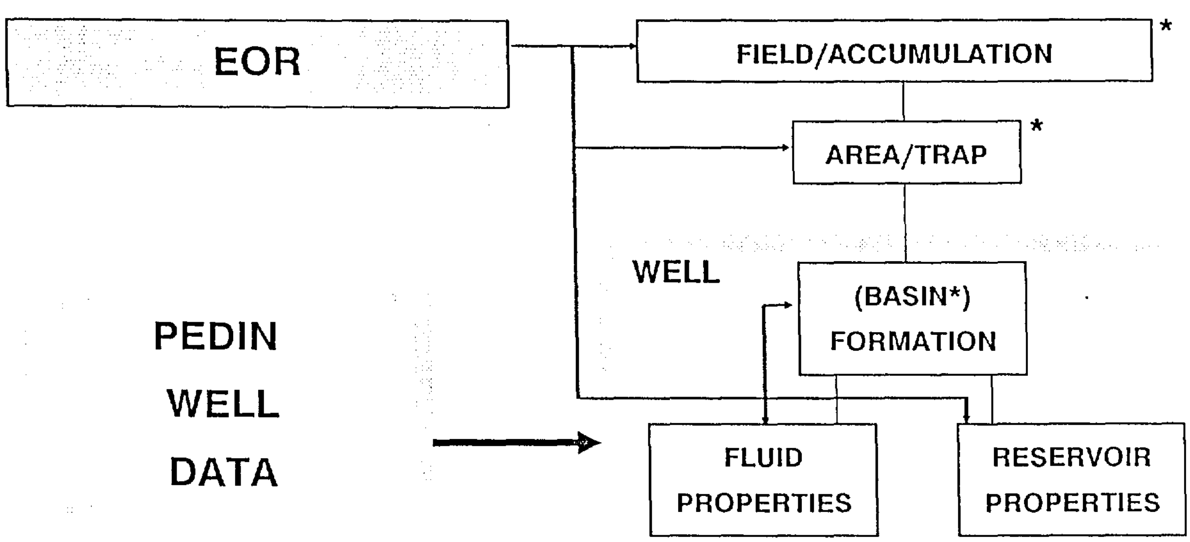
The setup in Oracle is basically well-based, in that we want to capture every oil discovery well in a basin, and associate that with the fluid properties and reservoir properties. Then we can either associate that with a basin or an area, and from these types of considerations will arise the economics. In other words, if a field or an area is remote from other fields then it is less likely to be developed.

Figure 23 shows the input data forms. The PEDIN number is our link back to the PEDIN database. The types of information we wanted were

EOR DATABASE

ORACLE TABLES AND FORM

ORACLE TABLES ORACLE FORM



* LINKED to RESERVES DATABASE

figure 22

the types that are needed as an input to this enhanced oil recovery program, particularly information like pressure, oil type and permeability. The oil initially in place and the initially recoverable reserves are estimated and of course from this oil in place will also come the potential for enhanced oil recovery.

Here is an example (figure 24) of a filled-out data entry screen. It is self-explanatory. You can see there are some areas that are of particular interest, permeability, for example. We are also interested in gas/oil ratio and formation volume factor to give us an idea of what the primary recovery mechanism would be.

Bureau of Mineral Resouces

Finally, I would like to talk about another link with PEDIN which has been developed recently and this has come up in the field of reserves estimation. We do a lot of reserves estimates particularly on new discoveries and areas where we are particularly interested in. We thought it would be a logical thing to link it back to PEDIN and associate the reserves assessment with the well, so this is basically reserves information that is linked to the database.

EOR database

Figure 25 shows a summary of resources information relating to a particular well. Figure 26 shows the reservoirs which have been discovered by that well. Figure 27 shows the fluid properties, the reservoir properties and the drive mechanism which is really back-up data for the subsequent reserves calculation. This is the actual reserves calculation form (figure 28). Shown here is the gas initially in place and oil initially in place resulting from these parameters, estimated recovery factors and the final recoverable oil and gas. We think this is the most efficient way to store assessments, because as each well comes up we usually do some kind of reserves assessment on it. Rather than doing an analysis, and storing it away in some file somewhere, it is readily available in this way.

These are just some of the uses we found for the Oracle database system and some of the links we have had. AUSTRES which Sandy talked about, covers the other side of things, the undiscovered resource information. I think there is a lot of scope for amalgamating data and using common data between the Commonwealth and the states.

THE CHAIRMAN: Thanks, Denis. We have just got about one minute before we are due to have our first break. Are there any questions for Denis and Sandy, at this stage?

EOR DATA ENTRY SCREEN

Accumulation ____________ Status ____________ Basin ____________ Operator ____ PEDIN No ____________

Formation ________________________________

KB RT GD/SL Notes

Elevation ________m________m________m________________

Area ________hA________________

Depth(Top) ________m________ Thickness (Gross) ________m________

(GOC) ________m________ (Net) ________m________

(OWC) ________m________ Water Saturation ________%________

Porosity ________%________ Permeability________md________

Pressure ________psia at ________m TVD ss________

Temperature ________C at ________m TVD ss________

Oil type ________________ Wax content ________

Bubble point pressure ________ psia Notes ________

Gravity ________API________ Pour point ________C________

Viscosity ________cp Notes ________

Water salinity ________ppm________________

Water resistivity ________ohm.m________________

Drive mechanism ________________ Gas cap (yes/no) ________

Formation volume factor ________rb/stb

Gas/oil ratio ________scf/stb Notes ________

Oil initially in place ________stb ________________

Init. recoverable res. ________stb Possible________stb ________

Cumulative production ________stb ________________

Notes ________________________________

References ________________________________

figure 23

EOR DATA ENTRY SCREEN

Accumulation	Status	Basin	Operator	PEDIN No
Triceratops	Producing	Eromanga	CC Oil	W4889999

Formation: Basal Jurassic

	KB	RT	GD/SL	Notes
Elevation	580 m	m	570 m	

Area: 754 hA

Depth (Top): 1715 m KB — Thickness (Gross): 25 m

(GOC): 1731 m KB — (Net): 17 m

(OWC): 1740 m KB — Water Saturation: 31 %

Porosity: 22 % — Permeability: 324 md

Pressure: 1800 psia at 1720 m TVD ss

Temperature: 80 C at 1720 m TVD ss

Oil type: Napthenic — Wax content: 8 %

Bubble point pressure: 1400 psia Notes

Gravity: 37 API — Pour point: 12 C

Viscosity: .78 cp Notes

Water salinity: 35000 ppm NaCl equivalent

Water resistivity: 0.1 ohm.m

Drive mechanism: Water Drive — Gas cap (yes/no): No

Formation volume factor: 1.3 rb/stb

Gas/oil ratio: 425 scf/stb Notes

Oil initially in place: 28.24 million stb

Init. recoverable res.: 14.73 million stb Possible 22.32 million stb

Cumulative production: 5.71 million stb

Notes

References

figure 24

1 Field/Accumulation Operator

Location State Permit

2 Area in accumulation

3 Area in accumulation Basin(s)

Formation(s)

Last updated Category

4

	Oil (Gl)	Condensate (Gl)	LPG (Gl)	Gas (Bcm)
Formation Reserves				
Initial				
Production				
Remaining				

5 Area/Basin Reserves

Initial
Production
Remaining

6 Resources for

Total Field/Accumulation

Initial commercial reserves
Cumulative production
Remaining commercial reserves
Non-commercial reserves
Inferred resources

figure 25

7

Field/Accumulation Area

EXECUTE QUERY on WELL for more data

8

Well

	KB	RT	GD/SS
Elevation	m	m	m

9 Latitude PEDIN No.

Longitude

10 Basin

Formation

Area	hA	hA	hA
Depth(TOP)	mSS	mSS	mSS
Depth(GOC)	mSS	mSS	mSS
Depth(OWC)	mSS	mSS	mSS

Basin

Formation

Area	hA	hA	hA
Depth(TOP)	mSS	mSS	mSS
Depth(GOC)	mSS	mSS	mSS
Depth(OWC)	mSS	mSS	mSS

figure 26

11

Field/Accumulation Area Well Formation

10

RESERVOIR PROPERTIES

	Gross	Net	Porosity	Water Saturation	
Gas	m	m	%	%	Gas Cap
Oil	m	m	%	%	

Temperature F at m Permeability to m
Pressure psia at m
Drive Mechanism Gas initially in place Bcm
Oil initially in place Gl

FLUID PROPERTIES

Oil Type Wax Content % Oil Viscosity cp
Pour Point C Gas Viscosity cp
OFV Factor bbl/stb Oil Gravity API Water Viscosity cp
GEx Factor scf/rcf Gas Gravity
GOR mmscf/stb Water Salinity ppm NaCl equivale
Water Resistivity ohm.m at F

Notes
References

figure 27

12

Field/Accumulation Area

Well

13

Well File Map

Type Datum

mSS

	Area	TOP	Depth 12	Map	Gross	Net	Net/Gross
			mSS	mSS			
GWC		hA	mSS	Gas	m	m	
OWC		hA	mSS	Oil	m	m	
	Volume		Porosity	Water Saturation		In place	
Gas		m3	%	% E	GIIP =		Bcm
Oil		m3	%	% Bo	OIIP =		Gl
						Recoverable	
Drainage Radius			m	Gas RF	% Gas =		Bcm
				Oil RF	% Oil =		Gl

figure 28

MR PARSLOW: Wayne Parslow from Geovision. I gather, Sandy, from the databases that you have established, that they are not spatially or geographically referenced. Your connectivity is via your - I think you called PEDIN number?

MS RADKE: Yes.

MR PARSLOW: That is your information connectivity point for all of the different databases that are there?

Bureau of Mineral Resources

MS RADKE: It is not interfaced with any sort of geographic information system or anything. We record geographic information on the database so that if we want to relate data spatially we can. In fact, we have sent Geovision some data for a seminar that we are organising next week at the BMR and we are going to see how that works. The only geographic or graphic information system that is at the BMR is Intergraph and it is not, at the moment, directly linked to Oracle but we would like to see that.

MR PARSLOW: But your petroleum data is not graphically entered or retrieved?

MS RADKE: It is a straight Oracle database and, there is very little front end or application software for the user.

MR PARSLOW: Could I ask a second question, Mr Chairman? Unrelated to the first one, I notice there are a lot of application programs you were using - analytical programs, I guess, that follow on from the database. How are you linking those to the - the databases to the applications?

MR WRIGHT: The basic interface is through the output file from Oracle into speadsheets such as 20/20. We are quite interested in graphical output from 20/20 because, for instance, if you have a large number of wells - and say 40 or 50 in a field, and each of them has say a stratigraphic top of some unit recorded as a height, there is no reason why you just cannot plot that out on 20/20 as a function of the latitude and longitude, particularly if it is in metric form. You get an instant stratigraphic cross section which is not up to the quality you would have from a draftsman but it gives you a very good idea of what data is missing, where it should have been and any gross errors in the data.

MR PARSLOW: There seemed to be some other programs that you were using as well apart from 20/20's. You mentioned one from the US as well. Are you just feeding directly from Oracle into that application?

MR WRIGHT: At present that goes to an Oracle output form, but the work on that is being done at the University of New South Wales and they are manually re-entering that now.

THE CHAIRMAN: We might leave it there. As I said, the question and discussion time was pretty brief, but if you have got further questions, then perhaps we can raise them again in the open forum tomorrow. We will just have a short break.

THE CHAIRMAN: I will now hand over to Terry Aust from the South Australian Department of Mines and Energy to talk about the activities here in South Australia.

MR AUST: I would like to open up by just explaining a little bit about the functions of the Oil, Gas and Coal Branch and how we got to where we are on our database, and then I will hand over to Bob Frost who is the programmer and can explain in more detail exactly what we have got.

South Australia

Back in 1985 and 1986, we prepared an extensive tender package for a database management system to meet all our requirements. In the Department we have, essentially, three major roles that overlap and interact with one another. There is, firstly, a responsibility to capture and maintain data and having it available to the public when they want it. Secondly, there is a function of making use of that data; analysing it and advising government on various aspects. The third funtion is to display those results at any time.

history and background

We tried the package approach. There were, in fact, were no real takers on the tender, which set us back to looking at how can we go about doing it some other way? What we began saying was, "Okay, let us get a product which we can use in-house." There was no way with the availability of man-power and, in a sense, skills available then, that we could do the whole project in one go. It would just be indigestible. So, it was preferable to get hold of the tender package and bite off chewable bits. The old trick of "How do you eat an elephant?" and the answer is, "One mouthful at a time" sums up what we decided to go for.

Thus the major force leading us to a pilot approach was the availability of know-how. This know-how is not only on the computing side, but also on the users side. It is very easy for a user to wish anything. We have all been there. We all just lay back and ask for everything that we could possibly ever want. The fact that we only want it once every million years bears no relationship to the want.

As for the availability of software, again, this comes into how much are you prepared to pay. There are some quite distinct jumps in software costs. You can get yourself a spread sheet for a couple of hundred dollars, something else at around about the $20,000 and something else again for $200,000 in that sort of order of leap. You get what you pay for in many ways, but equally "what job do you want?" and "will the software do it?" is a very important thing.

Against the pilot approach is the difficulty of control, both in the final product, and along the way. The great advantage of a complete database management system is that it exerts its own control, whereas on a pilot plant, you in effect have got these independent projects which quite quickly can go off on their own little paths and waste you a lot of time.

So there are some costs in the pilot plant approach. We tried to look hard at the tender package we had. It was extremely good. It had already prioritised a lot of things. We went through them again and kept asking people "Well, how often are you going to do it?" and "How much are you going to gain by doing it this way?" and this led us, if you like to cut the thing. We identified that there were some very big kernels or very obvious kernel things that could be pilot planted.

South Australia

We also began to realise that much of what we wanted was for us. We wanted to be able to reproduce data, to analyse data. The interaction with the public, in a sense, was almost the easy part to do. It threw up some other issues like reproduction of data: were we really going to use the electronic means to reproduce data or were we still going to give somebody a copy of paper data, keeping in mind that we needed to lower costs and improve service, both to ourself and to our client.

history and background

It is very easy to let a computer project become an exercise in itself. Computer work is intellectually very satisfying, when the computer works. I think there is a large element of this "intellectualism" which takes over on some. It is important to keep projects very tightly controlled. Who wants it? is probably the most important question that can be asked.

Another point that came out in analysing our needs is the time scale. For us a typical time scale is probably about a year because in many ways, our natural reporting time is a year. Some things one might want to be at 6 months, but for most things, it is a year. If you are a month out of date with your data, at the most that means you have got 12 wells that may be drilled in the month that are not in your system. What I am saying is that we have not got the need for an immediate turn around, or that as soon as a bit of data is received, it must be available on electronic means. We have got about 14 staff accessing this data within the department. In general they will know that well "X" has come in last month. So, requiring immediate access to electronic data is nice to have, but it is not a must to have. Again, the fact the computer lets you have immediate access sometimes takes over from the fact that you do not need it in real truth. So I think the time scale of some of our jobs is important.

One big question that arose was, should we go to a more formalised database management system characterised by SQL. We had a look at it, we even had a trial at it of one particular brand. Our answer was, and still is at this point in time, that we do not need it. That is not to say that there are not advantages to it - not to say that some time down the road, we will not need it, but at the stage we are at in developing at database, developing uses for a database and developing people to input and make use of a database, SQL would be almost a disadvantage. It would get in the way.

Another problem which we need to satisfy is security. People are almost paranoid about the apparent ease of access to computer systems. We can get paper and things transmitted to us by paper and nobody appears to worry in the least that somebody can get access to them and they could be copied. You can imagine it happening very easily. No one appears to worry about it.

South Australia

You can imagine people getting access to a computer very easy and everybody is paranoid about it. It is a real problem which we have got to face if we are going to get a reasonable working solution to transmitting data by electronic means to each other.

history and background

We are in the silly state at the moment of all of us getting paper data and spending money and time in inputting it into a computer system, because we will not let the two systems talk too easily. We have got to stop that, it is only worthwhile putting the data in once and in today's environment, very often a lot of the data we are talking about is captured electronically anyway. We have got to be able to develop the systems that will enable that data to flow through the electronic systems cheaply and effectively.

As for long term storage, tapes are not the way to store data if you want it to last for 50 or 60 years, which is a government problem. Essentially we may be called on to provide that data at any time in the future and need to deliver it, so we have got a problem with electronic storage.

The Electronic Office is the ability to talk to each other by electronic means cheaply and effectively. We are all developing EO in-house. Not a lot of work has gone into developing electronic communication between government and industry. I think it has been developed quite well between the various companies . We have got a big gulf between government and companies and we have got to put a bit of effort into closing it in a cost effective manner.

That is the end of mine and I will hand over to Bob.

MR. FROST: The main thrust of the PEPS database so far has been acquiring data, and so, what I propose to do is show you some of the data that we have got stored before I go through and show you some of the things that it can do.

We are using SAS to look after our data. Unfortunately we cannot show any graphics, because the display unit here does not support the graphics card we have in this machine. Instead, I have some graphic transparencies which I will show you later.

This is the main PEPS menu (figure 1), which is called by typing "PEPS". All the petroleum personnel in our department can use this system and these are the basic options that they've got.

South Australia

I will not go through all the data we have stored but the techniques are fairly similar throughout all the options.

PEPS

This is a docket system (figure 2) that keeps track of all the dockets that travel through the Oil and Gas Division, which can be up to 500 a week. The term "browse" is SAS command that allows you to have a look at the file. First, SAS puts the first record of that file on the screen and then allows you to search that data. I can, for instance, set up any of these fields that contain textual data as search fields and search for strings which occur within those fields.

SAS

For example, I will use a docket that I used recently as a reference. First of all I will set up a field to tell SAS to look for any text in that field that I type in. This search is case sensitive, by the way, so - I am just looking for the occurrence of "MAP" occurring within that title field.

SAS is not a database product like Oracle. It does not allow you to do many of the things that you could do in Oracle. However, I think that the big advantage with SAS is that you can do everything within it; you can analyse the data, you can produce graphs, etc. It can all sit within the one system; you do not have to go to a database, extract the data that you are looking for and then feed it into an external product. I cannot show you today, but we could put graphs up on the screen. We could do all that within the one package.

Okay, as you can see, it has found the occurrence "MAP" within the field (figure 3) and that was the docket I in fact had, and there are my initials down the bottom to say that I did have it.

We will just get back to the main menu again (figure 1).

```
                        <<<  P E P S  >>>
Select Option ===>                                  Press END to return.

            South Australian Department of Mines and Energy

                    Implemented  ---  April 1988


                    BR .... Basin References
                    DO .... Dockets
                    EX .... Exploration
                    GP .... Gas Production
                    LO .... Logs
                    OP .... Oil Production
                    WE .... Wells
                    WH .... Well History
```

figure 1

```
                          D O C K E T S
Select Option ===>                                  Press END to return.

            South Australian Department of Mines and Energy

            PETROLEUM EXPLORATION and PRODUCTION SYSTEM


                    DM .... DME
                    TE .... Tenement
                    WE .... Well
                    Q  .... Quit PEPS
```

figure 2

```
                 Browse SAS data set: SASDATA.DMEDOCS                Screen  1
Command ===>                                                         Obs   154

                    D M E    F I L E    L O C A T I O N S


 DME         :  192 / 81   ______

 Title       : DEPT. OF NATIONAL MAPPING- request for survey data

 Envelope    : ___________________

 Date In     : 30/08/88

 To Whom     : RBF DI

 Date Out    : 01/09/88

 To Whom     : N SANDERCOCK

 Comment     : _______________________________________________
```

figure 3

```
                   Browse SAS data set: SASDATA.WELLS                 Screen   1
Command ===>   f well = 'alfred flat bore'   numb = 1                 Obs      1

                      W E L L   I N F O R M A T I O N

Well        : ALFRED FLAT BORE             Field     : _________________________
Number      :  1 _                         Map100    : 6825   Unit :   117

WCR no      : Records GSB.22, vol.2        Spheroid  : ______
SR no       : ____________________         Latitude  :  36.0500000 deg. S
Basin       : MURRAY                       Longitude : 139.4300000 deg. E
Farmout     : _________________________    TD        :   922.0 feet
Tenement    : ____________________         KB        : _______ feet
Operator    : COORONG OIL CO               Elevation :   170.0 feet
On/Off      : ON  shore                    Cost      : __________
Class       : EXPLORATION
Sub Class   : NFW
Object 1    : OIL
Object 2    : ________________________________________
Status      : PLUGGED, ABANDONED
Spudded     : ________
Rig Rel.    : ________
Drill Rig   : JOHNSON BROS
Comment     : Spudded 1892,AlfredFlatBore#2 in 1922 to T.D.931' 3milesN-NW
```

figure 4

```
                    Browse SAS data set: SASDATA.WELLS              Screen  1
Command ===> f well = 'big lake' spudded >= 1/1/88                   Obs     1

                      W E L L   I N F O R M A T I O N

Well       : ALFRED FLAT BORE                 Field     : _________________________
Number     :  1 _                             Map100    : 6825   Unit :   117

WCR no     : Records GSB.22, vol.2            Spheroid  : ______
SR no      : ____________________             Latitude  :  36.0500000 deg. S
Basin      : MURRAY                           Longitude : 139.4300000 deg. E
Farmout    : _________________________        TD        :   922.0 feet
Tenement   : ____________________             KB        : _______ feet
Operator   : COORONG OIL CO                   Elevation :   170.0 feet
On/Off     : ON  shore                        Cost      : __________
Class      : EXPLORATION
Sub Class  : NFW
Object 1   : OIL
Object 2   : ________________________________________
Status     : PLUGGED, ABANDONED
Spudded    : ________
Rig Rel.   : ________
Drill Rig  : JOHNSON BROS
Comment    : Spudded 1892,AlfredFlatBore#2 in 1922 to T.D.931' 3milesN-NW
```

figure 5

All of this data can be edited in full screen mode; just go in and change the fields. It can also be listed out to a printer. These are basic functions that SAS provide for all these data sets. I will show you some others later that have been written in SAS code which allow you to do a lot more.

South Australia

We are able to restrict people in using different data sets or editing data sets. Most people just have a browsing right so that they can go in and look at the data or produce graphs but they cannot go in and change anything.

PEPS

I would like you to look at our well information as this is probably the file that is used most. SAS can can skip around the file fairly easily when a record number is input, or you can do a character string search, which takes a bit longer. SAS stores its data in direct access files which means that if you know the record number you can go straight to the record; but if you are searching for the occurrence of a string within a field, it takes a little longer because it has to read through each record, one after the other.

well data

For instance, I can find:

WELL="ALFRED FLAT BORE" NUMB=1.

Now, these, "WELL" and "NUMB" (figure 4) are variable names which are used within SAS. You are able to extract variable names from the screen by putting your cursor on the field and pressing, "Help" and it will tell you what they are. You get to know what those variables are the more you use the system. So any of these fields can be searched with any relational operator : =, , , etc.

Okay, back to Alfred Flat Bore. It has told me we have reached the end of the file without a match. What happened is that SAS searches from its current position to the end of the file. So if we just repeat that command, it will now search from the beginning - and there is Alfred Flat Bore 1 (figure 4).

If I wanted to find, for instance, all the Big Lake wells that have been spudded this year -

find WELL="Big Lake" spudded = 1/1/88

so it just goes to the first occurrence and you can just keep repeating the search and SAS will display the next occurrence.

South Australia

PEPS

well data

So although we do not have a database here, you can see it is reasonably efficient; and it is reasonably efficient because the file is fairly small. As the files grow, of course, SAS becomes less efficient, but for the volume of data that we are anticipating for the PEPS project, it seems more than adequate.

This is a piece of software that I have written into SAS which allows you to do queries (figure 6). It comes up with several screens and people can fill in any information they want; for instance, I will look for the "Otway Basin".

So any of these fields, from dates to geographic locations or whatever forms part of that well file, can be searched on. They do not need to be indexed and are in fact not indexed. SAS does not index any fields, so it is going to look through the whole file and find all the "Otway Basin" data.

We can then sort the data. We will sort it in order of spud date just for the demonstration.

Now, by default, all the fields will be listed on the screen. I can restrict those variables and you will notice (figure 6) at the bottom few lines of the screen that they are actually displayed so that if people do not remember those names they can grab them from there. So it is going to display those fields and it will be sorted by spud date. It is doing that now (figure 7).

SAS builds a temporary file, by going through the main data file, extracting all the data that meets the criteria that I have typed in and storing it in the temporary file. The temporary file will be dispalyed automatically and can be printed later in the session. I can print all of the variables or some of the variables in any order that I like.

Now, as you can see, that is reasonably fast. There are about 1000 records, I guess, in this file and they are not indexed; SAS just reads through sequentially. You also have the advantage that you can sort on any field.

You will notice there that some of the well names have been truncated; that is deliberate, so we can fit more information on the screen. I will just skip down through those. As you can see, they have been sorted in spud order.

So, people can do their own queries on the database and then go back to the well (figure 8) to print the data that has been listed. The temporary file still exists until they log out. When they print that data

```
Command ===>

                              SELECTION CRITERIA

Well        : _______________  or  _______________  or  _______________  or
              _______________  or  _______________  or  _______________
Number      : __  to  __
Ext         : _  or  _  or  _
Field       : _______________  or  _______________  or  _______________
              _______________  and _______________  and _______________
Map 100     : ____  to  ____
Unit        : _____  to  _____
WCR No      : _______________  or  _______________  or  _______________
              _______________  and _______________  and _______________
SR No       : _______________  or  _______________  or  _______________
              _______________  and _______________  and _______________
Basin       : otway__________  or  _______________  or  _______________
              _______________  and _______________  and _______________
Farmout     : _______________  or  _______________  or  _______________
              _______________  and _______________  and _______________
Tenement    : _______________  or  _______________  or  _______________
              _______________  and _______________  and _______________
Class       : _______________  or  _______________  or  _______________

              _______________  and _______________  and _______________
Sub Class   : _______________  or  _______________  or  _______________
              _______________  and _______________  and _______________
On/Off      : ___  or  ___
Object1     : _______________  or  _______________  or  _______________
              _______________  and _______________  and _______________
Object2     : _______________  or  _______________  or  _______________
              _______________  and _______________  and _______________
Operator    : _______________  or  _______________  or  _______________
              _______________  and _______________  and _______________
Status      : _______________  or  _______________  or  _______________
              _______________  and _______________  and _______________
Spudded     : ________  to  ________
Rig Rel     : ________  to  ________
Driller     : _______________  or  _______________  or  _______________
              _______________  and _______________  and _______________
Rig         : _______________  or  _______________  or  _______________
              _______________  and _______________  and _______________
Comment     : _______________  or  _______________  or  _______________
              _______________  and _______________  and _______________
Spheroid    : __________  to  __________

Latitude    : ___________  to  ___________
Longitude   : ___________  to  ___________
T.D.        : ___________  to  ___________
K.B.        : ___________  to  ___________
Elevation   : ___________  to  ___________
Cost        : ___________  to  ___________
```

figure 6

```
Sort by  : spudded__________________________________
(By default records are sorted by well numb extn)

Variables to be listed (other than well numb and extn)

   basin spudded td______________________________________________
(By default all variables are listed)

Valid variables for sorting and listing are :-

   well numb extn field map100 unit wcr sr basin farm tenem class
   sclass onoff object1 object2 oper status spudded rigrel driller
   rig comment spheroid lat lon td kb elev cost
```

SAS Data Set: WORK.WELTEMP

Command ===>

Observations
First 1
Last 19

WELL	NUMB	EXTN	BASIN	SPUDDED	TD
SOOC BORE	1		OTWAY	.	1170.0
SAOW	1		OTWAY	01/01/15	4504.0
SAOW	2		OTWAY	01/01/15	1824.0
ROBE	1		OTWAY	15/02/15	4504.0
SOOC BORE	.	A	OTWAY	01/01/25	2660.0
ENTERPRISE OIL	4		OTWAY	12/01/34	466.0
PENOLA	1		OTWAY	07/02/61	4985.0
BEACHPORT	1		OTWAY	01/09/61	3963.0
MOUNT SALT STRU	1		OTWAY	19/01/62	1007.0
MOUNT SALT STRU	2		OTWAY	26/01/62	998.0
MOUNT SALT STRU	3		OTWAY	06/02/62	997.0
MOUNT SALT STRU	4		OTWAY	13/02/62	997.0
MOUNT SALT STRU	5		OTWAY	20/02/62	997.0
MOUNT SALT	1		OTWAY	09/05/62	10044.0
GELTWOOD BEACH	1		OTWAY	22/08/63	12300.0
KALANGADOO	1		OTWAY	13/05/65	9040.0
CAROLINE	1		OTWAY	02/09/66	111061
ROBERTSON	1		OTWAY	29/11/66	5900.0
ROBERTSON	2		OTWAY	29/04/67	4941.0

figure 7

W E L L S

Select Option ===>   Press END to return.

South Australian Department of Mines and Energy

PETROLEUM EXPLORATION and PRODUCTION SYSTEM

BR .... Browse
ED .... Edit
GR .... Graphics Output
LI .... List Selected Data to Screen
PR .... Print Previously Listed Data
RE .... Remove Deleted Records
RP .... Reporting
Q .... Quit PEPS

figure 8

it does not physically go straight to the printer. It is written to the file and any subsequent searches are also appended to the file.

South Australia

We will now have a look at the gas production data. The gas production data, like the well data, also have graphical output which can be selected by the user and displayed directly onto the screen. We do have a few problems at the moment in finding suitable terminal emulators to allow our PCs to emulate the graphics and the textual data on the same screen. But we hope to resolve this shortly.

gas production data

Gas production data is supplied directly from SANTOS. There are about 25,000 records in the file. I will just go to the end of the file and show you how quickly it can look through a file if you know the observation number.

This data does not have an edit option because it is not edited. It is supplied directly by SANTOS and that is the way it is. We get updates on this data, however, and that goes in and is updated from on a regular basis.

As you can see (figure 9), it is a breakdown by formation of the production from a well. I might point out that the "Remaining Gas in Place" is sometimes negative. This is inherited from SANTOS and means that their original gas in place estimate was a bit astray.

Probably the biggest module of PEPS is the well history, and it contains all those things you see there (figure 10). The "add a history" option allows you to add history data to a particular well. I can now select a well, for example "Moomba 60", and SAS will go in and pick up all the files of all well history data and one after the other, find the last occurrence of Moomba 60. There is a lot of data which is duplicated because some of the fields are just altered slightly.

well history data

This selection screen is built using SAS. It is very easy to use. I just have to fill in the required items. I will not fill all the columns because of the time involved. All these screens and all the data we have on file are listed in the handout that everybody has received.

If Moomba 60 did not exist, it would put up a blank screen for data entry. It goes through all those options that I have selected, one after the other, each time picking up a new SAS data set, and when it exits, each data set is resorted, so it is doing a fair bit of work.

Okay, somebody else is editing that file, so we cannot access it temporarily.

Browse SAS data set: SASDATA.GASINFO — Screen 1

Command ===> — Obs 121

GAS INFORMATION as at OCTOBER 1988

Well : GIDGEALPA
Number : 8
Level : _

SANTOS Area : NORTH DOME

Original Gas in Place : 428.000 m3E6
Remaining Gas in Place : -0.955 m3E6 -0.22 %

	Formation	Total Production (m3E6)	Current % Contribution
1	TOOLACHEE	428.955	100
2	-------------------------	--------	---
3	-------------------------	--------	---
4	-------------------------	--------	---
		----------	-----
	TOTAL	428.955	100

figure 9

WELL HISTORY

Select Option ===> — Press END to return.

South Australian Department of Mines and Energy

PETROLEUM EXLORATION and PRODUCTION SYSTEM

AB .... Abandonments
AH .... Add a History
CA .... Casing Details
CO .... Cores
DR .... Drilling Details
DS .... Drill Stem Tests
FT .... Formation Tops
LO .... Logs Run
PR .... Print a Well History
WE .... New Well Details
WK .... Daily Workover Summary
Q .... Quit

figure 10

These drilling details are entered daily from telexes received by the department. We have got an engineer that enters and updates the data. He would go into that screen, duplicate that record and then edit the duplicated record to show the current day's value. While he is editing the file, it is not accessible to other users. We are looking, longterm, at capturing all this data electronically and save two people typing in the same information.

South Australia

Again, all these fields are searchable, as I have shown in the well data. We can list all the data out or list all the data for a particular well.

Now, whilst SAS is not a database product (you can only look at one data set at a time) it has got a merge option which allows you to bring all these data sets in and create one data set. The well name and number are common to all our data sets, so it is quite easy to merge all this data.

I think I will conclude here. Just before I go I will show a few transparencies which illustrate the sorts of graphs we can produce.

graphics and plotting

This shows all the petroleum wells in South Australia (figure 13). The coastline was fairly poor; it was one that I digitised by eye and consisted of about 50 points, but it gets the picture over and shows you where all the wells are.

These are examples of interest and demonstrate some of the graphs SAS can do (figure 14). These negative numbers are a restraint caused by the current version of SAS. We could do this for any well, show all the well locations by latitude and longitude - those figures are all the same.

This is a 3D surface of elevation plot over the Moomba Field (figure 15). Probably one wouldn't use a ground level surface of elevation, but perhaps, more like formation tops, soil type or something like that. SAS produces this very easily with very little code.

This is a contour map of the same area (figure 16). The contours are usually in colour so it is easier to pick up the different lines.

These are some of the graphs we have used with our production data (figure 17,18,19). If you want to know what that kink in the graph is, I am sure Mr Aust will be glad to explain that. Again, we can do this for all the wells, for a particular field or an individual well if we want.

I think that is about all I have got to say. Are there any questions?

```
                          Add a Well History
Command ===>
                            WELL SELECTION


      Enter Well              : MOOMBA
      Enter Number            : 60
      Enter Extension         : _


      Any character to include in the update process

               x New Well
               _ Drilling
               _ Workover
               _ Casing
               _ DST
               _ Cores
               _ Formation Tops
               _ Logs
               _ Abandonment
```

figure 11

```
                 Edit SAS data set: SASDATA.WELNEW            Screen  1
Command ===>                                                  Obs   451

                           N E W    W E L L S

Well               : MOOMBA
Number             : 60 _

Location Approval  : ________          Programme Approval : ________
TD                 : 10411.0
KB                 :   151.0
Elevation          :   135.0
Spudded            : 31/07/88
Rig Release        : 29/08/88
Status at Rig Rel  : P&A
Operator           : SANTOS
Contractor/Rig     : ODE 5
Lease Inspections  : ________ ________ ________ ________ ________ ________
Remarks
    13.3/8 CSG TO 1000 FT. 9.5/8 CSG TO 5714.
    ----------------------------------------------------------------------
    ----------------------------------------------------------------------
    ----------------------------------------------------------------------
    ----------------------------------------------------------------------
```

figure 12

South Australian Department of Mines and Energy

"PETROLEUM" WELL LOCATIONS

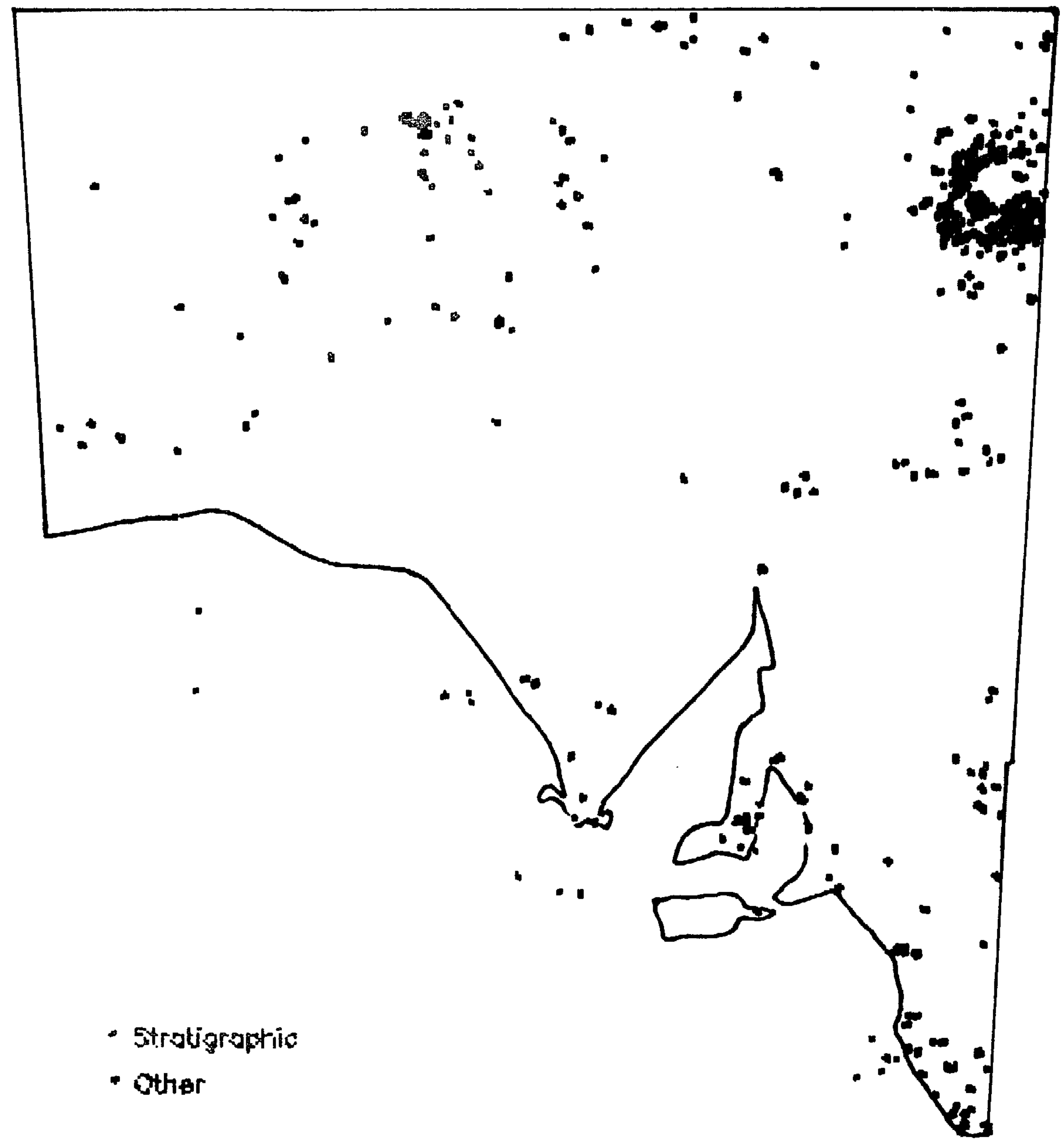


figure 13

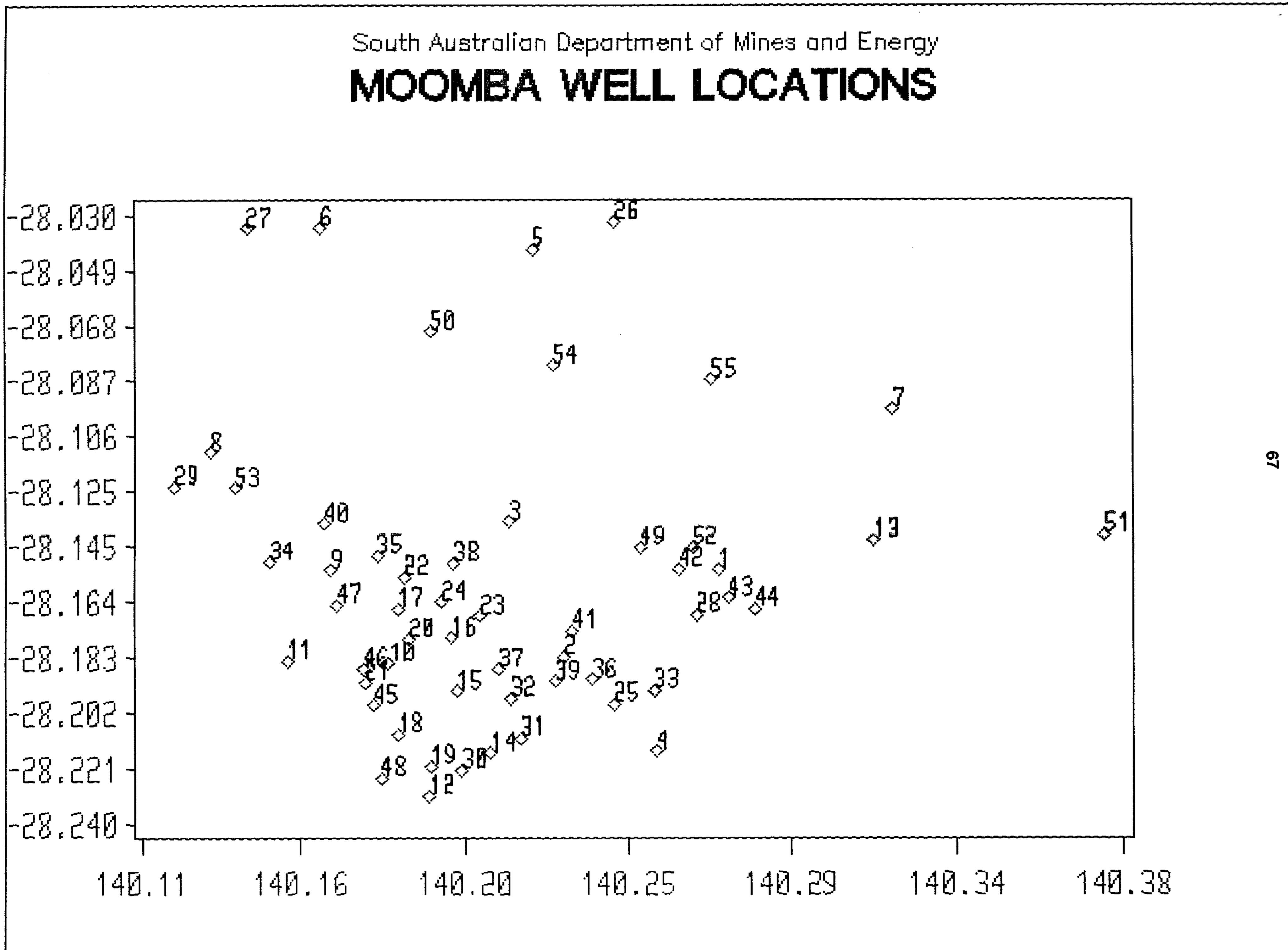

South Australian Department of Mines and Energy
MOOMBA WELL LOCATIONS
-28.030
-28.049
-28.068
-28.087
-28.106
-28.125
-28.145
-28.164
-28.183
-28.202
-28.221
-28.240
140.11
140.16
140.20
140.25
140.29
140.34
140.38

figure 14

South Australian Department of Mines and Energy

MOOMBA FIELD ELEVATIONS

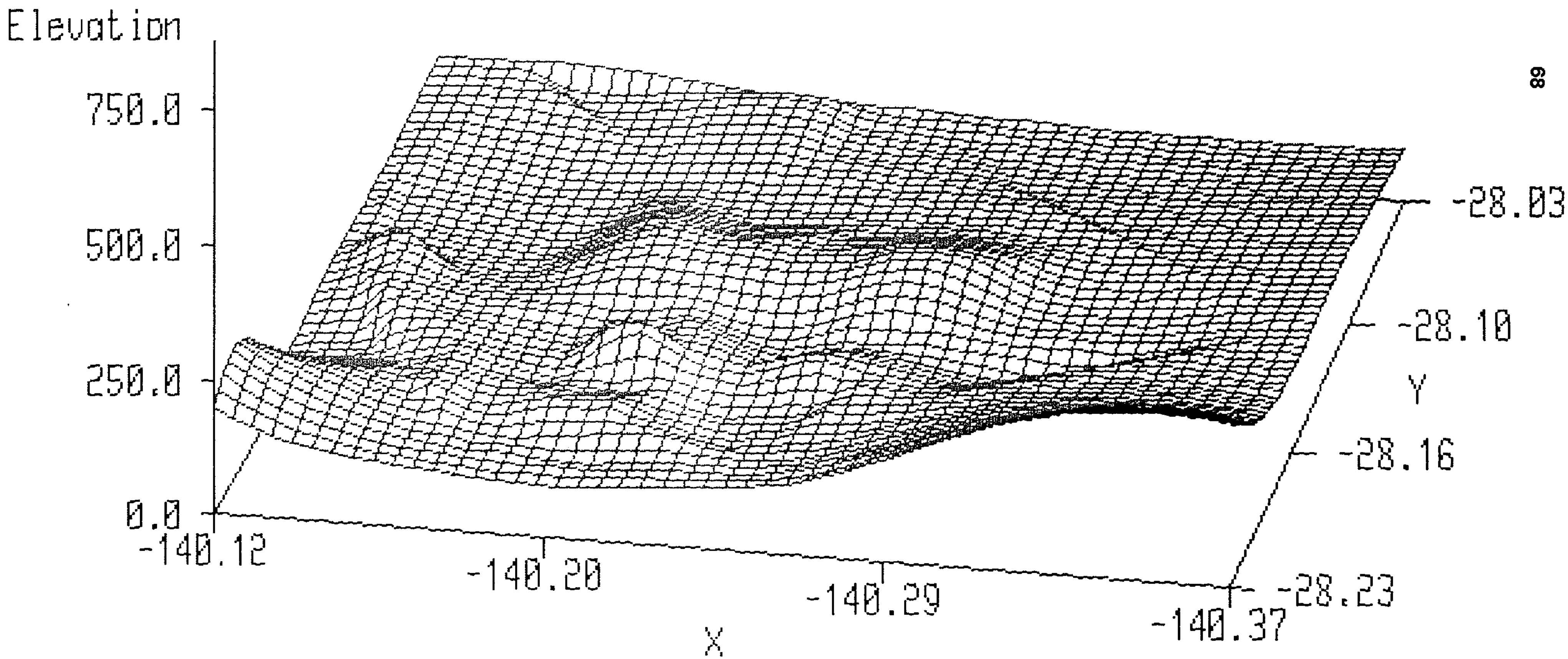


figure 15

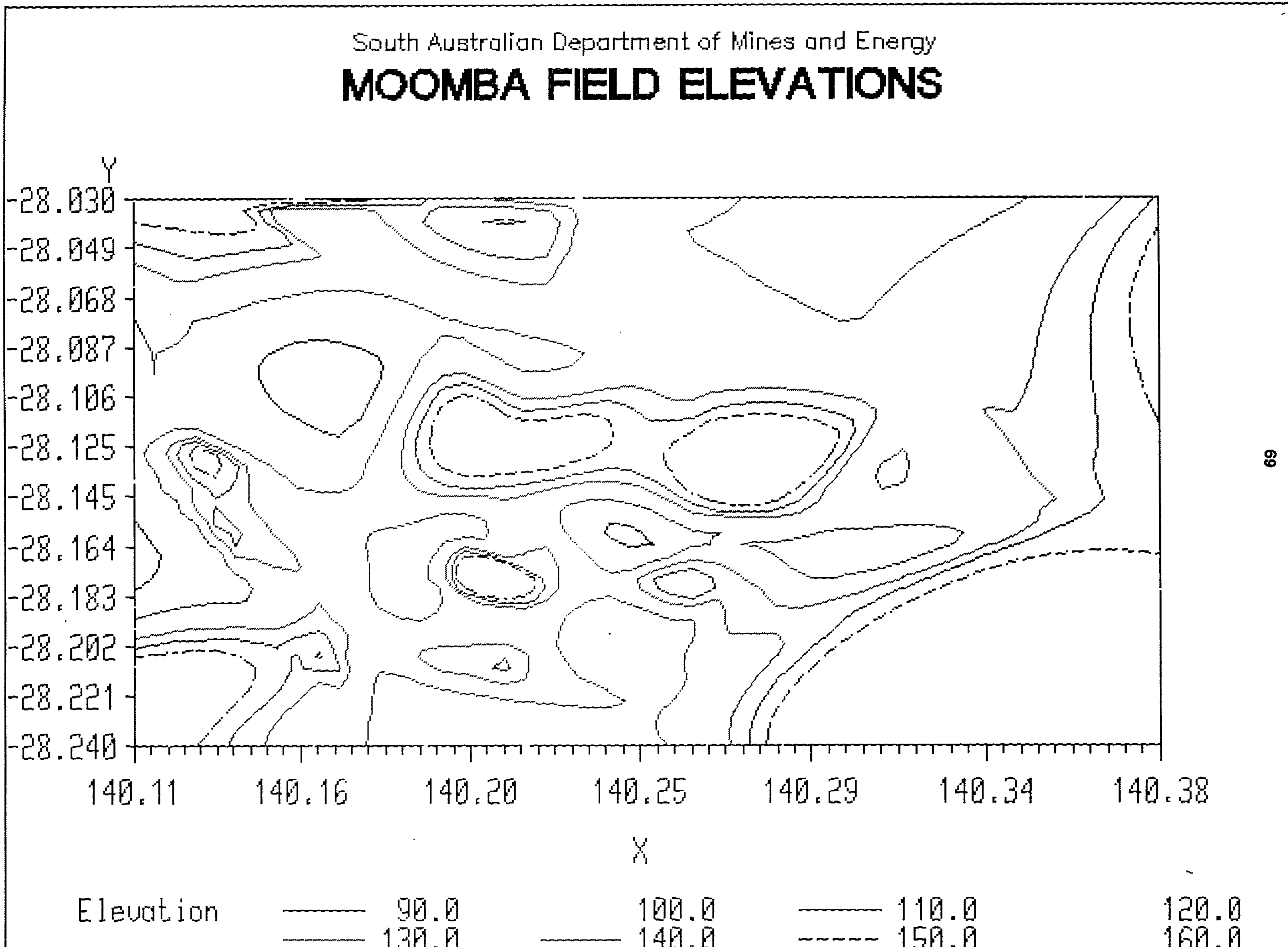

South Australian Department of Mines and Energy
MOOMBA FIELD ELEVATIONS
Y
-28.030
-28.049
-28.068
-28.087
-28.106
-28.125
-28.145
-28.164
-28.183
-28.202
-28.221
-28.240
140.11
140.16
140.20
140.25
140.29
140.34
140.38
X
Elevation
90.0
100.0
110.0
120.0
130.0
140.0
150.0
160.0

figure 16

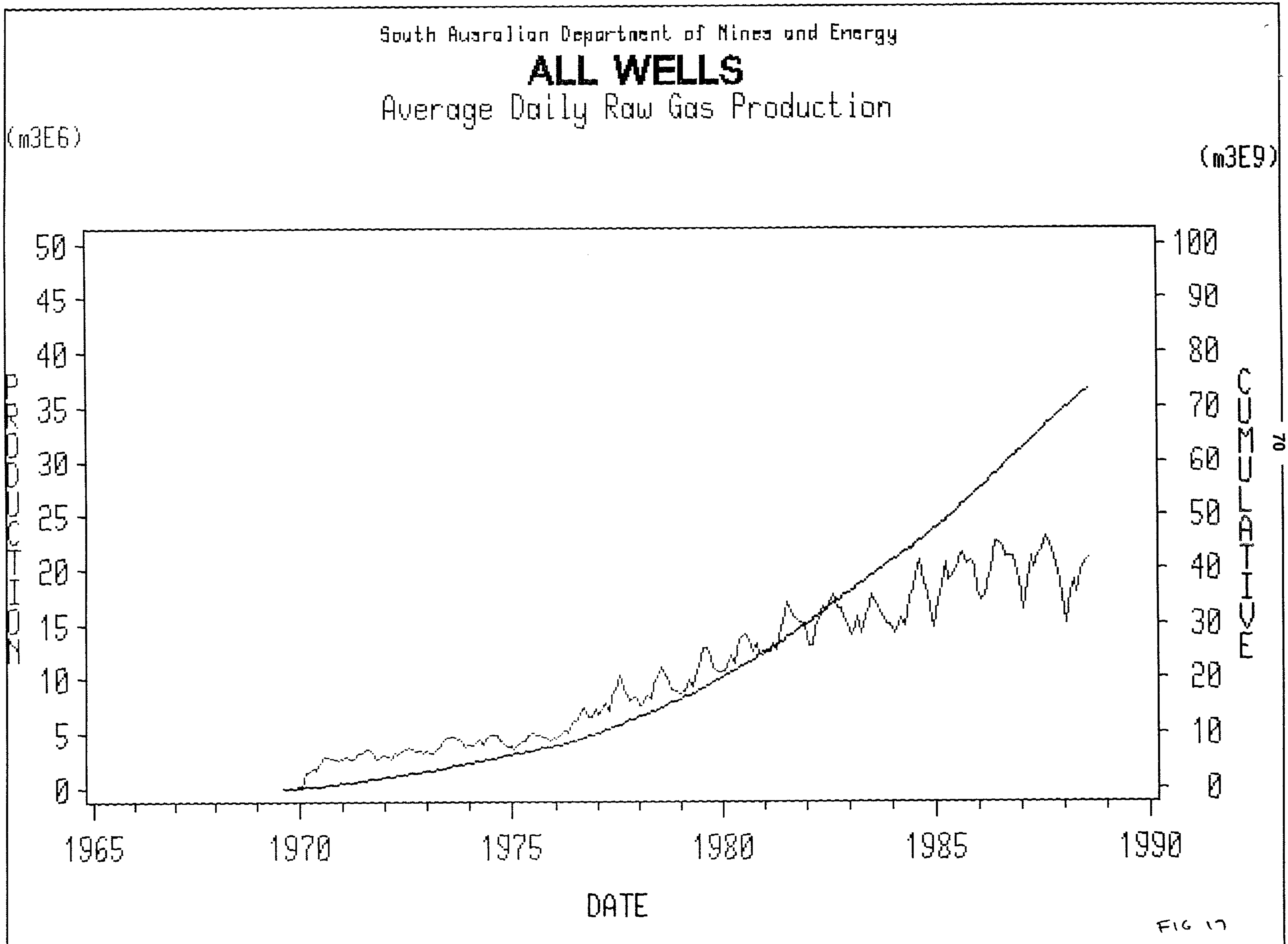

South Australian Department of Mines and Energy
ALL WELLS
Average Daily Raw Gas Production
(m3E6)
(m3E9)
PRODUCTION
CUMULATIVE
0
5
10
15
20
25
30
35
40
45
50
0
10
20
30
40
50
60
70
80
90
100
1965
1970
1975
1980
1985
1990
DATE
FIG 17

figure 17

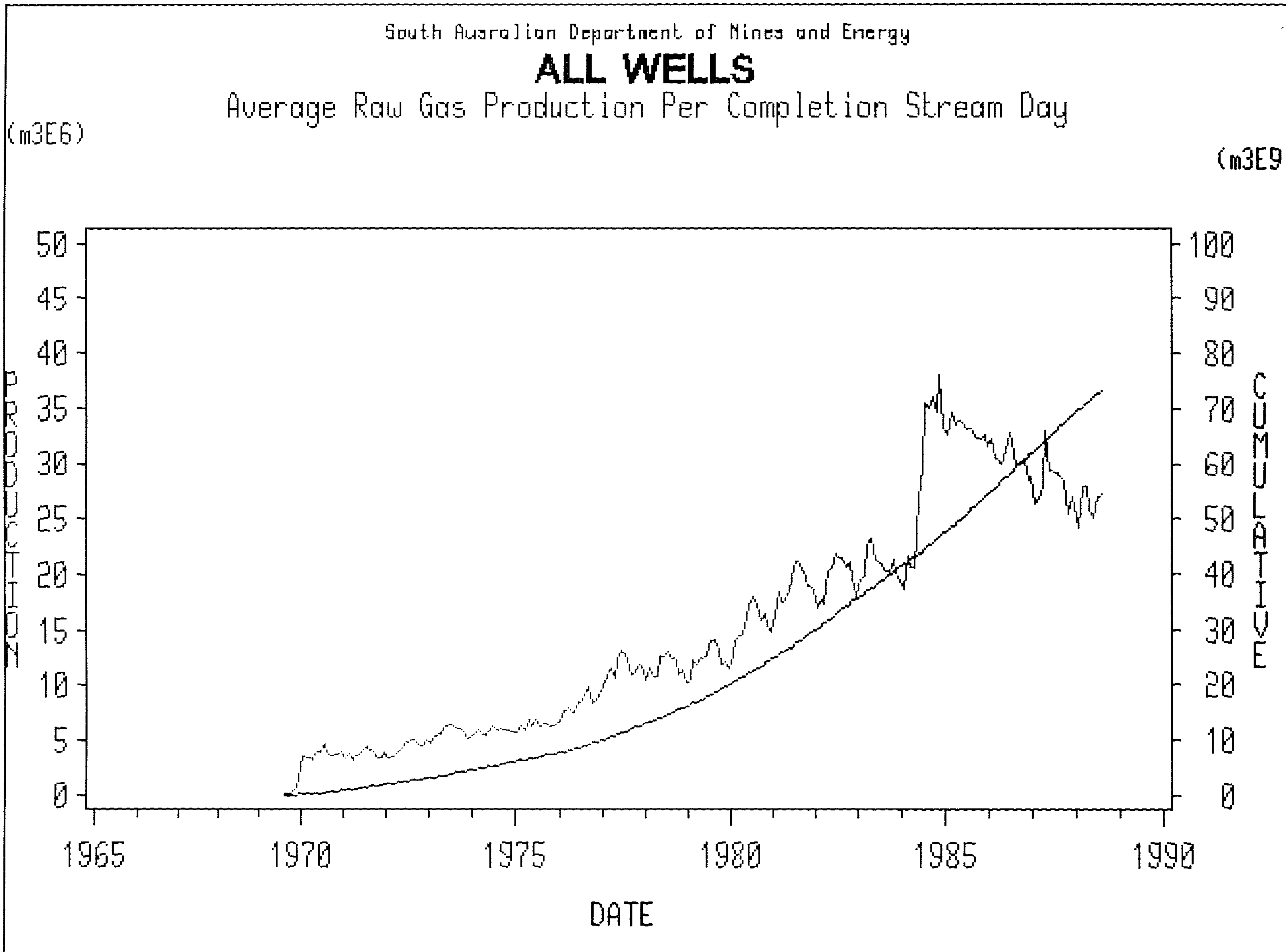

South Australian Department of Mines and Energy
ALL WELLS
Average Raw Gas Production Per Completion Stream Day
(m3E6)
(m3E9)
PRODUCTION
CUMULATIVE
DATE
0
5
10
15
20
25
30
35
40
45
50
60
70
80
90
100
1965
1970
1975
1980
1985
1990

figure 18

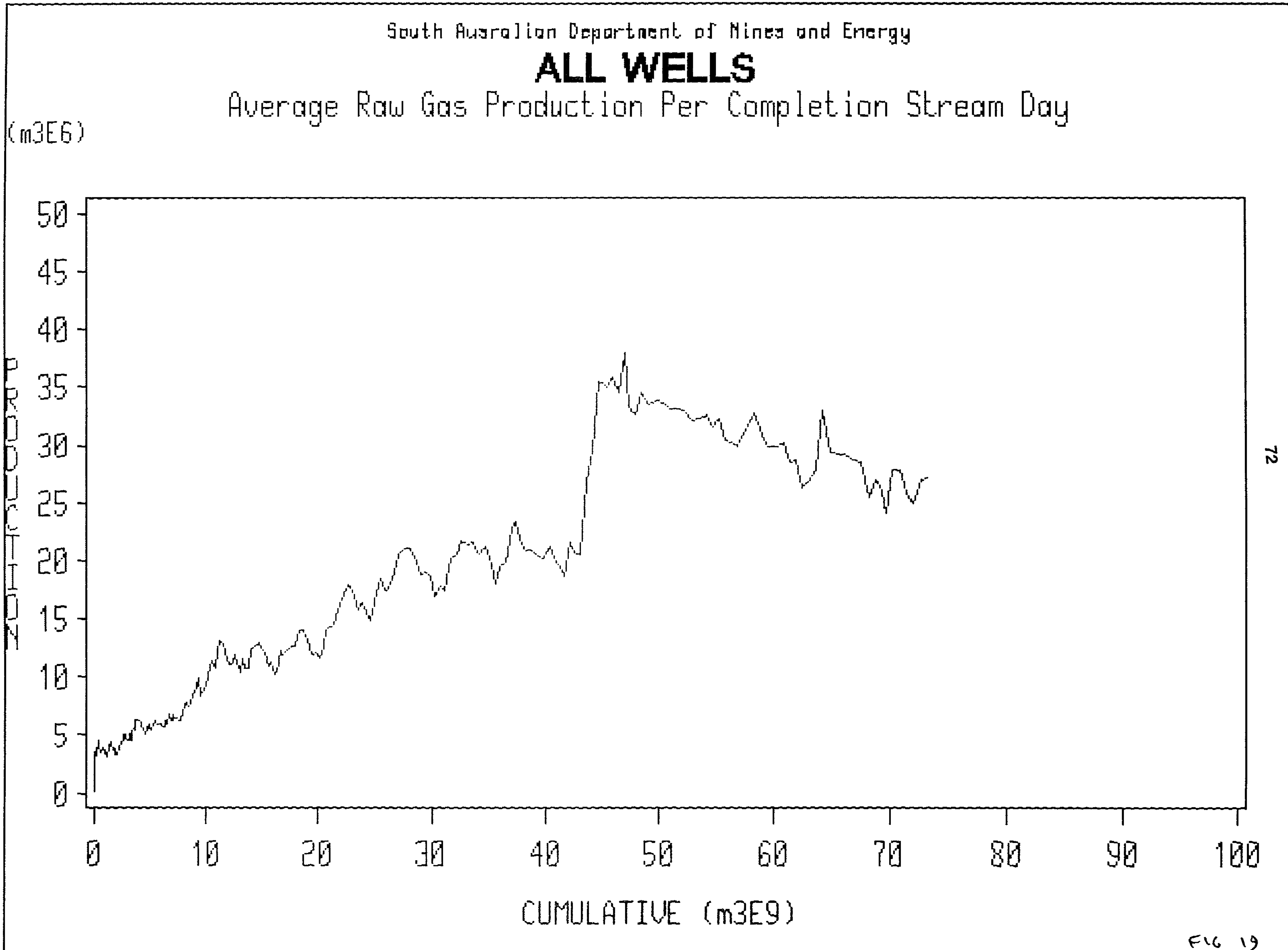

South Ausralian Department of Mines and Energy
ALL WELLS
Average Raw Gas Production Per Completion Stream Day
(m3E6)
PRODUCTION
0
5
10
15
20
25
30
35
40
45
50
0
10
20
30
40
50
60
70
80
90
100
CUMULATIVE (m3E9)
FIG 19

figure 19

Paper Submitted

PETROLEUM REPORTS IN THE SAMREF DATABASE OF THE SOUTH AUSTRALIAN DEPARTMENT OF MINES AND ENERGY

by

Loraine A. Gerdes

HISTORY AND BACKGROUND

South Australia

The purpose of this paper is to briefly outline a source of petroleum information which is not in a petroleum database, but is held in the Department's bibliographic database, SAMREF.

The Department is responsible for the storage, preservation and retrieval of all reports lodged by companies as part of legislative requirements of the Petroleum and Mineral Acts. When reports are released on open file, they are indexed and summarised by the Information Services Branch for SAMREF.

A brief summary of the history of SAMREF is as follows:

SAMREF

bibliographic data

. The database commenced in 1975 when it was developed as a simple bibliographic keyword index using software written in-house.

. In 1985, for ease of use, it was upgraded and redesigned using the STATUS information retrieval software. As this is free text software, abstracts in which all words may be fully searched, were introduced.

. In 1986, a copy of post-1983 references was made available to the [1]CLIRS Information Services for public online access.

. In 1988, additional data, supplied by the Petroleum Branch, was added to well completion report references in SAMREF.

1 *At the time of publication, CLIRS operates under the name INFO ONE*

DATABASE STORAGE AND QUANTITIES

The SAMREF database consists of 17,000 references, from 1953-1988, with abstracts included from 1983- 1988. Eight hundred and seventy petroleum company references are stored in the database in separate chapters.

SAMREF is stored as a single database on a NEC APCIV Powermate 2 personal computer. The database currently consists of 14.9 MB of text and 15.8 MB of concordance. It is probably the largest PC-STATUS database in Australia.

TYPE OF DATA

South Australia

SAMREF includes references to company and Departmental unpublished reports, geophysical reports, Departmental and other selected publications.

Each petroleum reference consists of the following named sections

SAMREF

bibliographic data

TI	Title
TN	Tenement number, farmout blocks
CO	Company (tenement holder and operators)
AU	Author
SO	Source (title of journal or report series, collation, date
CM	Comment (may not be searched)
NO	Notes
AB	Abstract
SU	Subject
ST	Stratigraphic names
DR	Drill hole or well
MI	Mine, field, deposit or prospect name

LO Location (geographic names, latitude, longitude, for well completion reports)

MA Map (1:250 000 to 1:50 000 standard numbers and 1:250000 standard names)

KEY Keyed fields of SADME unique identifiers

AD Administrative details

The AB (abstract) in well completion reports includes a free text summary, some basic drilling data, and depths of formation tops.

ACCESS TO THE DATABASE

South Australia

SAMREF

bibliographic data

The full version of SAMREF is at present only accessible through one personal computer in the Department. This version contains pre-1983 references which have not yet been edited. Information from SAMREF on new references released on open file is listed in hard copy form, in the "New Information Releases", distributed monthly to companies who subscribe to the State exploration licence maps.

Multi-user online access to post-1983 references in SAMREF is provided to the public on CLIRS. SAMREF, along with the New South Wales databases MINFINDER and COREFINDER, and the national system AESIS, are the only geoscience databases currently available in Australia which may be accessed online by public subscribers. The all form part of [1]ARID (Australian Resources Industry Database).

On CLIRS, SAMREF contains 3381 references with abstracts, from 1983-1988, with older references being added as they are revised and upgraded.

To develop more uniformity between databases on ARID, SAMREF was redesigned according to guidelines recommended by the AGIA (Australian Geoscience Information Association) Standards Subcommittee.

MANIPULATION OF THE DATA

1 *At the time of publication, the name ARID has been changed to GeoPac.*

Since May, 1988, value-added stratigraphic data from well completion reports has been transferred to the AB (abstract) named section of SAMREF from PEPS (Petroleum Exploration and Production System). As SAMREF is the only database in the Department available to the public online, the well completion data in SAMREF is intended to provide the users with a comprehensive summary of the well completion report, in addition to bibliographic information.

The additional data consists of age, interpreted stratigraphic units, and depth of formation tops intersected in the well. The stratigraphic units were revised by geologists in the Petroleum Branch to replace out-of-date nomenclature. It was considered that retaining this old data was of little value to users, with the potential to cause confusion when more recent information was readily available in computerised form.

DATA BACKLOG

South Australia

All open file reports from 1953-1988 have been indexed. Reports from 1983-1988 contain abstracts. The pre-1983 data requires major revision, editing and updgrading to obtain the same standard as the newer references. This is a major labour-intensive task yet to be achieved.

SAMREF

Confidential petroleum reports are currently being indexed, in preparation for their release on open file.

bibliographic data

DATA ENTRY PROCEDURES

A single indexing function is used to summarise data on well completion reports for both PEPS and SAMREF. The indexers provide data in a fixed field format for PEPS and in a free-text format for SAMREF. Word processing software MultiMate is used for enering bibliographic details, keywords and abstracts in SAMREF. The value-added data is transferred from PEPS to SAMREF by a Pascal editor.

CONCLUSION

As part of the Department's aim to encourage exploration and to provide an information service to the industry, SAMREF is being developed to include detailed information on exploration reports, including well completion reports. One of the objectives of SAMREF is to disseminate this information as widely as possible to users.

In keeping with the theme of the Workshop, comments on user requirements and how their information needs should be accommodated by government databases are therefore welcome.

Session Questions

South Australia

THE CHAIRMAN: Thanks, Lorraine. I will make one comment about SADME; seeing I spend most of my time there, I know a fair bit about it. One of the things we are looking at, as Lorraine just mentioned, was a relational database management system for the department overall. We have seen today what has happened with PEPS and with bibliographies very briefly. There are a large number of additional databases that the department will wish to implement over the next few years and we think that some sort of relational product is probably the best way to go for the development of theose particular databases. What happends to PEPS in the long-term, whether it aactually gets converted over to the new relational product from the SAS implementation will be determined over time. WE do not really know at this stage. I think the intention would be at the moment anyway to leave it as it is.

indexing

Are there any other question that you would like to put to either Terry, Bob or Lorraine ?

MR. KAY : Just one brief question for Lorraine. I am Brian Kay from the New South Wales Department of Minerals, Energy and Resources.

You memtioned that using the same index as an indexing process for PEPS and SAMREF. We have the same problem with the index. Do you use the same process for other information as well?

MS GERDES : No, I should qualify that, it is because of it being a special petroleum project that we did get some additional indexes just for the indexing the well competion reprts. We would like to see more of this developed in other areas.

THE CHAIRMAN : It would certainly be the intention as timegoes on and each new database gets planned that we look at the possibility of using the same, or at least a single entry function to feed a number of different final repositories of the data.

I will now hand over to Paul Senycia from the Northern Territory to talk about the present developments in the Territory.

MR. SENYCIA: Thank you, Maurie.

Northern Territory

You can see by looking at the hand-out, the amount of information that I have given you about the Northern Territory petroleum database very small. This is directly proportional to the limited size of our present petroleum database facility.

To understand the system in the Northern Territory at the moment, I need to give you some indication of the structure of the Department (figures 1 and 2). Petroleum is handled by two divisions, the Energy Division and the Geological Survey of which I am a part. Until seven months ago, the Geological Survey had no petroleum Division whatsoever. Now, there is myself and one other person.

history and background

This gives you some indication of the scale of the operations in the Northern Territory. It is very embryonic. It is, however, the beginning of something which we believe will have to become bigger. In 1985 seven exploration petroleum wells were drilled within the Northern Territory and waters under its jurisdiction; this year will see 30 to 35 wells being drilled. The amount of information that has been generated, particularly by offshore exploration is increasing ten-fold on what we have seen in past years. Consequently, the management of that data and its utilisation has to be addressed and that is partially the reason for my presence here today.

The Geoscience Resource Section within the Geological Survey handles handles all geoscientific data storage including not only petroleum, but also metalliferous and minerological. The Energy Division has some input into the main database, however, its primary concern is involved with upstream development, safety practices and legislation, for which they have developed their own information system.

Until now the Geoscience Resources Section has consisted of a geologist and up to three keyboard operators inputting mainly bibliographic data into a database system known as STAIRS. This holds a listing of petroleum and mineral exploration reports with an attached abstract.

The present system (figure 3) utilises the Government Computing Centre, which is located in Darwin and has ties to the National Library in Canberra and other national data systems such as AESIS. It is also connected by dial-up facilities to any location in Australia.

KS/AO.001

Ted Campbell x5461
SECRETARY
Mines and Energy

Executive Assistant
Bronwyn Foy (A) x5461
(PAWA)

SPECIAL PROJECTS
Terry Fegan x5298

DIRECTOR OF SECRETARIAT (E2)

Margie Arthur (A) x5450

- A5 Ministerial Assistant
  Mary Phillips x5330

DIRECTOR OF PUBLIC RELATIONS

Bob Young x5221

- Public Relations Assistant
  A5 - Lin Holmes x5443

TITLES BRANCH
Chief Draftsman
CD3 - John Fletcher x5438

- TITLES REGISTRATION
  Principal Registrar
  E2 - Dave Hart x5223
  - Special Projects
    E1 - Richard Jackson x5314
  - Applications
    A9 - Alicia Williams x5249
  - Title Management
    A7 - Harry Harmer x5230
  - EL Dealings
    A7 - Janece Barnes x5325
  - Tenements
    A6 - Bernie Hanschel x5300
  - Alice Springs Registrar
    A7 - Jenny Castleman 503653
  - Tennant Creek Registrar
    A7 - Warwick Pascoe 622004
- DRAFTING
  Supervising Draftsman
  SPD - Mike Maidment x5357
  - Cartography
    SDO - Gary Evans x5326
  - Survey Titles
    SDO - John Scott x5322
  - Land Status, Gazettes
    SDO - Yvonne O'Neill x5211
  - Computers
    DO2 - Alan Fleming x5265
  - SDO - Janet Watson 503660
    Alice Springs

DIRECTOR OF MINES (E5)

E5 - Bob Adams x5354

- Personal Assistant
  A4 - Christina Wu x5354
- LEGISLATION & COMMERCIAL
  Assistant Director
  E4 - Doug Scott (A) x5335
  - Mining Advisor
    E3 - Chris Smith x5308
  - Mining Advisor
    E2 - (NV) x5366
  - Mining Advisor
    E2 - Maurice Brohier x5367
  - Royalty Accountant
    E1 - Lyn Karlovsky(A) x5250
  - Prospector Consultant
    Sandy Mahalingham x5278
  - Tennant Creek Battery
    John May 622038
  - Computing
    CSO2 - Chris Brittan x5220
- ABORIGINAL LIAISON OFFICER
  A9 - Geoff Freeman x5205
- MINING & ENGINEERING
  Chief Gov Mining Engineer
  E4 - Fred Dykstra (A) 5248
  - Senior Mining Engineer
    Eng 4 - Vacant
  - Senior Elect/Mech Engineer
    Eng 4 - Geoff Neely x5315
  - Occupational Hygienist
    Sc3 - Wayne Creaser x5324
  - Alice Springs
    Government Mining Engineer
    Eng 4 - Vacant 503656
  - Tennant Creek
    Government Mining Engineer
    Eng 3 - Les Nicholls 622491
- ENVIRONMENT PROTECTION
  Chief Environmental Engineer
  Eng 5 - John Harland x5309
  - Senior Environmental Eng
    Jaime Bastias x5351

DIRECTOR OF GEOLOGICAL SURVEY (E5)

E5 - Paul Le Messurier x5355

- Project Officer
  A9 - Joe Smith x5375
- Personal Assistant
  A4 - Maureen Brown x5355
- NORTHERN REGION
  Assistant Director - Northern
  Sc4 Lex Mulder x5377
  - METALLIFEROUS
    Senior Geologist
    Sc3 Masood Ahmad x5276
  - REGIONAL MAPPING
    Senior Geologist
    Sc3 ~~Greg De Ross~~ x5214 Barry Pietsch
  - GEOPHYSICS
    Senior Geophysicist
    Sc3 Ted Finchammer x5441
  - NON METALLIC RESOURCES
    Senior Geologist
    Sc3Vacant x5320
  - GEOSCIENCE RESOURCE SECTION
    Geologist in Charge
    Sc2 John Fabray x5281
  - PETROLEUM
    Senior Geologist
    Sc3 Paul Senycia x5342
  - FIELD SERVICES
    Technical Officer Gr 1
    Tony Saveliev 843272
  - EQUIPMENT STORE
    Technical Officer Gr1
    Neils Rosenberg-Neilsen 843036
- SOUTHERN REGION
  Assistant Director - Southern
  Sc 4 - Dick Thompson 503650
  - Regional Mapping
    Senior Geologist
    Sc3 ~~Vacant~~ 503663
    Nigel Duncan
  - Metalliferous
    Geologist
    Sc2 ~~Christine Edgoose~~ 503661
    Leon Bagas
  - Geophysics
    Geophysicist
    Sc2 Bruce Simons 503661

DIRECTOR OF ENERGY (E5)

E5 - Bill Tinapple x5460

- Personal Assistant
  A4 - Yoga Harichandran x5299
- ALTERNATIVE ENERGY
  P4 Subash Chandra [005]
- OIL & GAS
  Assistant Director
  E4 (NV) x5425
  - Fuel Technologist
    P4 - Eric Nunn x5433
  - Senior Pipeline Engineer
    P4 - Brett Struck x5260
  - Petroleum Registrar
    A9 - Bill Thompson x5234
- POLICY & PLANNING
  Assistant Director
  E4 - Phil Cross x5437
  - E3 Principal Project Officer x5432
    Jerry Hemphill
  - Project Officers
    E2 - Yvonne Santalucia
    (P/P A9) x5234
    E2 - Margaret Milne x5263
  - Legislative Officer
    E2 - Ken Pocock x5435
    E1 - Keith Upton x5429
  - Senior Energy Technologist
    P3 - Phil Edwards x5264

DIRECTOR ALLIGATOR RIVERS REGION UNIT (E4)

E4 - Colin Hallenstein 6470

- Personal Assistant
  Kerry Gregory 6528
- PROMOTION/REGULATION
  Uranium Advisor
  E2 - Mal Wadd 6529
  - Uranium Mining Advisor
    A9 - David Dundas (A) 6527
- RADIATION/HEALTH
  Health Physicist
  Eng/Sc4 - Jiri Kvasnicka 6607
- MINES INSPECTION
  Senior Mining Engineer
  Eng/Sc4 - Geoff Brown 792159
- ENVIRONMENT
  Senior Environmental Scientist
  Eng/Sc4 - Bob Richards 6547
- WATER MANAGEMENT
  Principal Engineer
  Eng/Sc5 Tony McGill 6478

DIRECTOR OF ADMINISTRATION (E3)

E3 - Helena Jackson (A) x5447

- Personal Assistant
  A4 - Robyn Power (A) x5447
- ADMINISTRATION BRANCH
  Administration Manager
  E1 - Fay Veitman (A) x5430
- SPECIALIST SERVICES
  - Computer Systems Consultant
    E3 - Ian McDonald x5423
  - Staff Development Officer
    A9 - Vacant (A) 5420
- FINANCE BRANCH
  E2 - Doug Denniss x5225
  - Gas Ledgers Manager
    A9 - Brenda Pryce(A) x5212
  - Assistant Finance Manager
    A7 -Charisa Boase (A) x5224
- LIBRARY BRANCH
  Librarian
  Class 4 - David Hugo x5279
- OPERATIONAL SERVICES
  Operational Services Manager
  A9 -Diana Lessels (A) x5292
- SOUTHERN REGION
  Administrative Officer
  A7 - Debbie Blake 503655

NORTHERN TERRITORY
DEPARTMENT OF MINES AND ENERGY

DEPARTMENT OF MINES & ENERGY
ORGANISATION CHART
8 August 1988

MSL - 236 (total)

E1	-	Executive Level E1
A5	-	Administrative Class A5
Sc 4	-	Science 4
Eng 4	-	Engineer Class 4
P4	-	Professional Class 4
PTO 1	-	Principal Technical Officer, Grade 1
STO 1	-	Senior Technical Officer, Grade 1
SDO	-	Senior Drafting Officer
DO 1	-	Drafting Officer, Grade 1
CSO 2	-	Computer Systems Officer, Grade 2

figure 1

(Attachment B)

a5,002

figure 2

DIRECTOR (E5)
Paul LeMessurier [003]

- Project Officer (A9) Joe SMITH [031]
- Personal Assistant (A4) ~~Maureen BROWN~~ [069]
- Word Processor Operator (A3) Dagmar KELLY (LT) [083]

SOUTHERN REGION
Assistant Director (Sc4)
Dick THOMPSON [231]

- REGIONAL MAPPING SECTION
  - Senior Geologist (Sc3) Nigel DUNCAN [0131] (to commence 31/5)
    - Geologist (Sc2) Chris EDGOOSE [138]
    - Geologist (Sc1) Alfredo CAMANCHO [152]
    - Geologist (Sc1) Gresley WAKELIN-KING [153]
    - Geologist (Sc1) Peter HAINES [154]
- GEOPHYSICS SECTION
  - Geophysicist (Sc2) Bruce SIMONS [140]
- METALLIFEROUS SECTION
  - Geologist (Sc2) Leon BAGAS [0139]
    - Geologist (Sc1) Nigel DONNELLAN [155]
- FIELD SERVICES SECTION
  - Geological Assistant (TA2) Ernie KINGDOM [180]
  - Geological Assistant (TA2) Stefan BERGER [179]
  - Geological Assistant (TA1) Bill DURBRIDGE [186]
  - Mirko Pholh (TA1) (LT)

NORTHERN REGION
Assistant Director (Sc4)
Lex MULDER [114]

- REGIONAL MAPPING SECTION
  - Senior Geologist (Sc3) ~~Greg DE ROSS~~ [0132] Larry Pietsch
    - Geologist (Sc2) ~~Barry PIETSCH~~ [141] Vacant.
    - Geologist (Sc2) Steve WYCHE [142]
    - Geologist (Sc1) David RAWLINGS [157]
- GEOPHYSICS SECTION
  - Geophysicist (Sc3) Ted FINDHAMMER [0133]
    - Geophysical Tech. (STO1) Paddy RYAN [170]
- METALLIFEROUS SECTION
  - Senior Geologist (Sc3) Masood AHMAD [0134]
    - Geologist (Sc2) Andrew WYRGALAK [143]
    - Geologist (Sc1) Zia BAJWAH [158]
    - Geologist (Sc1) Philip FERENCZI [156]
- NON METALLIC RESOURCES
  - Senior Geologist (Sc3) Vacant [135]
    - Geologist (Sc2) Brian WHITEHEAD [145]
    - Geologist (Sc1) Peter KRUSE [159]
- PETROLEUM SECTION
  - Geologist Sc3 Paul SENYCIA [125]
  - Geologist (Sc1) Peter CREASER [160]
- GEOSCIENCE RESOURCES SECTION
  - Geologist (Sc2) John FABRAY [146]
  - Administration Clerk (A3) Gaylene MARRIOT [084]
  - Administration Clerk (A3) Laura TOWNS [085]
  - Trainee Penny CURTIS [226]
- FIELD SERVICES SECTION
  - Core Library/Field Mgr (TO1) Tony SAVELIEV [174]
    - Geological Assistant (TA2) Vacant [182]
    - Geological Assistant (TA2) Morne COOPER [183]
    - Geological Assistant (TA2) Gavin WEBB [181]
    - Geological Assistant (TA2) Raymond CURTIS (TA1) (LT) [184]
    - Geological Assistants (TA1) Barbara CAMERON (LT), Raymond SMITH (LT)
- EQUIPMENT STORE TO1
  - Niels ROSENBERG-NEILSEN [175]

MSL - 42

A - Acting (Higher Duties: Temporary Transfer)
LT - Limited Tenure
NP - No Position
NV - Nominal Vacancy
[123] - Position Number

All position numbers are prefixed by GS and suffixed by
D - Darwin
A - Alice Springs
T - Tennant Creek
K - Katherine
J - Jabiru

NORTHERN TERRITORY DEPARTMENT OF MINES AND ENERGY

GEOLOGICAL SURVEY DIVISION

ORGANISATION CHART

8 August 1988

PRESENT SYSTEM.

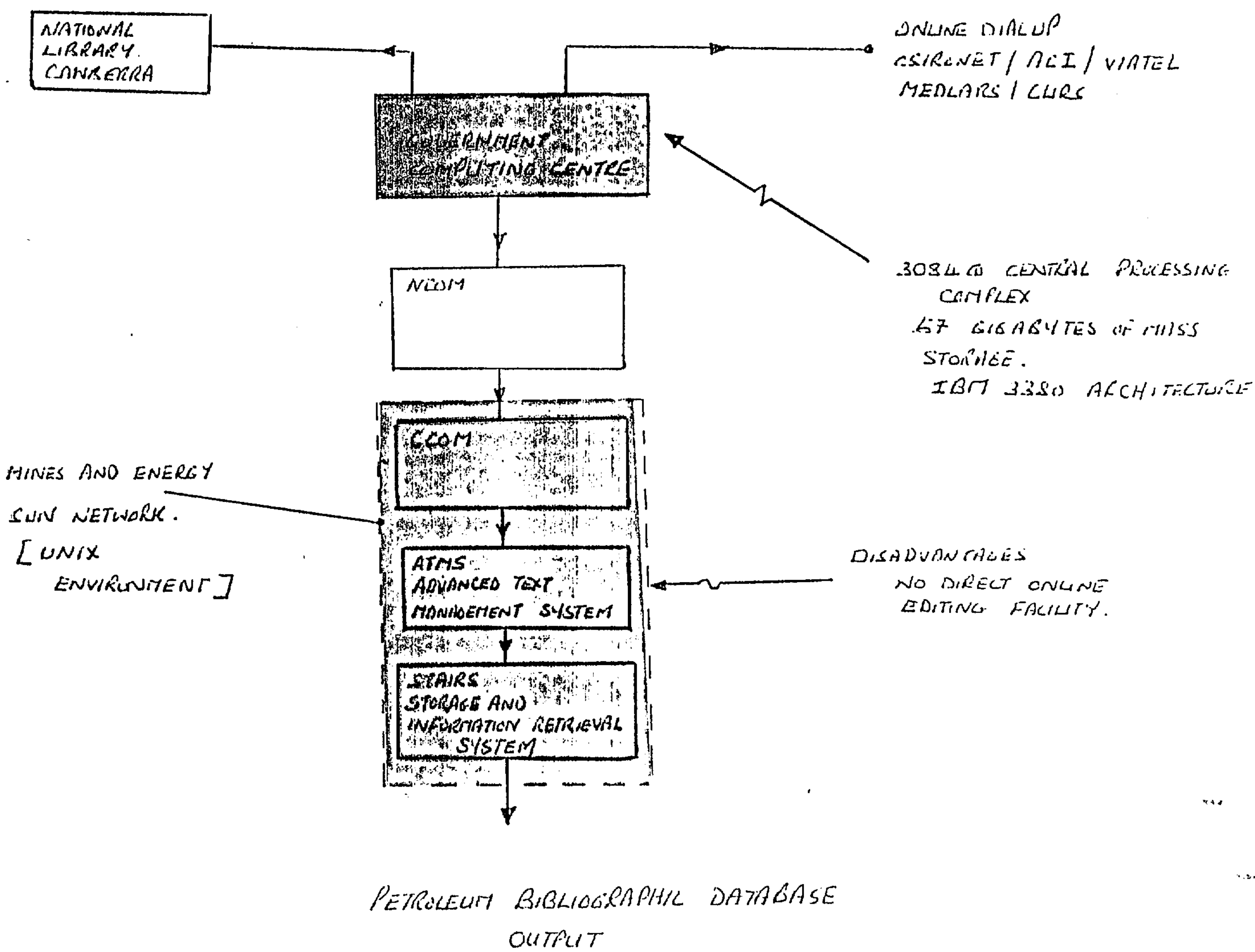


figure 3

Northern Territory

Problems we have with STAIRS include accessing it via NCOM (figure 3) and the editing of STAIRS requires offline manipulation using ATMS. Other Departments within the Northern Territory also use this system, and this creates overload problems. Presently our access is through the system chain NCOM, CCOM, ATMS then via our Sun microsystem network. The Sun is an "inhouse" computing network which has been in place in the Department for about 18 months.

hardware

The Sun Network is composed of a series of colour/monochromatic graphic workstations located throughout the Department in the Darwin, Alice Springs, Katherine, Jabiru and Tennant Creek offices. We operate in a Unix environment, running C, Fortran and Pascal as our programming languages as well as a number of specialised software packages as listed in figure 4.

software

We are presently setting up the TITAN database package for petroleum as well as for other data storage within the Department. It has recently been loaded on to the system and we are attempting to pull across all of the information previously held on STAIRS.

We also have Autocad capability which is designed for drafting/geographic data presentation. A link between TITAN, Geovision and Autocad should provide us with, a complete database allowing us to handle all geographic information with a direct link to our in-house bibliographic databases.

We also have another system called PETMENU that has been developed in-house and is run by the Energy Division. PETMENU is a small database that stores well and seismic information only. Figure 5 indicates the sort of screen that can be produced from PETMENU. It is our intention to pull across all the information from STAIRS and PETMENU and fit them in to the TITAN framework (figure 6).

STAIRS

bibliographic data

An example of STAIRS output is illustrated in figure 7. The keywords used to produce this output were "Money Shoals", you will note they are underlined in the text. STAIRS searches through the entire filing system and picks out records that contain the words "Money Shoals" in any of the available data fields. You can relate words differently, for example "Arafura with Basin", "Arafura adjacent Basin". It all depends on how you define the relationship between the keywords. Keywords may be single words or any characater string. The more keywords that are used, however, the slower the system becomes, and this is also a drawback, particularly when you are running on top of the main system.

CPU	SUN 2 * 8 SUN 3 * 50 MONOCHROME AND COLOUR SUN 4 * 4 HEURIKON * 4
MEMORY	FROM 4MB - 1218 MB per CPU
ON LINE STORAGE	9 x 474 FUJITSU EAGLE 9 x 344 CDC WREN IV
TAPEDRIVERS	1 x 1/2 " 1 600 bpi 6 x 1/4 " STREAMER CARTRIDGE 1 x 2GB 8 mm VIDEO CARTRIDGE
TERMINALS	70 ANSI STANDARD VDU's SOME WITH TEKTRONIX EMULATION 20 APPLE LASERWRITERS
WORK STATIONS	See CPU above
SOFTWARE	
OPERATING SYSTEMS	UNIX (SUNOS 4.0; SYSTEM V.2, BSD 4.2/3)
LANGUAGES	C, FORTRAN PASCAL
DBMS	UNIFY
OTHERS	S, TRANSCRIPT, DSS, ULTRACALC, SUNLINK, SNA 3270, SUNLINK INTERNETWORK ROUTER, TITAN, NEXPERT, FRAMEMAKER, AUTOCAD, GEOVISION

figure 4

figure 5

DEPARTMENT OF MINES & ENERGY, NORTHERN TERRITORY

OIL WELLS

Sep 7, 1988

Please refer to 1:2 500 000 Oil Tenement Map for geographical locations

Selection of wells completed between 01/01/88 and 07/09/88

Ordered by Well name

No.	WELL NAME	MAP	LAT.	LONG.	PERMIT	DEPTH(m)	SPUD	ABAND	BASIN	OPERATOR
189	Cassini No. 1	SD51	12 08 47.4	124 58 5.5	ACL-3	1555.0	22/06/88	01/08/88	Browse	BHP Petroleum
175	Delta No. 1	SD51	12 38 56.4	123 58 13.1	ACP-1	2900.0	28/02/88	16/04/88	Browse	Elf Aquitaine
187	Frienship No. 1	SD53	14 52 08	133 54 07	EP-5	395.0	11/06/88	27/06/88	Mcarthur	Pacific Oil & Gas
171	Jabiru No. 7	SC51	11 55 13.981	125 01 2.303	ACL-1	1817.0	22/01/88	19/03/88	Browse	BHP Petroleum
190	Lorikeet No. 1		11 10 25.24	125 37 4.75	ACP-4	1598.0	05/08/88	04/09/88	Browsc	BHP Petroleum Pty Ltd
173	Montara No. 1	SD51	12 41 21.66	124 31 53.98	ACP-7	2235.0	10/03/88	23/05/88	Browse	BHP Petroleum
170	Oliver No. 1	SC51	11 38 41.28	125 00 32.04	ACP-6	3500.0	26/11/87	07/02/88	Browse	BHP Petroleum
174	Pengana No. 1	SC51	11 53 29.16	125 01 44.56	ACL-1	2095.0	11/04/88	17/05/88	Browse	BHP Petroleum
185	Phillip No. 1	SF53	22 16 15	135 16 15	EP-10	586.0	17/04/88	17/05/88	Georgina	Pacific Oil & Gas
181	Puffin No. 4	SD51	12 17 32.02	124 21 38.41	ACP-2	2456.0	16/05/88	19/06/88	Browse	BHP Petroleum
172	Rainer No. 1	SD51	12 03 44.37	125 01 23.01	ACP-4	2400.0	08/02/88	09/03/88	Browse	BHP Petroleum
169	Skua No. 3	SD51	12 30 21.53	124 24 52.78	ACP-2	2500.0	19/11/87	20/01/88	Browse	BHP Petroleum

NOTE: *Depth* is the total depth of the well.
"*" indicates that no data is available at this time.
PERMIT denotes the permit number in which the Oil Well is located
The co-ordinates of the Oil Wells are in *DEGREES MINUTES & SECONDS*.
The reference to the map number represents a map at 1:1 000 000 scale.

PRESENT BIBLIOGRAPHIC DATABASE

[redacted]

KEYWORD/S DATA RETRIEVAL
E.G. MONEY ADJ SHOALS
ABSTRACT EXTRACTS FROM
ALL OPEN FILE PETROLEUM
REPORTS LODGED WITH THE
DEPARTMENT

[redacted]

WELL AND SEISMIC DATABASE
PRESENTLY DEVELOPED TO AN IMMATURE
STAGE.

TITAN

ADDITIONAL DATABASE INFORMATION
TO INCLUDE

UPGRADED SEISMIC AND WELL DATA
SPECIFICALLY GEOLOGICAL INFORMATION

STRUCTURE TO BE DEVELOPED
IN THE SHORT TERM.

figure 6

STATES/NT AUGRAIS - DOCUMENTS PRINTED FROM DATA BASE: AING PAGE 11

LICENSEE	LICENSEE	: Esso Exploration and Production Australia Inc.
VENTURE	JOINT VENTURE	:
OPERATOR	OPERATOR	: Esso Australia Limited
MAPS	1:1000000	: SC53 Cape Wessel
	1: 250000	:
	1: 100000	:
	1: 50000	:
PROSPECT	PROSPECT NAME	:
LOCATION	MINE/WELL LOCATION	
	LAT	: 10,42,40 LONG : 133, 10, 57
	(A.M.G.) EAST	: NORTH:
TECTONIC	TECTONIC UNIT	: Arafura Basin
MAJOR	MAJOR TERMS	: Petroleum geology
MINOR	MINOR TERMS	: geochemistry, logging, hydrocarbons, palynology, palaeontology, age determination methods, Devonian, Carboniferous, Cretaceous, Jurassic, Money Shoals Graben, fluorescence
NOTES	NOTES	: NT/P35 was formerly NT/P20 Part A: Site Investigation Survey Report (2 copies) B: 1 of 2 - Well Completion Report Volume 1 2 of 2 - Well Completion Report Volume 2 C: 1 of 4 - Final Well Report Volume 1 2 of 4 - Final Well Report Volume 2 3 of 4 - Final Well Report Section 1 4 of 4 - Final Well Report Section 2 D: Rig Move Report E: 'Exact Radius of Curvature Method' Computer Printout F: 'High Resolution Dipmeter' Computer printout G: Cancelled as of 23/4/85 H: Fission Track Analysis of Samples RAF-1 to RAF-9 I: Explanatory Notes & Discussion Re Fission Track Study of Samples from Tasman-1 & Torres-1 J: Well File K: Logs - 21 Sepia & 33 Paper
ABSTRACT	ABSTRACT	: Well was abandoned as a dryhole after an unsuccessful drill stem test. The well was drilled on a isolated perched fault block. Significant oil shows were encountered in Silurian limestones and clastics.
TEXTLOC	TEXT LOCATION	: L-D
ENTERED	ENTERED BY/DATE: WEL 4/11/83	CHECKED BY/DATE : WEL 4/11/83

figure 7

Northern Territory

The type of information that has been stored has traditionally been in the format required for mineral exploration, and that has been a major disadvantage. The information is in the system, but trying to get it out in a form which is useable for petroleum is often difficult.

PETMENU

PETMENU runs on the Sun network and is entirely different. It works on a key or unique number basis and it primarily contains well data and some seismic information. To search the database, you can specify a well number, which is shown on the far left-hand side of figure 5, and the normal suite of data as shown is available. The data can also be retrieved using the permit number, time period, or by specifying a basin setting; any field can be serched. The main limitation with this sytem at present is that the amount of data held on each well is very limited; it is only of the type you see here. There is very little geological, geophysical, production, or completion information held.

well data

seismic data

The anticipated data storage system (figure 8) is going to be TITAN. TITAN is an extremely powerful database, particularly for searching bibliographic data. We have looked at what we want on the system and with the limited number of staff we have available, we believe the way to initially enter the database market is to go for bibliographic data which can be easily obtained using a keyword option. The TITAN system becomes quicker as the number of keywords is increased, which is directly in opposite to STAIRS. It can be edited extremely easily, and we believe will provide us with a good starting point on which to continue to build the database for the Northern Territory.

Thank you.

THE CHAIRMAN: For those who have an interest in the subject, Lorraine mentioned the STATUS product - or PC STATUS used in the South Australian Department of Mines and Energy - STATUS and the STAIRS product that Paul has been talking about are functionally very similar. They are essentially free text storage and retrieval systems. I think STAIRS is actually the IBM product. STATUS is available from a different source.

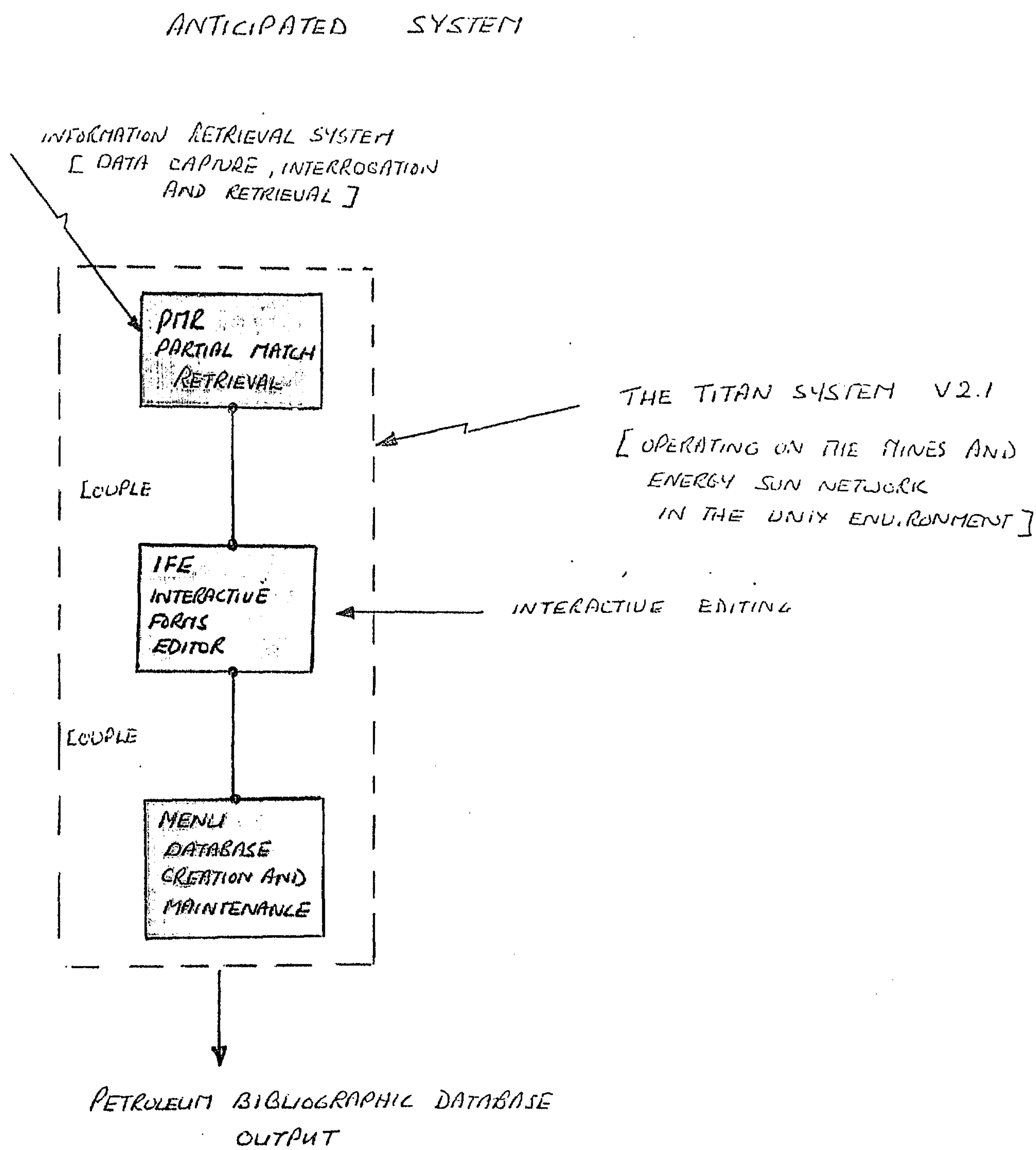

ANTICIPATED SYSTEM
INFORMATION RETRIEVAL SYSTEM
[DATA CAPTURE, INTERROGATION
AND RETRIEVAL]
PMR
PARTIAL MATCH
RETRIEVAL
THE TITAN SYSTEM V2.1
[OPERATING ON THE MINES AND
ENERGY SUN NETWORK
IN THE UNIX ENVIRONMENT]
COUPLE
IFE
INTERACTIVE
FORMS
EDITOR
INTERACTIVE EDITING
COUPLE
MENU
DATABASE
CREATION AND
MAINTENANCE
PETROLEUM BIBLIOGRAPHIC DATABASE
OUTPUT

figure 8

MR CHAIRMAN: We will hand over now to Peter Baillie from Tasmania.

MR BAILLIE: As you may or may not know, Tasmania is very much the poor relation with regards to petroleum exploration, and of course this of necessity means that money and staff are at a premium, and in fact I am the only person in the Tasmanian Mines Department - which has got a staff of about 130 - who is engaged full-time on petroleum exploration. So if I was to talk about the title as listed here, "The Current Status of the Future Options of the Tasmanian Petroleum Database", I could say that the future options are in limbo and leave it at that. But I will just give you a brief run-down on what we actually do at the moment.

Tasmania

We have had off-shore exploration since about 1961; there is a little bit of on-shore exploration going on at the moment, but our major effort has been off-shore in the Bass Basin and the continental margin of western Tasmania.

TasExplore

A reasonable amount of seismic data has been gathered and 34 exploration wells have been drilled. The first well was drilled in 1965, and the most recent was in 1986, and I think the next one will probably be in about 1991. However, there is a fair bit of information that goes with all that, and what I am currently looking at doing, given the financial limitiations I have got, is adapting an in-house database designed for mineral exploration, called TasExplore, and using it for petroleum exploration data.

With respect to security, there is a built-in security mechanism: closed file, restricted file, open file. Closed file means that access is very limited. If it is open file it would then go on to the AESIS system.

Any of the data fields in TasExplore (figure 1) can be used to access the data and I am told that with minor modifications we will be able to use this for petroleum exploration. So a seismic survey would be referenced with a unique number, data fields, a brief description, and then we can access it via that information. The system that this would operate on is a Perkin-Elmer mini-computer.

I also use a Macintosh SE for my own work. I have a complete set of digital data from Wiltshire Geological Services on floppy discs, with which I do my own work using an interpretative program called Maclog. Also, I have software for wells, which I have built myself, using Microsoft File (figure 2). Given the small number of wells, this is easily handled on one floppy and we can access each of the parameters quite easily, or print out a summary for a particular well.

REPORT NUMBER TCR	DEPARTMENT OF MINES - TASMANIA MINERAL INDUSTRY UNPUBLISHED REPORT
☐ CF ☐ RF ☐ OF	**DATA SHEET**

AUTHOR(S):

DATE :

TITLE :

COMPANY(S) :

FORMAT : No. of Volumes : Structure :

COMPANY REF. (if any) :

LICENCE / LEASE :

LOCALITY : SK55- ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8

Map sheet :

Geographic :
(not in title)

100 ☐ GEOLOGY	300 ☐ GEOPHYSICS	400 ☐ GEOCHEMISTRY	501 ☐ PETROLOGY
1 ☐ Surface mapping	GND AIR	1 ☐ Stream Sediment	502 ☐ ORE GENESIS
2 ☐ Remote sensing	1 ☐ 2 ☐ Magnetic	2 ☐ Soil (A,B,C horiz.)	503 ☐ ORE RESERVES
3 ☐ Mine/deposit	3 ☐ 4 ☐ Electromag.	3 ☐ Bed-rock	504 ☐ FEASIBILITY STUDY
200 ☐ DRILLING	5 ☐ 6 ☐ Radiometric	4 ☐ Mineral'n/Gossan	505 ☐ MINERAL PROCESS.
1 ☐ Diamond	7 ☐ S.P./A.P./E.P.	5 ☐ Rock-chip	506 ☐ MINING
2 ☐ Percussion	8 ☐ E.I.P./M.I.P.	6 ☐ Water	507 ☐ ENVIRONMENT
3 ☐ Rotary/Rev. Circ.	9 ☐ Resistivity	7 ☐ Biogeochemistry	508 ☐ ENGINEER. GEOL.
4 ☐ Auger/Test pits	10 ☐ Gravity	8 ☐ Isotopes	509 ☐ INDUST. MINERALS
5 ☐ Logs	11 ☐ Seismic - Refraction	9 ☐ Whole-rock: Major	510 ☐ CONSTRUCT. MAT.
6 ☐ Analysis	12 ☐ Seismic - Reflection	10 ☐ Whole-rock: Trace	511 ☐ FUELS: Coal
7 ☐ Metallic Minerals	13 ☐ Physical properties	11 ☐ Mineral Analysis	512 ☐ FUELS: Oil shale
8 ☐ Non-metallics	14 ☐ Well-logging	12 ☐	513 ☐ FUELS: Oil/Gas

MINERALS :

MINE / DEPOSIT NAME(S) :

OTHER KEYWORDS :

ANNOTATION :

figure 1

A. B. CAUDELL, Government Printer, Tasmania OS K 4309

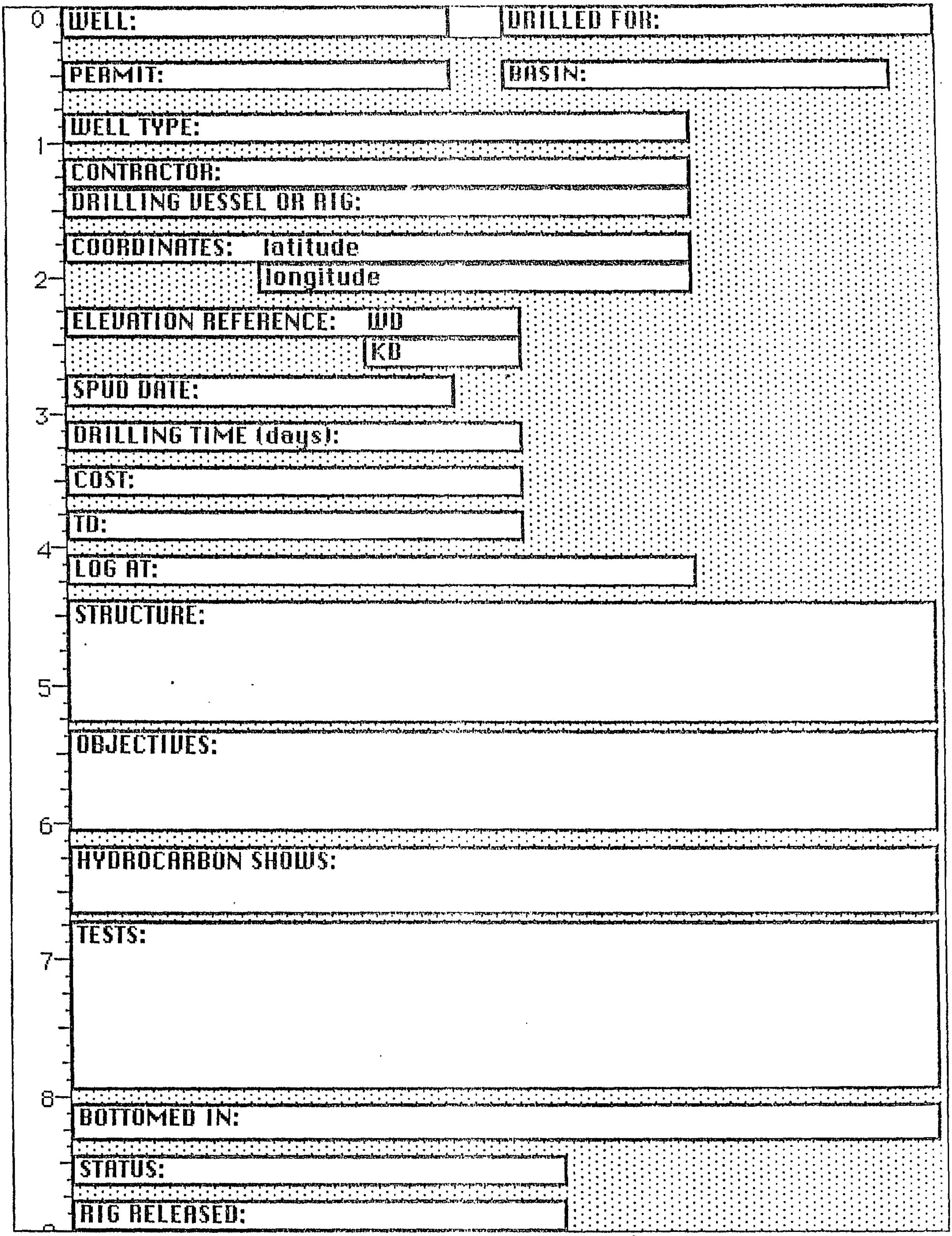

WELL:
DRILLED FOR:
PERMIT:
BASIN:
WELL TYPE:
CONTRACTOR:
DRILLING VESSEL OR RIG:
COORDINATES: latitude
longitude
ELEVATION REFERENCE: WD
KB
SPUD DATE:
DRILLING TIME (days):
COST:
TD:
LOG AT:
STRUCTURE:
OBJECTIVES:
HYDROCARBON SHOWS:
TESTS:
BOTTOMED IN:
STATUS:
RIG RELEASED:
0
1
2
3
4
5
6
7
8

figure 2

So that is basically the story for Tasmania. If we were to purchase a major electronic database, the sorts of things I would expect are these:

* It should be be versatile; it should be able to handle the various well-completion reports, seismic data, etc.
* It should be user friendly so that non- computer people like myself could use it.
* It must be complete and up-to-date.
* It should be variably accessible - we should be able to close off certain bits of it.
* It must be marketable; the customers should be able to use it as well as the people at the Mines Department.

Tasmania

* It should be compatible with systems operating throughout the country, and particularly with the BMR one.

I think I will leave it there, thank you.

(LUNCH)

Paper Submitted

PETROLEUM RELATED DATA BASES OF THE QUEENSLAND DEPARTMENT OF MINES

by

J.W. Laycock, B.H. John

SUMMARY

This paper gives brief descriptions of the data sets within the Queensland Department of Mines which contain information likely to assist in petroleum exploration.

Queensland

INTRODUCTION

The Queensland Department of Mines has a large volume of data useful for the explorationist and contained on various storage media including card files, paper folios, computer records, maps, microslides, magnetic tape, and core.

The computer based systems only, are discussed here, and of the 150 (approximately) such systems, only those relating in some manner to petroleum exploration (43) will be mentioned, and of these only the 10 more important in any detail.

A list of all computerized petroleum related data sets has been compiled by B. John (1988b). The more important data sets which are to be discussed are as follows:

Mining Tenures Data Base System

Company Report System

Company Report Bibliographic System

Queensland Energy Resource Data Base (QERDB)

Water Bore Record System

SURVMAP - a register of seismic survey data

LINDAT - a register of seismic survey lines

Petroleum Well Register

Oil Core and Cuttings Detailed Information

SPLOC - a register of petroleum well location data

Queensland occupies approximately 1 727 000 sq kilometres of north-eastern Australia and within this area there are a number of sedimentary basins covering about two thirds of the State. A of these sedimentary basins are petroleum prospective, the most important to date being the Surat and Eromanga Basins to the south of the State. Figure 1 indicates the distribution of these sedimentary basins in Queensland.

Queensland

The Department of Mines is responsible for the management of mineral, coal and petroleum resources within the State and the organizational structure of the Department is indicated on Figure 2. The Department since 1987 has been program oriented and there are now 10 programs responsible for the Department's major activities. Within each program there are sub-programs with staff and structures to best meet the needs of its program objectives. Petroleum exploration activity is involved to some extent with half of the programs.

All company exploration activity commences with an application for an Authority to Prospect for a particular commodity in an area of Queensland which is currently not held by existing tenure. The general data flow following an application for an authority to prospect is shown on Figure 3. The length of time between lodgement of an application and its approval may be considerable.

Most organizations consult the appropriate sources of data within the Department early in the program of exploration because availability to existing data will often have a bearing on the program of activity and could represent savings of considerable expenditure - particularly in the use of existing stratigraphic drill core, wireline well logs and seismic records.

The trend for computer activity in the Department is for the use of data base packages often in dissociation with related graphics systems. The future usage will involve the amalgamation of a suitable digistal graphics background (which may be geographical, geological, cadastral or topographic etc), with related non-graphical data so that ad- hoc thermatic maps may be produced. For example it will be possible to produce a map over any part of Queensland showing geological boundaries, lease boundaries and all wells which intersected a particular formation.

AVAILABILITY OF EQUIPMENT/SOFTWARE

The Department of Mines uses the services of the State Government Centre for Information Technology and Communication (CITEC) (previously SGCC - State Government Computer Centre) as well as its own facility.

At CITEC use is made of Sperry 1100/62, 1100/82 systems for general data storage and manipulation of technical data using proprietary software products MAPPER and UNIDAS. The CITEC Prime 9955 and 9755 computers are also used for graphical work involving the software package GDS (a general 2 dimensional drafting system) which is used for survey plan drawing and general drafting.

The Department has a PRIME 9750 on which most technical computing is done, and more recently a PRIME 4050 which is being used for development of the Department's Mining Tenures Data Base System. Software used on the PRIME 9750 includes GEOLOG from MINCOM, a package for analysis and presentation of wireline log data,

Bluepack and MAP from SIROMINES, a geostatistical analysis and surface representation package, SURFACE II graphics system from the Kansas Geological Survey for surface representation and many in-house graphics routines. An Oracle data base system is used on both the Prime 9250 and 4050 and the ARC/INFO Geographical information system from ESRI is also available on the PRIME 4050. The Department has ten SUN 3/60 Workstations to be used in conjunction with the Mining Tenures Data Base project, as well as Tektronix autovectorizer for image scanning and an associated Tektronix 4325 Workstation. Most technical sub-programs within the Department also have access to one of a number (45) of microcomputers ranging from IBM/XT to Intel 80386 microprocessor based machines. Software used on these machines includes spreadsheet and data base software including Lotus 123, DBase III, Foxbase DBXL, wordprocessor software including Wordperfect and the desktop publishing software Ventura.

Other ancillary computer devices include four GTCO digitizers, Benson 1202 and HP7586 drum plotters, and a WILD TA20 high precision flat bed plotter.

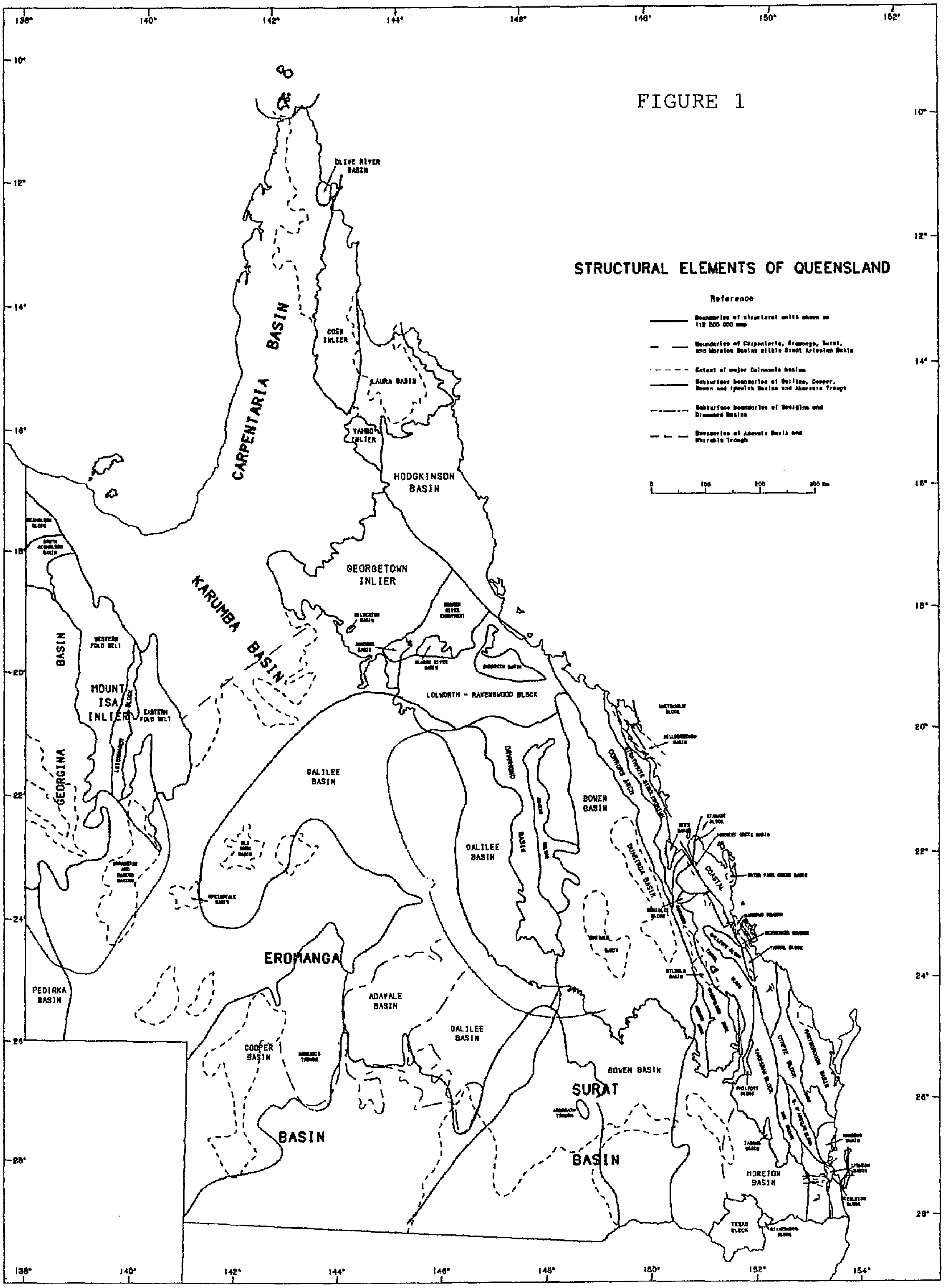


FIGURE 1
STRUCTURAL ELEMENTS OF QUEENSLAND
Reference
CARPENTARIA BASIN
KARUMBA BASIN
OLIVE RIVER BASIN
COEN INLIER
LAURA BASIN
YAMBO INLIER
HODGKINSON BASIN
GEORGETOWN INLIER
LOLWORTH - RAVENSWOOD BLOCK
MOUNT ISA INLIER
EASTERN FOLD BELT
WESTERN FOLD BELT
GEORGINA BASIN
GALILEE BASIN
BOWEN BASIN
DUARINGA BASIN
COASTAL
EROMANGA BASIN
ADAVALE BASIN
COOPER BASIN
PEDIRKA BASIN
SURAT BASIN
MORETON BASIN
TEXAS BLOCK

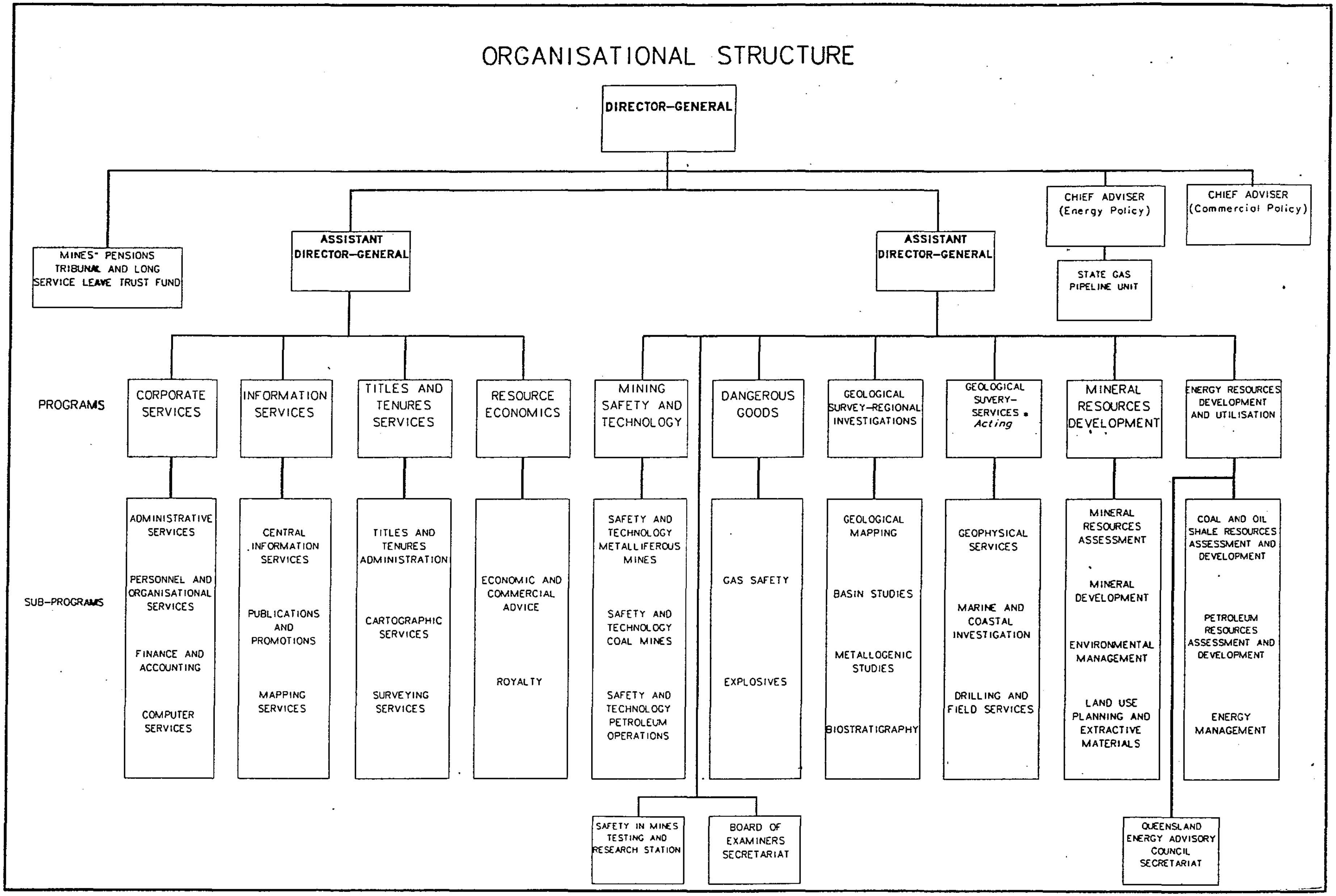
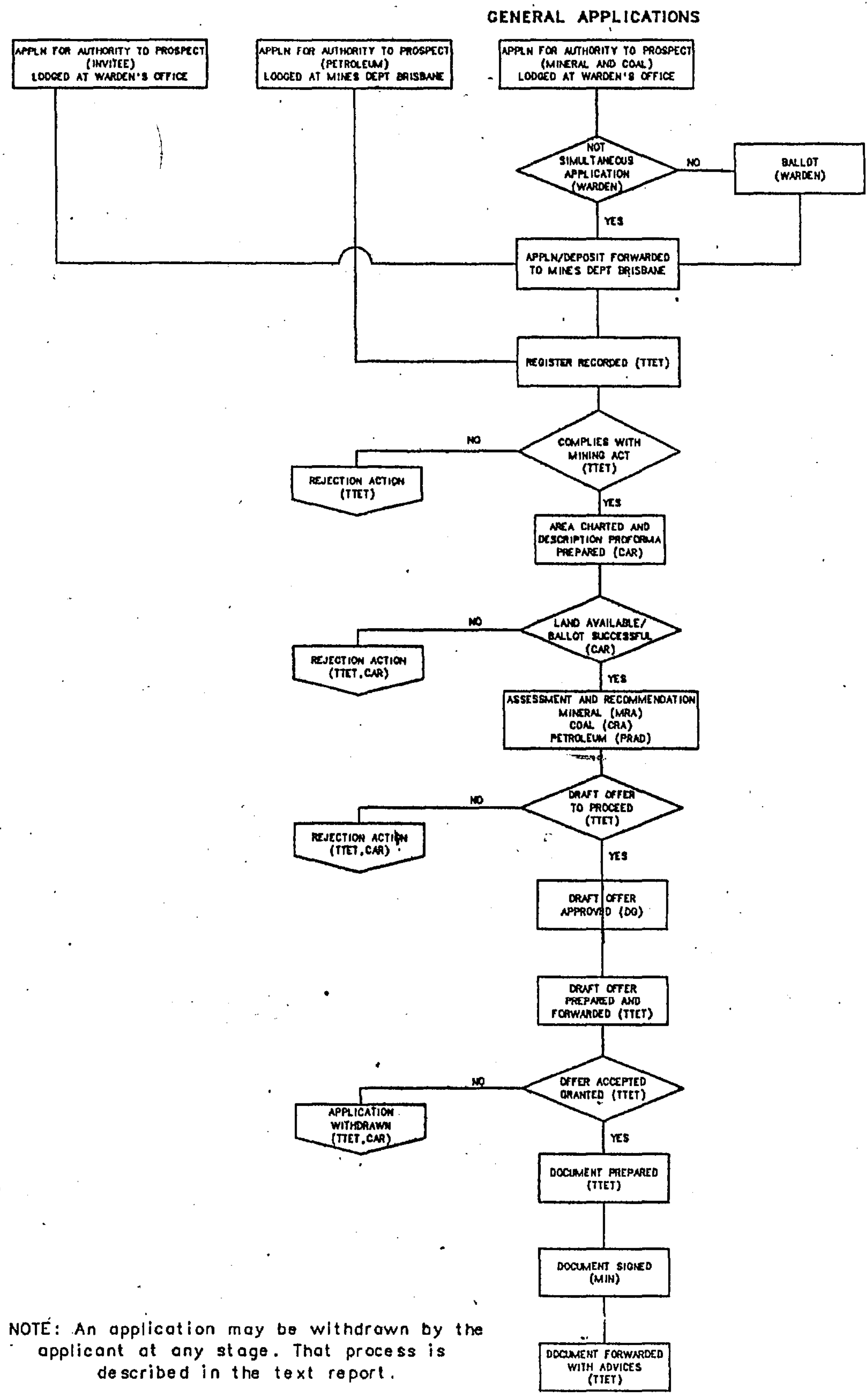

ORGANISATIONAL STRUCTURE
DIRECTOR-GENERAL
MINES' PENSIONS TRIBUNAL AND LONG SERVICE LEAVE TRUST FUND
ASSISTANT DIRECTOR-GENERAL
ASSISTANT DIRECTOR-GENERAL
CHIEF ADVISER (Energy Policy)
CHIEF ADVISER (Commercial Policy)
STATE GAS PIPELINE UNIT
PROGRAMS
CORPORATE SERVICES
INFORMATION SERVICES
TITLES AND TENURES SERVICES
RESOURCE ECONOMICS
MINING SAFETY AND TECHNOLOGY
DANGEROUS GOODS
GEOLOGICAL SURVEY-REGIONAL INVESTIGATIONS
GEOLOGICAL SUVERY-SERVICES * Acting
MINERAL RESOURCES DEVELOPMENT
ENERGY RESOURCES DEVELOPMENT AND UTILISATION
SUB-PROGRAMS
ADMINISTRATIVE SERVICES
PERSONNEL AND ORGANISATIONAL SERVICES
FINANCE AND ACCOUNTING
COMPUTER SERVICES
CENTRAL INFORMATION SERVICES
PUBLICATIONS AND PROMOTIONS
MAPPING SERVICES
TITLES AND TENURES ADMINISTRATION
CARTOGRAPHIC SERVICES
SURVEYING SERVICES
ECONOMIC AND COMMERCIAL ADVICE
ROYALTY
SAFETY AND TECHNOLOGY METALLIFEROUS MINES
SAFETY AND TECHNOLOGY COAL MINES
SAFETY AND TECHNOLOGY PETROLEUM OPERATIONS
GAS SAFETY
EXPLOSIVES
GEOLOGICAL MAPPING
BASIN STUDIES
METALLOGENIC STUDIES
BIOSTRATIGRAPHY
GEOPHYSICAL SERVICES
MARINE AND COASTAL INVESTIGATION
DRILLING AND FIELD SERVICES
MINERAL RESOURCES ASSESSMENT
MINERAL DEVELOPMENT
ENVIRONMENTAL MANAGEMENT
LAND USE PLANNING AND EXTRACTIVE MATERIALS
COAL AND OIL SHALE RESOURCES ASSESSMENT AND DEVELOPMENT
PETROLEUM RESOURCES ASSESSMENT AND DEVELOPMENT
ENERGY MANAGEMENT
SAFETY IN MINES TESTING AND RESEARCH STATION
BOARD OF EXAMINERS SECRETARIAT
QUEENSLAND ENERGY ADVISORY COUNCIL SECRETARIAT

figure 2

AUTHORITIES TO PROSPECT FOR MINERAL, COAL AND PETROLEUM

FLOW CHART - EXISTING PROCESSES (MACRO VERSION)



NOTE: An application may be withdrawn by the applicant at any stage. That process is described in the text report.

figure 3

PETROLEUM RELATED DATA BASES

Mining Tenures Database

Queensland

The Mining Tenures Data Base System was initially established in 1983 to handle an Administrative aspects of mining tenure processing.

The first phase of the program involving the administration of an Authorities to Prospect was completed in 1985.

The system was designed to run on a Sperry Computer at CITEC, and as implemented using MAPPER, a Sperry proprietary product. This system maintains data on 1224 current Authorities to Prospect and 580 applications. The data base comprises about 20000 records on Coal, Mineral and Petroleum data.

The second phase of the program was to include the manipulation of mining lease data.

In 1987 a Departmental review indicated that administration of mining tenures was not proceeding quickly enough and also there was no geographical component involved in the existing system. Graphics including background tenure and geographical data are vital to the registering of tenures. The background information on land availability was required to be maintained accurately and to reflect all land transactions in "real time". The Mining Tenures Data Base is one component of a much larger Queensland Government land information system.

The Mining Tenures Data Base project is being developed using modern hardware and software tools to facilitate the registering processing and management of all applications and transactions at a number (probably ten) of registry offices distributed in Queensland.

The new Mining Tenures Data Base system is anticipated to be operational by the end of June 1989 and it will be based on remote SUN 3/60 workstations at each registry office communicating with a Brisbane office PRIME 4050 computer. The software to be used to store attribute data is ORACLE and the graphical component will be based on ARC/INFO.

Company Report System

Companies holding Authority to Prospect in Queensland, are required to provide reports to the Minister for Mines containing full particulars and results of the prospecting operations and investigations carried out by or for the company on the area of tenure.

Reports which are required to be submitted six- monthly from the commencement date or on relinquishment of all or part of the Authority to Prospect, form the Company Report System.

Queensland

The company report system, a computerized index to the reports, commenced in 1978. The index enables other exploration companies access to previous information in areas of interest. The system includes details on the Authority to Prospect held at the time of the exploration, the title and author of the report(s) submitted, and the general geographic location of the work area.

The system at present includes data on approximately 17500 reports of which 6500 are confidential. Of the 11000 non-confidential reports, 7300 are for mineral A/P, 936 for coal A/P, 2104 for petroleum A/P and there are 639 reports in the system unrelated to authority to prospects.

In association with other data files output lists of all non-confidential reports available for viewing are produced, as well as lists of company report numbers and A/P numbers for particular 1:100 000 map sheet indexes. The data base may also be searched for particular words within the title by a free text search and for activity by a particular company by the use of encoded company names.

Computer generated lists are available as paper copy or as microfiche.

The system is accessible through listings held in the Central Information Services Sub-program and a Public reading area.

Company Report Bibliographic System

The company report bibliographic system developed from the company report system, and the need for additional mechanisms by which the company reports could be selected, apart from free-text search of the titles or reports selected from within geographical limits.

Coincident with the establishment of the Australian Mineral Foundation (AMF) AESIS system, company reports were given keywords relating to the type of exploration activity, and based on the AMF thesaurus. Other data included information on minerals present, the tectonic/structural setting, mine names, 1:250 000 and 1:100 000 Index etc. This data base enables searches to be made on such criteria as "the information within the data base for all references to gold within given limits of latitude and longitude."

The data base at present contains data on 15000 company reports; about 20 percent remain to be indexed. It is envisaged that in the future these data will be able to be related to a continuous geological map base so that various thematic maps may be produced.

At present selective retrieval can be made on the data base to produce printer output. These data have been interrogated using either the Sperry Software UNIDAS or in-house FORTRAN programs.

At present the Department intends to further automate searches on the data, with the use of a microcomputer based system and appropriate software.

Queensland Energy Resource Data Base

The Queensland Energy Resource Data Base (QERDB) was established in 1982 by the Queensland Department of Mines (QDM) with the assistance of funding from the Commonwealth Government under the National Energy Research Development and Demonstration Program (NERDDP). The data base is maintained by the Department's Basin Studies Subprogram.

The project was to provide the basis for petroleum exploration and to provide a consistent basin-wide interpretation of stratigraphy.

Two geologists were employed for the duration of the project, which was completed in 1986.

Significant resources were provided to the project in excess of the NERDDP grant, and the estimated cost of production of the data base is $300 000.

QERDB currently contains data relating to in excess of 1100 petroleum wells, 240 Departmental stratigraphic bores, and 150 coal exploration bores from throughout the State. Data from significant deep water bores will be incorporated into the system for areas where there is little other subsurface control.

Queensland

The system was designed using a relational data base model and was initially installed on a Sperry (CITEC) computers, using a proprietary product MAPPER.

It was found that the use of MAPPER in demand mode, was not flexible enough for some of the more complex enquiries which were being made, and MAPPER language programming was required to handle the query. A decision was made to program specialist retrieval requests in FORTRAN on original ASCII files as these were less expensive to run and were able to be written more readily than the MAPPER.

An example of the type of data held within QERDB is shown as Figure 4.

To enable efficient storage in QERDB, some data are recorded in coded form. These codes have been standardised and are listed together with explanations, in a set of explanatory notes (JOHN, 1988a). Data throughout are recorded in metric units. In order to facilitate manipulation and retrieval, data in QERDB are organised according to record types. These record types correspond to well data topics, and are identified by a two- letter code as follows:-

Well name (Record type AA): The name of wells and bores are prefixed by a three-letter code to identify the operator. The remainder of the name is as used by the operator.

Batch number (Record type AB): The batch number refers to the Queensland Department of Mines file number. For the older

figure 4

Well name	AAP FERMOY 1
Batch number	64/2997
Authority to Prospect number	86P
Well category	ONSHORE
Latitude	23 08 32
Longitude	143 03 26
Easting	710638.006
Northing	7439240.671
1:250000 Name and index	SF54-16 MANEROO
1 100000 Index only	7551
Spud date(day,mth,year)	11.08.64
Release date(day,mth,yr)	25.09.64
Well type	PETEXP
Bottom hole temp.	90.0
Result of drilling	DRY
Status of well(current)	PAA
Casing shoes	87.3* 642.4*
Total depth	1603.9
PBTD	603.5
Core (conventional)	01 1033.9 1042.4 98 101.6
Core (conventional)	02 1081.1 1081.4 100 101.6
Core (conventional)	03 1081.4 1090.0 96 101.6
Core (conventional)	04 1090.0 1098.5 100 101.6
Core (conventional)	05 1163.4 1168.6 96 101.6
Core (conventional)	06 1204.3 1213.1 100 101.6
Core (conventional)	07 1281.1 1289.6 98 101.6
Core (conventional)	08 1355.1 1358.2 90 101.6
Core (conventional)	09 1410.6 1415.5 90 101.6
Core (conventional)	10 1493.8 1496.3 100 101.6
Core (conventional)	11 1542.9 1545.6 65 101.6
Core (conventional)	12 1600.5 1601.7 100 101.6
Core (conventional)	13 1601.7 1603.9 85 101.6
Cuttings	3.00 9.1 1158.2
Cuttings	1.50 1158.2 1603.9
Hydrocarbon indications	460.3 490.7*MACKUNDA BEDS*
Hydrocarbon indications	963.2 966.2*ROMA FM*
Hydrocarbon indications	1030.2 1033.3*TRANSITION BEDS*
Hydrocarbon indications	1280.2 1289.3*SHSST SHALEY SST*
Hydrocarbon indications	1355.1 1358.2*SHSST SHALEY SST*
Wire-line logs	86.9 643.4*EPT * * * *1*1:600*
Wire-line logs	86.9 643.4*EPT * * * *1*1:240*
Wire-line logs	15.2 1598.4*GR * * * *1*1:600*
Wire-line logs	15.2 1598.4*GR * * * *1*1:240*
Wire-line logs	777.2 844.3*MLLC * * * *1*1:600*
Wire-line logs	777.2 844.3*MLLC * * * *1*1:240*
Wire-line logs	960.1 1600.5*MLLC * * * *1*1:600*
Wire-line logs	960.1 1600.5*MLLC * * * *1*1:240*
Wire-line logs	642.2 1600.5*IEL * * * *1*1:600*
Wire-line logs	642.2 1600.5*IEL * * * *1*1:240*
Wire-line logs	642.2 1597.2*SL * * * *1*1:600*
Wire-line logs	642.2 1597.2*SL * * * *1*1:240*
Wire-line logs	1502.7 1599.9*CDM * * * *1*1:1016*
Drill stem tests	1078.1 1098.5*1545*01*TRANS/SSTU UPPER SST*REC. 2C.M. WATER NGTS*
Drill stem tests	1202.4 1213.1*1545*02*SHALEY SST*NGTS*
Drill stem tests	1351.0 1358.2*1545*03*SHALEY SST*NGTS*
Drill stem tests	1408.7 1428.6*1545*04*SSTL LOWER SST*NGTS REC. 4C.M. WATER*
Drill stem tests	1488.5 1522.2* * *SASHB BASAL SANDY SHALE*NGTS REC.4C.M. H2O
Production tests	NONE
Elevation (ground-level)	242.3
Elevation (kelly-bushing)	246.2
Basins intersected	EROMANGA*
Formation tops(GSQ picks)	0000.0* 378.6*WINTO (WINTON FM)*CRETACEOUS*MNW/AYL*
Formation tops(GSQ picks)	378.6* 155.1*?MACKU (MACKUNDA FM)*CRETACEOUS*MNW/AYL*
Formation tops(GSQ picks)	533.7* 255.7*ALLAR (ALLARU MST)*CRETACEOUS*MNW/AYL*
Formation tops(GSQ picks)	789.4* 36.6*TOOLE (TOOLEBUC FM)*CRETACEOUS*MNW/AYL*
Formation tops(GSQ picks)	826.0* 200.0*WALLU (WALLUMBILLA FM)*CRETACEOUS*MNW/AYL*
Formation tops(GSQ picks)	1026.0* 49.9*CADNA (CADNA-OWIE FM)*CRETACEOUS*MNW/AYL*
Formation tops(GSQ picks)	1075.9* 225.6*HOORA (HOORAY SST)*JURASSIC-CRETACEOUS*MNW/AYL*
Formation tops(GSQ picks)	1301.5* 16.2*WESTB (WESTBOURNE FM)*JURASSIC*MNW/AYL*
Formation tops(GSQ picks)	1317.7* 17.3*ADORI (ADORI SST)*JURASSIC*MNW/AYL*
Formation tops(GSQ picks)	1335.0* 78.7*BIRKH (BIRKHEAD FM)*JURASSIC*MNW/AYL*
Formation tops(GSQ picks)	1413.7* 116.4*HUTTO (HUTTON SST)*JURASSIC*MNW/AYL*
Formation tops(GSQ picks)	1530.1* 73.8*BMSED (SEDIMENTARY BASE)*?CAMBRIAN-ORDOVICIAN*MNW/A
Formation tops(Company picks)	3.7* 331.6*WINTON FM*CRETACEOUS*
Formation tops(Company picks)	335.3* 154.8*MACKB MACKUNDA BEDS*CRETACEOUS*
Formation tops(Company picks)	490.1* 300.9*TAMBO FM*CRETACEOUS*
Formation tops(Company picks)	791.0* 34.4*TOOLM TOOLEBUC MBR*CRETACEOUS*
Formation tops(Company picks)	825.4* 203.3*ROMA FM*CRETACEOUS*
Formation tops(Company picks)	1028.7* 61.3*TRANSITION BEDS*CRETACEOUS*
Formation tops(Company picks)	1090.0* 77.1*SSTU UPPER SST*CRETACEOUS*
Formation tops(Company picks)	1167.1* 241.1*SHSST SHALEY SST*JURASSIC-CRETACEOUS*
Formation tops(Company picks)	1408.2* 109.1*SSTL LOWER SST*JURASSIC*
Formation tops(Company picks)	1517.3* 18.9*SASHB BASAL SANDY SHALE*JURASSIC*
Formation tops(Company picks)	1536.2* 67.7*BASEMENT*-MES PRE-MESOZOIC*
Well completion number	1545
Report topic and number	* 1545*PALYNOLOGY
Report topic and number	* 1545*PETROLOGY
Report topic and number	* 1545*PETROPHYSICS
Report topic and number	* 1545*INORGANIC GEOCHEMISTRY

petroleum wells, much of the drilling data was submitted to the Department in letter form, and these are stored on Departmental batch files.

Authority to Prospect number (Record type AC): This refers to the Authority to Prospect or Petroleum Lease for the well location, current at the time of drilling.

Well category (Record type AD): This identifies whether the well was drilled either onshore or offshore.

Latitude (Record type AE) Longitude (Record type AF)

Easting (Record type AG) Northing (Record type AH): These refer to Australian Mapping Grid (AMG) coordinates. They are computer derived, calculated from the latitude and longitude.

Queensland

1:250 000 Name and index (Record type AI), 1:100 000 Index (Record type AJ): These identify the map Sheet areas on which the well was drilled.

Spud date (Record type AK), Release date (Record type AL): This refers to the day, month and year on which the well was spudded, and the rig released respectively.

Well type (Record type AM): Well types include petroleum exploration, stratigraphic, and coal exploration.

Bottom hole temperature (Record type AN): The temperature at or as near as possible to the bottom of the hole is recorded, together with the corresponding depth.

Result of drilling (Record type AO): This refers to the classification of the well at the time of drilling. Options include oil, oil plus gas, and dry. It does not necessarily relate to the current status.

Status of well (Record type AP): Options here include producer, suspended, and plugged and abandoned. This again refers to the status of the well at the time of completion, and does not necessarily relate to the current status. The status of wells is updated on an ad hoc basis.

Re-entry (Record type AQ): The purpose of re-entry into the well is recorded, together with the start and finish dates and depths.

Casing shoes (Record type AR): The depth of casing shoes is recorded. These data are used mainly to identify false breaks on wireline-log responses.

Total depth (Record type AS), Plugged back total depth (Record type AT): These record respectively the total depth of the well, and the current total depth, corresponding to the top of the shallowest plug set in the hole.

Core (conventional)(Record type BA): This indicates for conventional cores cut in the well, the core number, depth interval, percentage recovery, and diameter.

Core (sidewall)(Record type BB): For sidewall cores shot, records are made of the core number, depth, and whether or not the core was recovered.

Cuttings (Record type BC): For cuttings recovered during the drilling, the frequencies of sampling over specified intervals of the well are recorded.

Hydrocarbon indications (Record CA): If hydrocarbon indications were observed during the drilling ofthe well, the depth intervals and related lithostratigraphic units are recorded. The lithostratigraphic units are determined by Departmental geologists, and are recorded using a five- character code.

Wireline-logs (Record type DA): For wireline-logs run in the well, the interval, type, run number, and scale are recorded. Wireline-log types are recordedin coded form. The relevant QDM company report number isrecorded where an assessment has been made of the wireline-logdata. This covers the situation where the assessment is reported-separately from the main well completion report.

Drill stem tests (Record type EA): Where drill stem tests have been carried out, the interval, number, coded related lithostratigraphic units, result, and QDM company report number are recorded. As for hydrocarbon indications, the lithostratigraphic units involved are determined by Departmental geologists. The results generally include coded data, with abbreviations derived from company usage. As for wireline log data, company report number is included, as drill stem tests may be reported separately from the main well completion report.

Production tests (Record type EB): The intervals for any production tests carried out are recorded, together with results. As for drill stem tests, the results generally include coded data derived from company abbreviations.

Elevation (ground-level)(Record type FA), Elevation (kelly-bushing)(Record type FB): Elevations are recorded relative to mean sea level.

Basins intersected (Record type FC), Structural elements/sub-basins (Record type FD): Records are made of the sedimentary basins and/or structural elements or sub-basins intersected by the well, as interpreted by Departmental geologists.

Formation tops (GSQ picks)(Record type FE): For each well in QERDB, an interpretation of the lithostratigraphy of the sequence encountered is made by Departmental geologists. The interpretation is independent of that made by the petroleum company, and conforms to defined lithostratigraphic nomenclature. The standards used to pick formation tops apply basin wide, and have been developed from regional cross sections using fully-cored Departmental stratigraphic bores as key reference sections.

This record type comprises depth, thickness, lithostratigraphic unit, age, and initials of the geologist responsible for the interpretation. The thickness is computer derived. The lithostratigraphic unit is recorded using a five- character code.

Formation tops (Company picks)(Record type FF): The petroleum company lithostratigraphic interpretation of the sequence intersected by the well, is recorded as depth, thickness, lithostratigraphic unit, and age. Once again, the thickness is computer derived. The unit is recorded using a five-character code, and the nomenclature used by the company is adhered to. In this way a record of the original company interpretation is kept, and the data base may be later interrogated on behalf of companies wishing to use this nomenclature.

Well completion number (Record type GA): This is a record of the QDM company report number of the well completion report.

Report topic and number (Record type GB): Further reports relating to the well are recorded as QDM company report numbers and topics, or topics and other reference locations. These reports provide additional data, or present a re- interpretation of data relating to the well. As well as being expanded with data from newly drilled wells, data already within QERDB are upgraded and updated by Basin Studies Subprogram. Revision of lithostratigraphic interpretations become necessary as recent concepts are applied to areas under investigation by the Subprogram.

Uses of QERDB are many and varied, and are equally applicable to both scientific and administrative purposes. Within the Department, data from QERDB have been used mainly by the Basin Studies Sub-program. Here QERDB data have been used to support a major current commitment assessing the hydrocarbon generation potential of the southern Eromanga Basin in Queensland, with funding assistance from a NERDDP grant (Noon & others, 1986). The project area is approximately 355 000km^2, and incorporates 246 wells and Departmental stratigraphic bores. The work will enable the development of models for the known hydrocarbon accumulations and assist in the formation of new exploration concepts in the basin. Outputs from the project include well location, structure contour, and isopach maps, based wholly on data from QERDB, and regional cross-sections, partly based on QERDB data.

Open-file data held within QERDB are also available to explorationists and members of the public. They may be obtained as magnetic tape copies of the ASCII data in the original form, as computer output microfiche, or as printer listings of all or selected parts of the data base. Data sets of specified data from QERDB can be prepared using one or more of the well data topics as search parameters, and presented as either listings or maps. In the future, outputs from QERDB will be extended to include data packages for specified areas (sedimentary basins, map sheet areas, etc), incorporating listings of wells and bores and related data, location maps of wells and bores, structure contour maps of formation tops, and isopach maps of formation thicknesses. In addition, data packages will be prepared of information relating to land advertised by the Department, as available to be taken up under Authority to Prospect.

Water Bore Record System

The Water Bore Record System (WBRS) was established in 1964 as a means of storing and manipulating data from regional groundwater projects in Queensland, each covering a 1:1 000 000 Sheet area of 6 degrees of longitude by 4 degrees of latitude (Muller & Dale, 1985).

Much of the data are from deep bores in the sedimentary basins of Queensland and the data base therefore provides very useful stratigraphic and hydrogeochemistry data for petroleum exploration.

The data base comprises data on about 14500 wells and covers 55 1:250 000 Map sheets.

All data from this system are available on paper, fiche and magnetic media. Selective data can be retrieved using in-house FORTRAN routines and eventually the data will be converted to an ORACLE data base.

OTHER DATA BASES OF USE IN PETROLEUM EXPLORATION

Queensland

Included here are a number of data bases of geophysical data such as LINDAT, a register of seismic sections and shot point maps, SURVMAP, a register of seismic survey locations, and SPLOC, a file of the coordinates of seismic shot points. The Department also is the repository of many magnetic tape files of exploration well geophysical data and there is a magnetic tape register.

An index to all data on petroleum wells including development and appraisal wells is maintained. This index contains information on 2070 wells and 330 well logs. Data from this service is available as paper, fiche and magnetic media.

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Session Questions

THE CHAIRMAN: Any questions for John or Brad?

Queensland

MR SHELLEY: Question, Paul Shelley from BMR. You have mentioned before, John in particular, the various people extracting information from the report for a variety of different data bases. Following on the comment that was made earlier by Lorraine, does the report pass through several hands to make that happen or does one person, in fact, read the report and extract it on one pass?

indexing

MR LAYCOCK: Reports that come in on petroleum, go to groups that are involved with petroleum in some way. For example, the Petroleum Geophysics group will extract the data for the geophysical data base. So it is for coal and other areas. They go to different groups of people that do this sort of work and what they are taking out will likely be basic data - names of the survey, etcetera. They are fairly small data bases, in fact, and they are data bases that are run on an AT or some PC with ?? free type program, quite simple.

MR SHELLEY: Does one person index, sorry, extract information for two or three of the different data bases?

MR LAYCOCK: No, the reports go to different people, depending on whether there is seismic data, or petroleum or coal or whatever. In the case of the bibliographic system, when the company reports come in, the information is now given to the library people who are doing the indexing for those databases, to bring it up to date. The problem existed in the past in getting somebody with spare time to do this and we had to co-opt people from different sections, then within the geological survey, to be forced to do this. That is not particularly desirable because it is surprising that, quite often, it does not matter who has keyworded the thing, you do not get the sort of information that you want. It is a very specialist activity and that is where it is now - back in the area where the specialists in that particular task are being employed to do it.

complex searching

I will just show you one thing, out of interest if we have a moment, to show what we can get out of the database. To get the output which Brad said we produced to get the thickness of the Jurassic sediment within the Eromanga basin, we need to know the well name, which is up the top there; we need to know its lat and long because we are going to plot it on a conic projection; we need to know the RL to kelly bushing. But the interesting requirment from the database system is that we want the section that starts at the Cadna-owie but goes down to the end of the Jurassic. We have got to start screening through data. There is the Cadna-owie so we want to know that. We go down there looking for things like Jurassic until we find something that is not. Having got that, that is the thickness we want which is then the output with the co-ordinates. That is what we plotted. That is something that is not particularly easy to do with a database - with a lot of database systems.

Queensland

MR BAILLIE: Peter Baillie, Tasmanian Mines Department. How long is it going to take you to digitise all your geological maps with your GIS system? I assume you are going to do it at quarter million and how do you overcome the problem of a quarter million map can be largely interpretative and then correlating one map to the one next door?

geographic data

MR LAYCOCKS: The first thing to be done is this system called the . Mining Tenures database. It has got top priority within the Department and in terms of access to Oracle Arc/Info, at the moment and we do not have a show on digitising the quarter million geological maps. It has got to happen eventually, there is no doubt about it.

We have within the Department, as well, an auto- vectorise Techtronics scanner. We scan the database and produce pictures automatically. The image goes in and it has done it within two hours and you automatically vectorise the quarter million map.

What we aim to produce as the end result is what we term a continuous geological database. The concept of this is that we have over the whole of the state a continuous sequence. The data might be be from originally different scales but they have all been made to match. So what that means in effect is that you do not consider things in terms of quarter of a million boundaries or million boundaries or whatever; you can look at them in terms of basin boundaries if you want, or you can look at it with any particular small subset. What we would like is to extract from that data are all the wells within a particular area that you might care to point to, and behind it will come the topo data, the geological data, on top the things that you particularly ask for. For example, an exploration well location out of the Energy Resource Database could be related to those data on mines that might occur within a particular quarter million; there could also be information on the titles of all company reports that happen to be within some area you have asked for. So that is where we are attempting to go.

As I say, initially priority will be given to the mining team's database project which is supposed to be completed by the end of June, at which stage some of these products are hopefully going to be available to us or these other things that we want to do on a GIS.

THE CHAIRMAN: We had better move on. I will hand over now to Ian Walsh from the New South Wales Department of Mineral Resources.

Paper Submitted

PETROLEUM DATABASES IN THE NEW SOUTH WALES DEPARTMENT OF MINERALS AND ENERGY

by

I.L Walsh and R. Khaiami

NOTES:

New South Wales

The N.S.W. Department of Minerals and Energy has two Divisions dealing with petroleum data. The Petroleum Geology Section of the Geological Survey deals directly with the petroleum companies and the incoming data; and the Information and Extension Services Branch (now Public Affairs and Information Division) is responsible for data storage and facilitating public access.

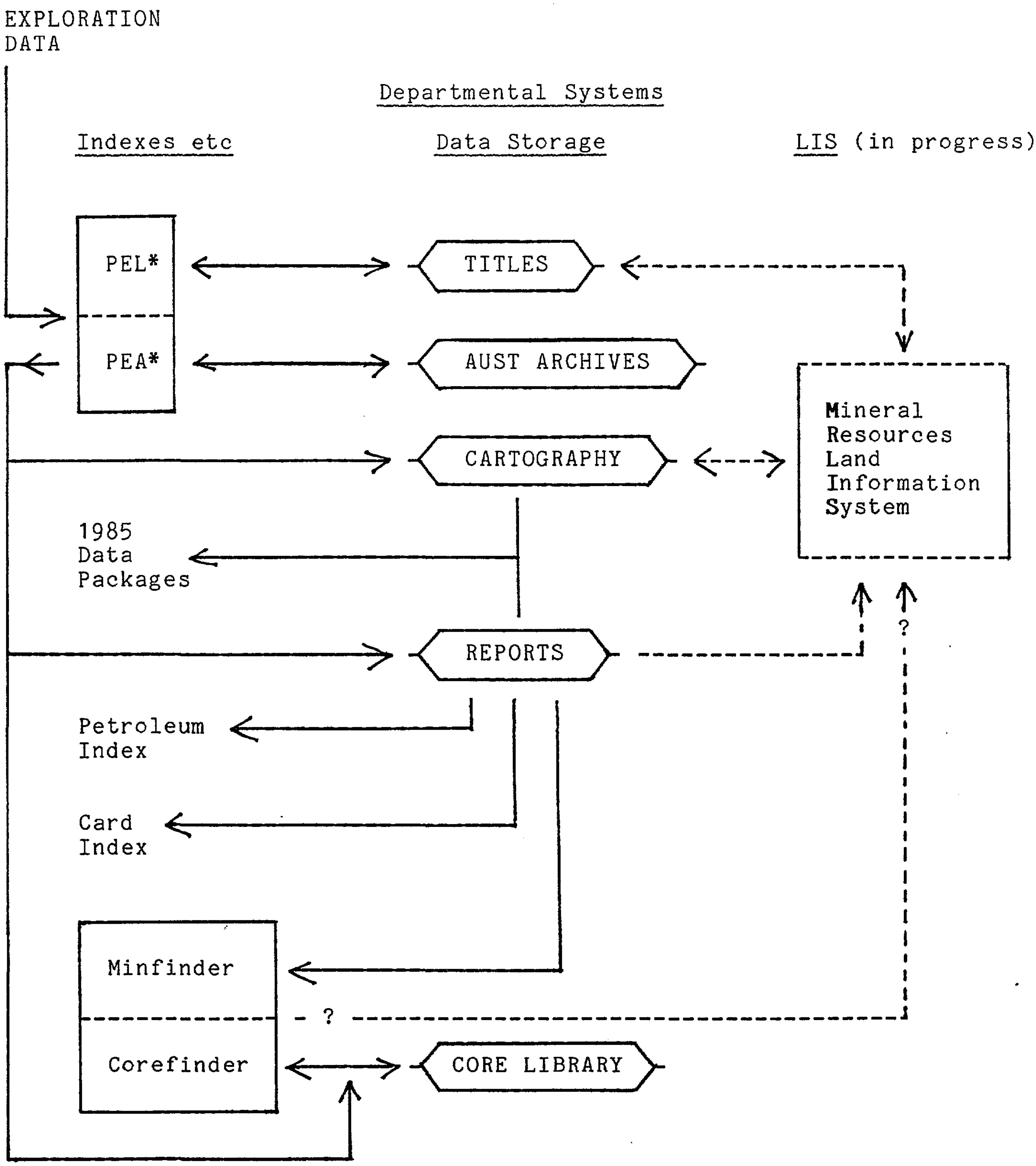
These notes have been prepared by Mr Ian Walsh (Petroleum Geologist), and Mr Rhamat Khaiami (Scientific Information Officer).

This is a composite document only partly based on the transcript of Mr Khaiami's talk at the Workshop.

OVERVIEW: I.L. Walsh

Figure shows the flow of petroleum exploration information around the various Departmental systems. The Petroleum Geology Section of the Geological Survey gathers and subdivides petroleum information into two basic groups: exploration data and title administration data. The Petroleum Geology Section has developed two computerised indexes/databases for its own use:

"PEL" holds Petroleum Exploration Licence material, (e.g. licence history, company contacts and other confidential data not described in any further detail here).



Notes:

Items in rectangles are computerised, others are manual/hardcopy.

* "PEL" and "PEA" are Geological Survey systems that contain confidential data on existing Petroleum Exploration Licences (PEL) and Petroleum Exploration Assessment (PEA).

figure 1

PEL___ WORK PROGRAMME(S): (N.B. [Y] = item received [ ] = item not received)
PEL___, PEL___, PEL___, PEL___, PEL___, PEL___ PEL___ WORK PROGRAMME(S): (N.B. [Y] = item received [ ] = item not received)

Project name seismic survey (type) PEL
Location: <km/PEL>

	scope	start	end	expenditure
expected	km	__/__/__	__/__/__	K$
actual	km	__/__/__	__/__/__	K$

[ ] Regional [ ] Detailed: structure(s)/lead(s)
Contractor:
[ ] Permitting [ ] Archaeological survey/NPWS site check [ ] Location map [ ] Shot point map
Reports [ ] Operations [ ] Processing [ ] Interpretation [ ] Rehabilitation
Sections [ ] paper, line numbers: [ ] plastic, line numbers:
Archives [ ] digital tapes [ ] observers' logs [ ] survey details

Title: [ ] Satisfactory report SS___
Author(s): Dated __/__/__ Received __/__/__

Updated: __/__/88 Telex/Comments:

Project strat/exploration well basin Status: PEL ___
Location: Lat __*__'____" Long ___*__'____"
AMG (ZONE) E N
Seismic line: ____________________ Shot point ____ CDP ____
Structure/lead: Near town:
Ground level: ______ m/ _____ ft Kelly bushing: ______ m/ _____ ft
Driller:

	scope	spud	release	expenditure
expected	m	__/__/__	__/__/__	K$
actual	m	__/__/__	__/__/__	K$

Formation(s): spud T.D. target(s)
Reports [ ] Well prognosis [ ] Archaeological survey/NPWS site check [ ] Well completion [ ] Rehabilitation
DSTs [ ] DST(s), No./interval/formation/result:
Velocity [ ]
Logs: [ ] paper [ ] plastic, types & intervals:
Analyses:
Library: [ ] core, intervals:
[ ] SWCs, depths:
[ ] cuttings, depths & intervals:

Title: [ ] Satisfactory report WCR___
Author(s): Dated __/__/__ Received __/__/__

Updated: __/__/88 Telex/Comments:

Project name type PEL ___
Location:

	scope	start	end	expenditure
expected		__/__/__	__/__/__	K$
actual		__/__/__	__/__/__	K$

figure 2

Title: [ ] Satisfactory PGRreport___
Author(s): Dated __/__/__ Received __/__/__

Updated: __/__/88 Telex/Comments:

"PEA" is the Petroleum Exploration Assessment database of material received from current licence holders.

These systems were developed in 1984 as a short term measure while the development of the Department's Mineral Resources Land Information System (MRLIS) continues. Prior to 1984 the same basic division of incoming data occurred by using less comprehensive manual systems.

The PEA system stores data in a free text form using a word processor program on a local area network. The data is structured into "chapters" for each licence and uses some embedded key words: simple templates are used to start off each new entry. Figure 2 shows some empty templates and figure shows some real examples. While this system is not particularly fast, it is relatively easy to use and very flexible: searches can be made for any terms or key words, entries can be any length, "fields" from the templates can be repeated, and data exchange/export is very easy. Some of this data is open-file and is exported to compile tables or exploration summary reports.

The company exploration data passes on from the Petroleum Geology Section for storage by other groups:

> Magnetic tapes and supporting materials from seismic and other surveys are given special storage at the Australian Archives repository. The Archive has its own system of indexing and retreival.
>
> Some transparent plans and maps go into the Survey's cartographic system for storage.
>
> Exploration reports are sent to the Information Division for indexing and storage in the "GS system". The GS system holds the hard copies of all unpublished company and original Geological Survey reports ever received. Access is available to the open- file portion of the system at the Department's central inquiry counter. Paper and/or microfiche copies are available for most of the open-file reports in the GS system. A copy of the GS index goes into the Department's computerised bibliographic reference "Minfinder".
>
> Core and cuttings samples go to the Core Library, and the entries are controlled by the "Corefinder" database.

Apart from the Department's "Minfinder" and "Corefinder" databases (described in the section below), most other public access is restricted to hardcopy indexes, compilations and publications.

New South Wales

Two manual indexes exist for public use: the "Petroleum Index" is a brief, typed tabulation of all of the petroleum geology/geochemistry, seismic, magnetic and gravity survey and well completion reports that have ever been received in the Department. Copies of the Petroleum Index are available for sale: however, it is only updated sporadically. The report information also goes into the "Card Index" on the public enquiry floor of head office.

The Geological Survey compiled several Petroleum Data Packages as special GS reports in 1985 for the State's onshore basins: the Clarence-Moreton, Darling, Eromanga, Gunnedah, Murray, Surat and Sydney Basins. The packages include basic data indexes, summary maps, borehole summaries, source and reservoir rock data where available, cross sections, basin geology and exploration summaries. (Reprints are available for sale; updates are expected to be done in the near future).

Current petroleum exploration activity is reported in the Department's publication "MINFO: The N.S.W. Mining and Exploration Quarterly". (A subscription costs $8.00 per year). Since 1986, the Petroleum Geology Section has also produced Annual Reviews as GS reports: these can be used to check exploration activity since the Data Packages were compiled.

Other sources of published information include the Department's Annual Reports, and Geological Survey Memoirs, Bulletins, Records, Quarterly Notes, and the Mineral Resources and Mineral Industry Series.

The onshore Petroleum Act 1955 holds all exploration data (both basic and interpretive) confidential until the relevant title expires. (However, companies holding old confidential data may allow its release on request). The proposed onshore Petroleum Act will hold basic data and interpretive data confidential for two years and five years respectively, or until termination of the title, whichever occurs first.

DESCRIPTION OF "MINFINDER" AND "COREFINDER" PUBLIC ACCESS BIBLIOGRAPHIC DATABASES

transcript of talk by R. Khaiami

New South Wales

The Department has two computerised databases for public access: Minfinder and Corefinder. This is the example of a print-out from Minfinder (figure 3). Minfinder is a bibliographic reference database that contains general bibliographic information as well as an abstract for all the reports in the GS system. It has about about 15,000 articles in it at the moment.

bibliographic data

As Lorraine Gerdes said, Minfinder, Corefinder (which I will talk about later), SAMREF and AESIS are available via on-line access to the public on 1ARID (the Australian Resources Industry Data Base), which is managed by Info One. We went through a reasonable amount of pain to standardise the presentation and the format of these databases to match that of AESIS when AESIS joined ARID, so now, hopefully, they look a little bit more similar.

The database is structured into several "named sections" (figure 3), starting with the TItle, and that says just what the report is, a well completion report. The author - AU standing for author - is the company or the person that holds the licence; it is not the person who wrote the report; it is not the company who might be operating the well. The holder of the licence is the first author, followed by any joint venturers or the operators, etcetera. The SOurce named section has our reference number (#ref), or well completion report (WCR) number. The SUbject named section, contains broad category terms, and we have recently started using AESIS broad subject categories as well. Then there is information on whether a microfiche of it is available or not, and map information, location, basin, etcetera, and an abstract of the report.

This other screen (figure 4) just says what Minfinder is, and I hope I have covered that.

1 *At the time of publication, the name ARID has been changed to GeoPac.*

```
4BC              Aa              T0--MIN4A01D   R 2  C 2          13:37 26/09/8
 DBase: D2031                   S T A T U S      Date: 26/09/88 Time: 14:00:3
.d
---- ------------------ ENTER = Clear & Process --- Any PFK = Scroll & Proces
    1.
 Well completion reports, AOG-Morisset 1 to 6 structural holes,
 northern Sydney Basin.
 SO
   #ref=WCR169
 AU
 Australian Oil and Gas Corp Ltd
 SU
 Geophysics, Magnetic airborne, Drilling, Structural geology

                     and Gas Corp)
 #Cno=08096       #Date=1957    #Date=1958
 Micro y                        open file
 107 pp, 8 figs, 6 maps
 TN
 #tn=PEL0010
 MA
 Sydney           #250=S15605
 #100=91311
 LO
  More?   Enter  Y (Yes),  N (Next) or  X (eXit) :-
4BC              Aa              T0--MIN4A01D   R 2  C 2          13:50 26/09/8
 DBase: D2031                   S T A T U S      Date: 26/09/88 Time: 14:02:0

----------------------- ENTER = Clear & Process --- Any PFK = Scroll & Proces
 AOG Morisset 1 to 6
 AB
 Six scout boreholes were sunk in the Morisset area to contribute information
 concerning the regional structural pattern. The drill holes pierced the
 basal few hundred feet of the Triassic (Narrabeen Group) and the top few
 hundred feet of the Permian (Upper Coal Measures).
 The investigations to date have proved an anticlinal area (the Morisset
 Anticline) striking north-south and lying between a marked north-south
 syncline (The Macquarie Syncline which traverses through the Newcastle
 Coalfield) on the east and a broad syncline (The Yarramalong Syncline)
 on the west. West again of this latter structure lies the marked Kulnura-
 Lochinvar Anticline, also trending north-south.
 The Morisset Anticline is in reasonable proximity to  outcropping Permian,
 freshwater and marine strata in the Hunter Valley but at the same time is
 well east of the Kulnura - Lochinvar structure. A deep test at this point
 would be expected to pierce a full and thick section of the Permian Upper
 Coal Measures as well as that of the Permian Upper Marine. It is probable
 that marine strata would not be encountered in such a test until a depth
 of 4500 feet had been attained.
 Should the Morisset structure prove of further interest a seismic survey
  More?   Enter  Y (Yes),  N (Next) or  X (eXit) :-
4BC              Aa              T0--MIN4A01D   R 2  C 2          13:50 26/09/8
 DBase: D2031                   S T A T U S      Date: 26/09/88 Time: 14:02:4
 y
----------------------- ENTER = Clear & Process --- Any PFK = Scroll & Proces
 recommended to delineate the structure at depth.

 >
```

figure 3

```
C:\QIKB>
 DBase: D2031                 S T A T U S          Date: 26/09/88 Time: 13:47:18
 s 2031
 Please press ENTER, or place Cursor in Text Area and press any PFK ------------

                                 MINFINDER
                                 =========
  Minfinder is the Bibliographic Index produced by the NSW Department
  of Mineral Resources, Information and Extension Services branch.
  Coverage includes unpublished geological and petroleum surveys,
  mine records, annual report compilation, Departmental publications
  and general published material.

  19:02:1988 Database updated.
  In addition to the standard CLIRS STATUS commands you may use the following:-

      SEARCH COMMANDS
  AB  Abstract           AU  Author                  CATNO Catalogue No
  DATE                   GS  Control Number          LO    Locality
  MAP Map Number         SU  Subject                 TI    Title

  RDATE, RMAP and RCATNO will allow range searching on these values
  All the above prefixed with "S" will refine the current list of records

      DISPLAY COMMANDS
```

figure 4

The first example was a well completion report on Minfinder, and this (figure 5) is a report of a seismic survey, just to give you an idea of what the data looks like.

New South Wales

All of you who are familiar with STATUS, know that databases are free text and can be searched for any term anywhere in the database. Minfinder is not particularly large, so it is not too bad in terms of search time. Minfinder follows the same standard format; the only difference being that each of the map sheets have to be listed separately by name and number.

The final type of petroleum data that we have on Minfinder are stratigraphic drilling information. This (figure 6) is a Departmental stratigraphic hole, which was drilled in the Eromanga Basin, DM Lake Stewart DDHl. The abstract tells you the rationale behind selecting the area and what the outcome of the drilling was.

In addition to the examples that I have shown you, Minfinder also includes other unpublished GS reports; for example, regional geological mapping and petrological, mineralogical and palaeontological reports done by the Geological Survey. This other reportage is directly related to petroleum basin studies.

core data

As I said before, all the petroleum core that is drilled in New South Wales must be submitted to the Department for storage at the Core Library. Corefinder is an index reference to the core that is held at the Core Library (figure 7). In addition to the central Core Library at Londonderry, we have four regional core sheds. They mainly contain coal drilling core, but the cores stored in those sheds are also referenced in Corefinder. For example, the name of the prospect, its basin, the prefix of the holes etcetera.

The LOCALITY named section includes the 1:250,000 and 1:100,000 map sheets, the county and shire (if it is still available), the nearest town, etc. Then there is the LICENCE information - in this case, petroleum exploration licence (PEL) 102.

In NOTES, the number after "#NUMBER" is a unique number only for our use - for storage of the hard- copy of the index sheet etcetera. It is stored in a "keyed field" which is one of the features of STATUS that enables us to sort on the unique number or the prospect name (or whatever data is held in a keyed, or #, field).

Also in NOTES, we have some information on the references that are available to that core - the GS reports, the well completion reports etc. There are also other comments, such as confidentiality, which may go

1.
Seismic survey report on the Lake Stewart area, New South Wales (Lake Frome Embayment).
SO
#ref=SS023
AU
BOC of Australia Ltd
Clarence River Basin Oil Exploration Co NL
SU
Geophysics, Seismic
NO
#Au=(BOC of Australia Ltd)
#Cno=06396 #Date=1962
Micro part Confid nc
24 pp, 6 figs, 3 maps plus 1 fig. microfiche
TN
#tn=PEL0031
Section stored at Archives are on microfiche.
MA
Milparinka #250=SH5407

#100=7139I	#100=7139II	#100=7139III	#100=7139IV
#100=7239I	#100=7239II	#100=7239III	#100=7239IV
#100=7138I	#100=7138II	#100=7318III	#100=7138IV
#100=7238I	#100=7328II	#100=7238III	#100=7238IV

LO
Lake Frome Embayment, Milparinka, Lake Stewart (HMSD), Great Australian Basin.
AB
The purpose of the survey was to obtain reconnaissance subsurface control on the basement to determine the attitudes and thickness of the geologic sedimentary section.
The results of the survey indicate the existence of at least 4,500 feet of sediments in the northern portion of the area diminishing to approximately 3,000 feet of section in the southern portion of the prospect. The investigation also reveals a gently undulatin subsurface with the possibility of faulting near the middle of the south refraction profile.

figure 5

2.
Petroleum stratigraphic well DM Lake Stewart DDH1.
SO
#ref=WCR217
AU
Etheridge, L.T.
SU
Drilling, Geophysics, Well logging, Petrology, Palynology
Stratigraphy, Cadna-owie Formation, Mooga Sandstone, Murta member
NO
#Au=(Etheridge, L.T.)
#Cno=16707 #Date=1985
Micro n open file
125 pp, 10 figs + plates
MA
Milparinka #250=SH5407
#100=7139II
LO
DM Lake Stewart DDH 1, Eromanga Basin, Milparinka
AB
The Department of Mineral Resources has drilled DM Lake Stewart DDH 1 a fully cored stratigraphic well, to aid the assessment of petroleum prospectivity in northern NSW.
The well encountered a sequence a Eromanga Basin sediments comprising the Winton and Oodnadatta Formations, the Coorikiana Sandstone, Bulldog Shale Cadna-owie and Mooga Formations, and an undifferentiated unit before terminating at 903.7 m.
Good to excellent quality potential source rocks, reservoir sandstones, and seals exist in the Cadna-owie Formation and the Murta Member of the Mooga Formation; these units are interpreted as having resulted form shoreline regression in lacustrine and paralic environments. The Namur Sandstone Member of the Mooga Formation, interpreted as a braided fluvial deposit, also has good to excellent reservoir characteristics.
The results from the well have upgraded the petroleum prospectivity of the area, and the region to the north where hydrocarbon generation is expected to be more mature.

figure 6

```
  20.
badgelly 1 camden 5 woronora 1 sydney basin
australian oil & gas ltd
LOCALITY
Sheet Name: wollongong
 #SHEET=si/56-9  #MAP=9029i
 County: cumberland
 Nearest Town: camden appin
 LICENCE
pel 102 aog badgelly pel 13 aog woronora camden
 NOTES
 #NUMBER=00136
 #ALPHKEY=badgelly
 References: gs1971/761  wcr 98,  wcr 39, wcr 80
 CORE
                        DIAMOND DRILL CORE
 NUMBER                    DEPTH           LIBRARY        YEAR
                      FROM       TO        POSITION
  More?   Enter  Y (Yes),  N (Next) or  X (eXit) :-
4BL                 Aa              T0--MIN4A01D   R 2  C 2          14:32 [illegible]
 DBase: D2032                    S T A T U S       Date: 26/09/88 Time: 14:[illegible]
 y
----------------------- ENTER = Clear & Process --- Any PFK = Scroll & [illegible]
  badgelly 1        0'       2166'      N/L2/12        1964
  camden 5          0'       1981'      M/L3/7         1958
  woronora 1        0'       7587'      N/L5/17        1964
  woronora 1        1491'    1930'      M/L5/17
  CULLINFO
  SAMPLING

   >
```

figure 7

New South Wales

core data

in that area, as well as whether or not the core is slabbed or full core etcetera.

Then in the CORE named section are the name and the number of the holes, the depth of the tops and bottoms of the core intervals that we store, its position or location in the core library and the year of drilling.

CULLINFO and SAMPLING are two name sections which are filled if the core has been culled. The Department went through an extensive culling programme before we moved into the new facility and in these cases we report that the core had existed and is being culled. When it is culled, we first offer it to the company that drilled it first in case they want it back, then we advertise the core in Minfo for anybody who wants to come and take it (usually some tertiary institutions wanting to use them for teaching purposes) and if there are no takers, then we take them to the tip. However we record information in CULLINFO so that anybody who sees it knows that the core existed at some stage, it has been culled, where it is at the moment and what referenences can be found about it.

SAMPLING provides information regarding sampling by other companies who come to the core library. When a licence has expired, the core that is stored in the core library becomes public property. Typically, the next company that happens to have a licence over that same area comes and samples that core, however they are not entitled to hold the sampling result confidential. We do co-operate with them by not really announcing that they have done that sampling, as long as their licence is current, but they must submit to us a separate copy of the results of their sampling. We indicate in Corefinder that this core was sampled by such-and- such company on such-and-such a date and what it was assayed or tested for.

The inspection of all confidential core can always be arranged with permission from the company that holds the licence over that area. I think I will just leave it at that and if there are any questions, I will be happy to answer them.

Paper Submitted

DITR PRESENTATION AT THE GOVERNMENT PETROLEUM DATABASES WORKSHOP

by

Maher Megallaa

Chief Petroleum Geophysicist

Victoria

I would assume that most of the Audience here in one way or another have come across or heard of our Database Manager, Mr Jack Davin. Jack has served the exploration community for almost two decades and he will be retiring soon. He devised a Manual Card Indexing System and has used it effectively. I was asked by my management to see if we could replace Jack's system by an electronic database retrieval system.

A number of people have asked me about Jack's system which is based on two major steps:

First: Arrival and Storage of the Data

Secondly: Distribution of the Data

The received data must first be broken up into one of the following ten categories:

-Wells (exploration)	1 box
-Surveys	1 box
-Reports	2 boxes
-Core cuttings	1 box
-Field tapes, Log, SP	1 box

-(grouped reports)	1 box
-Core analysis reports	
-Geochemical reports	
-Hydrocarbon reports	
-Wells (development)	1 box
-Halfplate negatives	1 box
-Floppy disk box	1 box

General details of the received data are then put into cards that fall into one of these categories.

Victoria

Relevant details on expected data to arrive are recorded on cards. If received data is replacing old information then the old information is written over.

The information stored on the cards is of a general nature and often contains a reference to other card(s) or to a bay/shelf/draw location.

In planning for the design of the database retrieval system I addressed the following constraints:

1. The hard copies are stored in four locations in Melbourne and one location in Sydney.

2. The system should recognise and differentiate between authorized users and public. Also certain authorized users have full access to data to enable file maintenance and editing.

3. Date for release of open file data and keeping information that has not passed the recognition date of release.

4. The system should provide the unclassified data to the public in the form of screens and reports.

5. The established database will provide an enquiry service on 420 offshore wells and 268 onshore wells. 112,000 km on offshore seismic coverage and 15,000 km on onshore seismic grids as well as a number of gravity, magnetic and geochemical surveys. The replacement cost of this data in todays money is thought to be in the order of $2B.

6. The designed system would be easily incorporated into a larger system should the need arise.

7. Download the required data for this system from BMR's database rather than keying in the information.

8. The system should have multi-user access to the data.

9. There should be a means for transferring the data to an ORACLE file.

10.The machine this system is being developed on is a Pyramid, however, for security reasons it will reside on both a PC and the Pyramid when completed. It is intended to have the database on the PC as the parent and the database on Pyramid as the child and a means to download open dat from the parent to the child will be provided.

Victoria

The system has to be simple and in fact it is similar to the public libraries database retrieval system.

Mr Arthur Gouros is the enthusiastic young programmer who is currently near completing the codes. To complete this project he has to finish the database maintenance modules.

HARDWARE

As I mentioned the system is being developed on a Pyramid machine running on UNIX. On its completion it will reside as a Clevland 386 PC computer already purchased for this purpose.

Two terminals will be required for this system, though not in the immediate short term. In the long term there will be four terminals connected to this system. Only one printer will be connected to it which will produce reports on A4 paper.

The disk requirements are at a generous estimate:

11.25 megabytes for the data.

5 megabytes for the application (Based on the size of BMR's application).

THE SOFTWARE

The system is being developed using **TODAY** which is a 4GL language revolving around INFOREX DATABASE. It is a code above Informex which provides interface with screen and reports.

INTERFACES

Victoria

Initially the system will be a stand alone system, however there is the possibility that it may be included as a part of a much larger Departmental GIS Database.

INPUTS

As I mentioned the inputs when the system is initialised will be by down-loading data from BMR's database. This will require information on proper number of block size, standard number of characters per block and standard number of tracks. When the system is running the inputs are through key entry.

SERVICES TO COMPANIES OUTSIDE VICTORIA

Our Pyramid is connected to AUSTPAC Computer network which will make it feasible in future for the oil companies in any part of Australia to "dial-in" for access to the open file data.

Report 1:

DATE | DMETR Petroleum Division. Gippsland Basin. | PAGENO

Company
Title

Author | Date
Status | Date for release

(20)XXXXXXXXXXXXXXXX
(140)XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
(40)XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX DD/MM/YY
Open file/Confidential DD/MM/YY

(20)XXXXXXXXXXXXXXXX
(140)XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
(40)XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX DD/MM/YY
Open file/Confidential DD/MM/YY

(20)XXXXXXXXXXXXXXXX
(140)XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
(40)XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX DD/MM/YY
Open file/Confidential DD/MM/YY

(20)XXXXXXXXXXXXXXXX
(140)XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
(40)XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX DD/MM/YY
Open file/Confidential DD/MM/YY

(20)XXXXXXXXXXXXXXXX
(140)XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
(40)XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX DD/MM/YY
Open file/Confidential DD/MM/YY

..............................End of Report ....

Screen 2.(Magnetic).0.0

Magnetic Survey on Surveyname Surveylocality Surveynumber

Page 1 of 2

Survey Type
Flightline Number/Magnetic Profile
Line Spacing

Magnetic Tapes

Identifier
Tracks Width BPI
Storage Location

Observers Report

Date Received
Storage Location

Correction Charts

Date Received
Storage Location

Altitude Charts

Date Received
Storage Location

Total Magnetic Intensity Charts

Date Received
Storage Location

Recovery Path Film

Date Received
Storage Location

Screen 2.(Magnetic).0.0

Magnetic Survey on Surveyname Surveylocality Surveynumber

Page 2 of 2

Reports
- Field Operation
  - Contractor
  - Date Received
  - Storage Location
- Interpretation
  - Contractor
  - Date Received
  - Storage Location
  - Confidentiality

Data Processing
- Contractor
- Date Received
- Storage Location

Maps
- Type of Magnetic Anomaly Maps
- Scale
- Storage Location

Screen 2.(Gravity).0.0

Gravity Survey on Surveyname SurveyLocality Surveynumber

Page 1 of 2.

- Contractor
- Total Number of Stations
- Station Spacing
- Basic Fact Listings
  - Printout Received
  - Storage Location
- Magnetic Tape
  - Identifier
  - Tracks
  - Width
  - BPI
  - Storage Location

Screen 2.(Gravity).0.0

Gravity Survey on Surveyname SurveyLocality Surveynumber

Page 2 of 2.

- Reports
  - Field Operation
    - Contractor
    - Date Received
    - Storage Location
  - Data Processing
    - Contractor
    - Date Received
    - Storage Location
  - Interpretation
    - Contractor or Author
    - Date Received
    - Storage Location
    - Confidentiality
- Maps
  - Type of Map
  - Scale
  - Storage Location

Screen 2.(Seismic).6.0

Reports on Surveyname Surveylocality Surveynumber

1. Operation Report
2. Navigation Report (Offshore)
3. Surveyor Report (Onshore)
4. Processing Report
5. Reprocessing Report
6. Interpretation Report

Screen 2.(Seismic).6.1

Reports on Surveyname Surveylocality Surveynumber

Operation Report

Contractor or Author
Date Received
Storage Location

(- <u>The following screens are displayed according to the type of survey selected</u> -)

Screen 2.(Seismic).0.0

Seismic Survey Data on Surveyname Surveylocality Surveynumber

1. Basic Seismic Survey Data
2. Shotpoint Location Maps
3. Seismic Sections
4. Velocity Analysis
5. Magnetic Tapes
6. Reports
7. Bathymentry/Elevation Maps
   & Weathering Maps
8. Miscellaneous data

Screen 2.(Seismic).1.0

Seismic Surveys on Surveyname Surveylocality Surveynumber

Energy Source
Vessel (if Marine)
Lines Shot
Total Length
Reflection Coverage

Screen 2.0.0.0

```
[redacted]

Number         XXXXXXX
Name           (34)XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Locality       XXXXXXXXXXXXXXXXXXXXXXX
Type           Seismic | Gravity | Magnetic | Geochemical
Date Started   DD/MM/YY     Date Finished DD/MM/YY
Kilometers     NNNNN K.
Basin          XXX  Off/Onshore
Permit         PEP100(Onsh & Expl) | PPL1 (Onsh & Dev) | VIC/P11 (Offsh & Expl)
               | VIC/L11 (Offsh & Dev)
Company        (20)XXXXXXXXXXXXXXXX

Date for Release
Operator
Contractor
Location: N-lat.          S-lat.           E-long.          W-long.
```

(- If the number, or the name and locality and type is entered then the particular survey screens are displayed, otherwise a list of surveys are displayed as follows and a selection required. -)

```
            Survey Data on Surveyname Surveylocality Surveynumber
            -----------------------------------------------------

Number         XXXXXXX
Name           (34)XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Locality       XXXXXXXXXXXXXXXXXXXXXXX
Type           Seismic | Gravity | Magnetic | Geochemical
Date Started   DD/MM/YY     Date Finished DD/MM/YY
Kilometers     NNNNN K.
Basin          XXX  Off/Onshore
Permit         PEP100(Onsh & Expl) | PPL1 (Onsh & Dev) | VIC/P11 (Offsh & Expl)
               | VIC/L11 (Offsh & Dev)
Company        (20)XXXXXXXXXXXXXXXX

G11111 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXX Geochemical
G22222 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXX Seismic
G33333 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXX Magnetic
G44444 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXX Magnetic
G55555 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXX Geochemical
...etc
...etc
```

Screen 1.1.5.0

(- If the report is confidential then it will not be displayed should the option be selected, unless it is run by the privileged user. -)

Well Reports on Wellname Wellnumber

1. Well completion reports
2. Geological Analysis
3. Hydrocarbon Studies
4. Reservoir Fluid Study
5. Core Analysis Study
6. Geochemical/Source Rock Analysis

Screen 1.1.5.1

Well Reports on Wellname Wellnumber

Well completion reports

Subject
Title
Number of Volumes
Confidentiality
Author/Contractor
Date Received
Storage Location

Screen 1.1.1.4

Log Tapes on Wellname Wellnumber

```
Type   e.g. Sonic, Gamma, neutron, ...20
Depth Interval (meters) e.g. 1200-1700, 1723-300, 3078-TD
Tape no NNN out of NNN
Format
      Width
      Tracks
      BPI
Storage Location
```

Screen 1.1.1.5

Computer Printouts on Wellname Wellnumber

```
Do we have them (Y/N)
Storage Location
```

Screen 1.1.2.0

Cores & Cuttings on Wellname Wellnumber

1. Cuttings
2. Cores
3. Sidewall Cores

Screen 1.1.2.1

Cuttings on Wellname Wellnumber

Interval (meters) e.g. 1000-2000
Storage Location

Screen 1.1.1.0

Well Logs on Wellname Wellnumber
Logging Company XXXXXXXXXXXXXXXXXX
1. Log Transparencies
2. Log Paper Prints
3. Well Velocity Survey Type
4. Log Tape
5. Computer Printouts

Screen 1.1.1.1

Log Transparencies on Wellname Wellnumber
Type Interval Scale Storage Location

(- if a number or a name is not entered then the following is displayed and after a selection is made then the previous screen is displayed. -)

```
                         Well Data
                         ---------

Enter key to search on:

Number     XXXXXX                    Name        (34)XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Basin      XXX   Off/Onshore         Permit      (34)XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Latitude   NN NN NN X                Longitude   NN NN NN X
Company    (20)XXXXXXXXXXXXXXXX      Spud Date   DD/MM/YY
Status     XXXXXXXXXXXXXXXXXXXX      Total Depth NNNN m
Northing   NN NN NN X                Easting     NN NN NN X

Select a No.:

Number Name                              Spud Date Status
W11111 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX DD/MM/YY XXXXXXXXXXXXXXXXXXXXXXXXX
W22222 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX DD/MM/YY XXXXXXXXXXXXXXXXXXXXXXXXX
W33333 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX DD/MM/YY XXXXXXXXXXXXXXXXXXXXXXXXX
W44444 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX DD/MM/YY XXXXXXXXXXXXXXXXXXXXXXXXX
W55555 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX DD/MM/YY XXXXXXXXXXXXXXXXXXXXXXXXX
W66666 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX DD/MM/YY XXXXXXXXXXXXXXXXXXXXXXXXX
...etc
```

Screen 1.1.0.0

```
                 Well Data on Wellname Wellnumber
                 ---------------------------------

                       1. Well Logs

                       2. Cores & Cuttings

                       3. Fluid Samples

                       4. Palynology/Palaeontology

                       5. Reports
```

Screen 1.0.0.0

```
                              Well Data
                              ---------

Enter key to search on:

Number      XXXXXX                    Name         (34)XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Basin       XXX   Off/Onshore         Permit       (34)XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Latitude    NN NN NN X                Longitude    NN NN NN X
Company     (20)XXXXXXXXXXXXXXXX      Spud Date    DD/MM/YY
Status      XXXXXXXXXXXXXXXXXXXX      Total Depth NNNN m
Northing    NN NN NN X                Easting      NN NN NN X
```

(- if a <u>number</u> or a <u>name</u> is entered then the following is displayed -)

```
                              Well Data
                              ---------

Enter key to search on:

Number      XXXXXX                    Name         (34)XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Basin       XXX   Off/Onshore         Permit       (34)XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Latitude    NN NN NN X                Longitude    NN NN NN X
Company     (20)XXXXXXXXXXXXXXXX      Spud Date    DD/MM/YY
Status      XXXXXXXXXXXXXXXXXXXX      Total Depth NNNN m
Northing    NN NN NN X                Easting      NN NN NN X

Date for release                 DD/MM/YY
Type                             Expl/Development
Designation                      (20)XXXXXXXXXXXXXXXX
Contractor                       (34)XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Drilling Rig                     XXXXXXXXXXXXXXXXXXXXXXXXX
Spud Date                        DD/MM/YY
Rig Release Date                 DD/MM/YY
Water Depth/Elevation            NNNN m.
Kelly Bushing/Rotary Table       NNNN m.
TD date     DD/MM/YY  TD Location: lat NN NN NN X  long NN NN NN X
```

5. Screens and Library Reports

Screens for the Petroleum Indexing System

Screen 0.0.0.0

D.I.T.R. Petroleum Indexing System
----

1. Wells

2. Surveys

3. Petroleum Library Reports

Paper Submitted

WESTERN AUSTRALIA PETROLEUM EXPLORATION DATABASE (WAPEX)

by

R. Iasky

Western Australia

Introduction

The Western Australian Petroleum Exploration data base (WAPEX) is primarily a library indexing system. It will be used to aid the storage and retrieval of petroleum exploration and development data base will also be used as a tenement management tool.

The present manual system consists of a collection of petroleum exploration, development and production reports, data and correspondence files submitted to the Department by petroleum companies. The data are used by the Geological Survey and Petroleum Division of the Department to approve work programmes, monitor compliance with statutory regulations, assess applications for renewal of tenements, conduct basin and reservoir studies and assist in the administration and assessment of the State's petroleum resources.

History and background

The idea of a petroleum exploration database began in August 1983, in an unpublished paper on the "EDP plan for the S-filing system" presented at a WA Mines Department seminar to which members of the industry and Government where invited.

WAPEX itself did not begin to materialise until May 1985 (figure 1) when a departmental committee was set up to assess the viability of the project. By the end of October 1985 reports were drawn up to assess the need for a petroleum database and to define the system. The committee recommended that the project should continue, and a prototype of the system was developed with the FOCUS database package by June 1986.

Due to lack of both program development and data capture funds, the project was shelved until August 1987. After this time the project

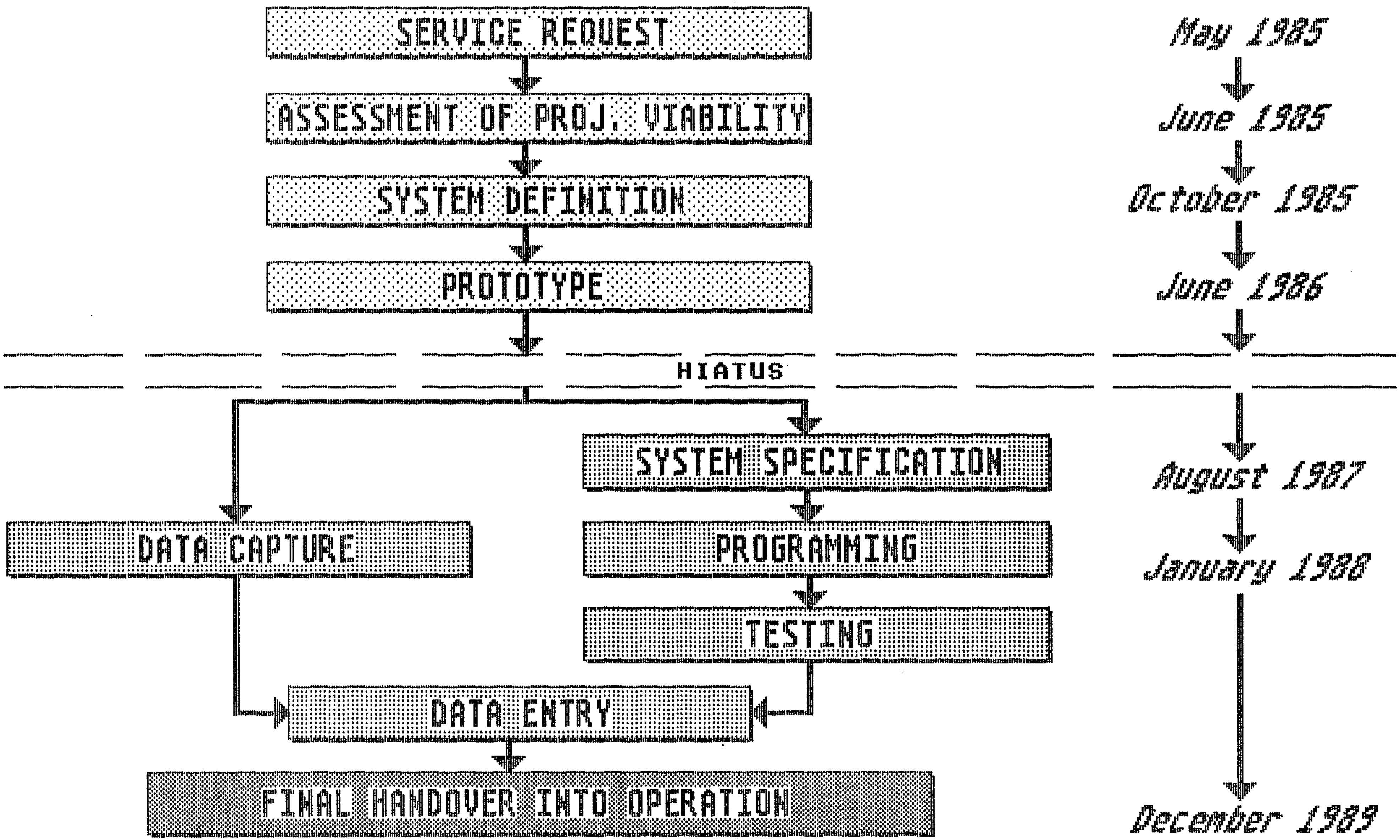


Figure 1. WAPEX development schedule

became a top priority item in the department, and funds became available (approximately $95,000). The system specifications were drawn up in August 1987 and the programs began to be assembled shortly thereafter. Data capture staff was hired in December 1987 and a keyboard operator was hired in May 1988 to begin to enter data.

Approximately 35% of data have been captured and 15% have been entered into the system to date. The database is still in the development stage and the programs are expected to be finished by the end of 1988. The bulk of the data capture should be completed by the middle of 1989 and the system should be fully operational by the second half of 1989.

Western Australia

Legislative requirements and responsibility

The Department monitors petroleum exploration and development and all work must be reported. The data submitted can be divided into "basic" and "interpretive", but only basic data are released to the public unless specific authorization is received to release the interpretive data. The petroleum industry makes use of the basic data contained in reports (made available in microform) to support applications for new tenements and exploration programs and to avoid duplication of costly exploration.

The Basins and Fossil Fuels Section (BFF) of the Geological Survey of Western Australia and the Petroleum Division (PD) will be the main users of WAPEX. BFF is curator of the library of exploration and development the reporting requirements, while the PD is responsible for development data and monitoring work programs.

One of the main functions of the Department is to make petroleum exploration data available to the public. Microform copy of all non-confidential surveys and wells may be obtained from the Department. Requests for full size copies of seismic sections and electric logs are handled by PI Energy Services which holds a non-exclusive contract with the Department to make these data available to the public.

Requests to sample open file cores and cuttings and loans of palaeontological material for special studies, are also handled by the Department; reports resulting from the examination of these materials are microfiched and released to the public six months after the material is sampled.

WAPEX has been designed to streamline and eliminate duplication in the present manual system, but at the same time, provide greater data access to the public, by interactive computer queries and printouts.

To assist the monitoring of exploration activities, the completion dates of the various activities, will be essential in determining outstanding reports. Release dates will be calculated automatically by the software and regular printouts of outstanding reports and released data will be an important aspect of the system.

Standard letters to companies requesting outstanding reports will be drawn up from the printouts. Microfiching priorities of wells and surveys will be determined by our staff from the dates specified in the printouts.

Data storage

WAPEX is being written in CICS COBOL and the system will run on an IBM 4381 model Q14 mainframe computer. The database will have SAS and DB2 for support queries languages.

The main contents of the database are a bibliography of petroleum reports submitted by exploring companies for activities carried out in the State. An S-number is assigned for every activity (well, survey or tenement) initiated under the Petroleum acts. This number is a unique number which identifies that activity.

The petroleum reports and data are addressed by four distinct sources of information which has determined the structure of the database (figure2).

The four different parts of the database are:

- tenements
- wells
- geophysical surveys
- general reports

Tenements

When a tenement is granted, an S-number is allocated and an S-file is created. A preliminary evaluation report and all subsequent quarterly and annual reports are filed on the S-file as accessions to that tenement.

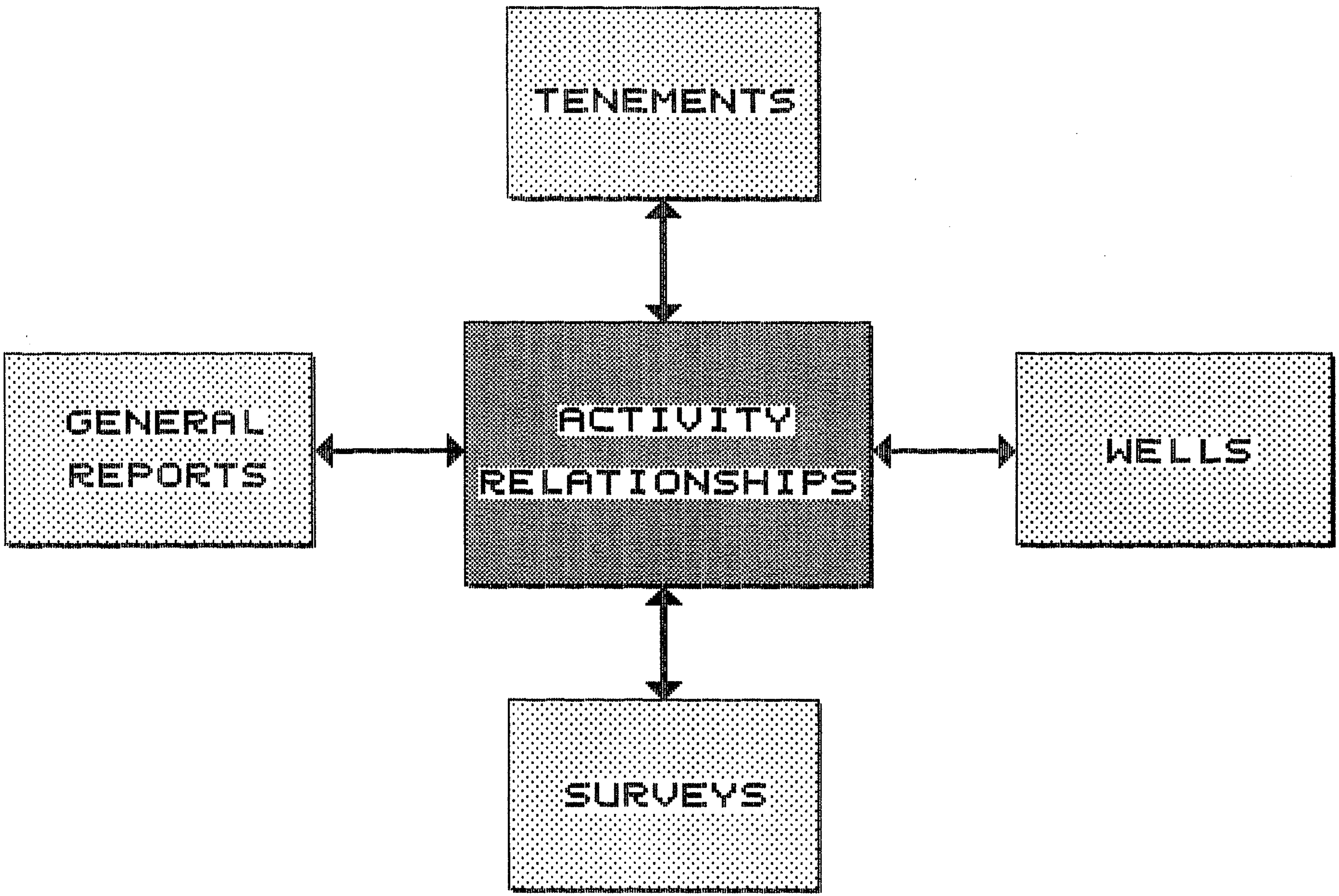


Figure 2. Database structure

The tenement is the heart of all petroleum exploration and production activity and because of it, it gives a rough spatial fix to any activity one might be searching for in the database. In the past, petroleum companies have submitted data in relinquishment packages and therefore the tenement file is an invaluable source of data and a good cross-reference for other associated data.

The PD uses the information to monitor work programs versus actual work done and predict future exploration. This part of the database is crucial as an aid to determine the compliance of the permittees to the proposed work program in a permit.

The tenement information is contained in five parts (figure 3) which are displayed over six screens. These are:

1. Tenement - general information on tenement such as Operator, Issued and expiry date, location status, basins etc.

2. Related Activities (Tenement) - list of any other associated activities, ie Wells and surveys carried out on the tenement.

3. Tenement Map Packets - list of S.P. base maps stored under the tenement.

4. Work - proposed commitments, variation to proposed work and actual work done in a tenement.

5. Statutory Reports - quarterly and annual reports dates

6. Accessions - all reports stored with the tenement S-No.

To date 966 tenements have been granted in Western Australia, of which 89 are currently active (55 onshore, 28 offshore and 6 Territorial Permits).

The Tenement part of the database totals approximately 6 megabytes of computer memory.

Wells

As soon as an application to drill a well is received by the Department, an S-number is allocated and an S-file is made up. All reports, logs and other data associated with the well, will subsequently be given this S-number.

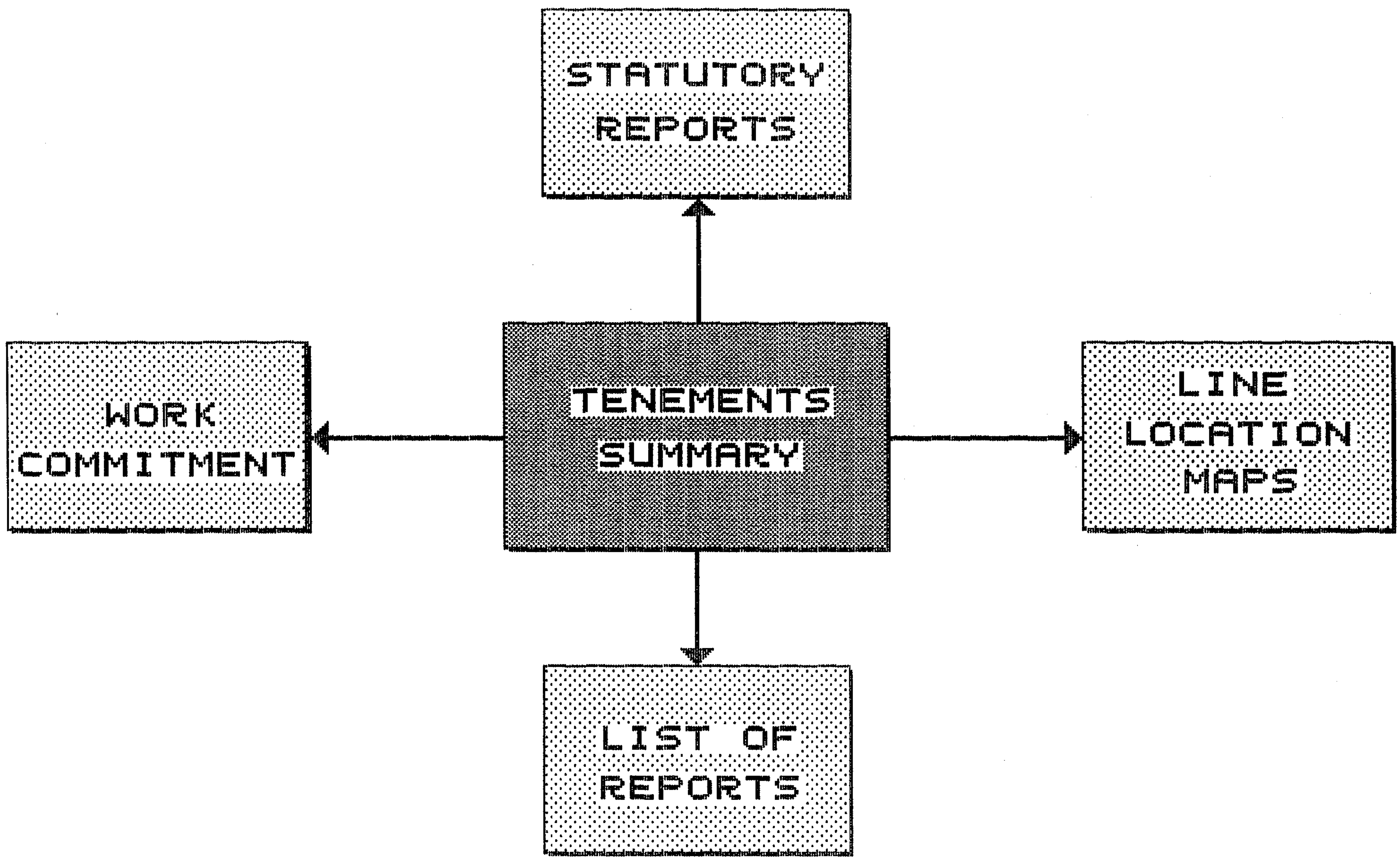


Figure 3. Tenement content of database

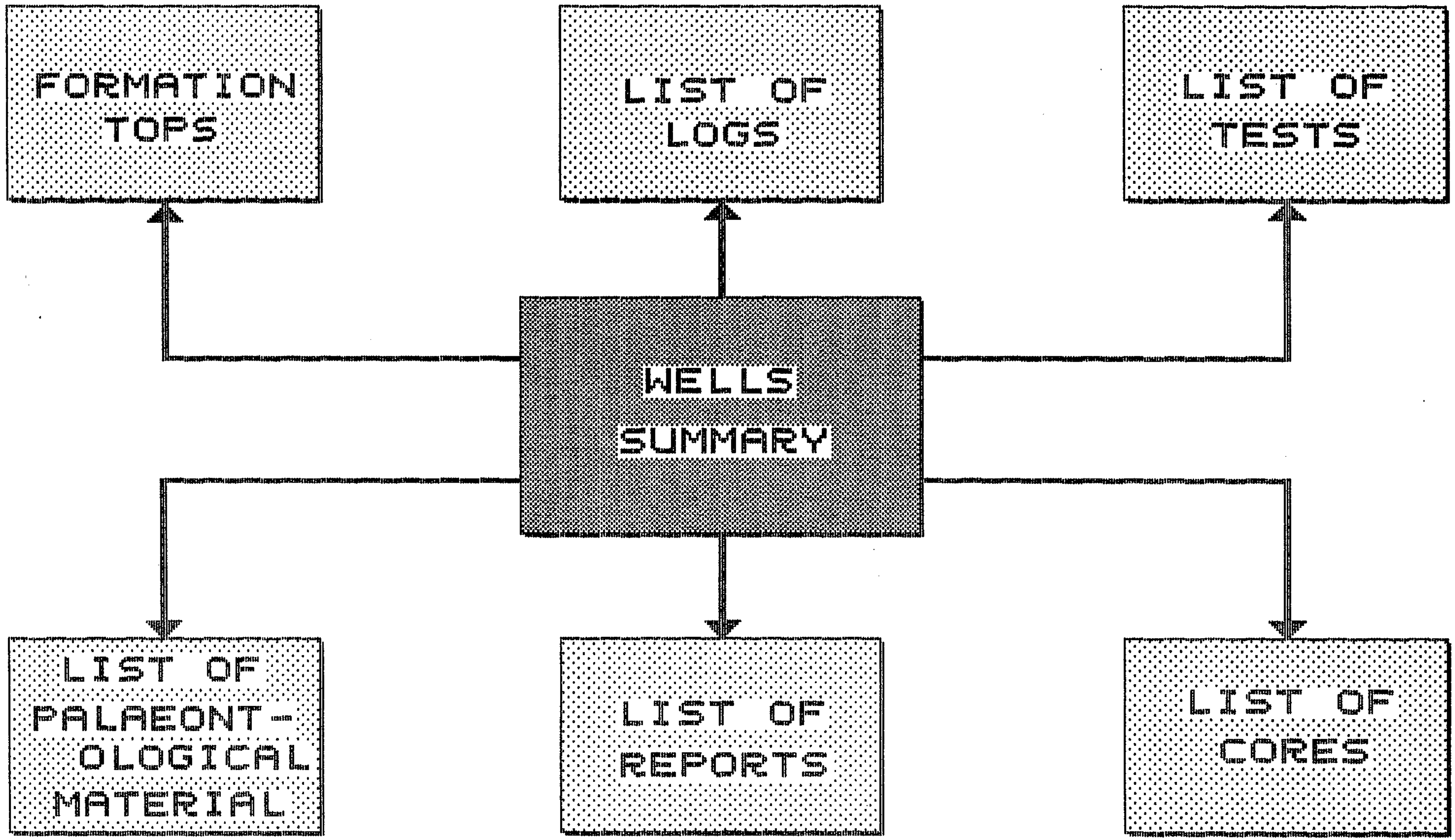


Figure 4. Well content of database

This part of the database holds all the information needed to access the petroleum wells drilled in Western Australia and obtain some basic general information about a particular well or a group of wells. Proposed wells are included in the database but will not be available to the public as this information is regarded confidential until the well is started.

Stratigraphic information from each well is the only geological part of the database. This information is considered to be interpretive and therefore confidential unless permission to release the data is granted. The program allows for the storage of several interpretations.

The well information is contained in seven parts (figure 4) which are displayed over nine screens. These are:

Western Australia

1. Well-general 1 - this includes general information about each well including location, dates, operator etc

2. Well-general 2 - continued general information. It could not fit on one screen, therefore the information was split over two screens.

3. Related Activities (Wells) - a list of all other related activities to a particular well, eg the tenement the well was drilled, reference to any special studies carried out on well cores or cuttings samples.

4. Palaeo - a list of palaeontological material received for a well. This is not a comprehensive list of samples, but a broad list of the type of material in each interval group.

5. Formation tops - a list of the formations intersected by the well with the depths and lithology for each formation.

6. Cores - a list of cores obtained in the well. This may not necessarily be equivalent to the cores submitted to the department.

7. Logs - a comprehensive list of logs received by the department.

8. Accession - a list of all reports received for a well.

There are 1636 S-files for petroleum exploration and development wells in Western Australia. This includes completed wells, wells in progress and proposed wells.

This part of the database totals approximately 8 megabytes of computer memory.

Geophysical Surveys

As soon as an application to conduct a survey is received by the Department, an S-number is allocated and an S-file is made up. All reports, sections and other data associated with the survey, will subsequently be given this S-number.

Most petroleum exploration surveys are seismic reflection surveys. These data can be in the form of raw magnetic tapes used for reprocessing or the final sections either full scale or on microfiche.

As in the Well part of the database, the information kept in the Survey portion, is used to gain access to, and find general information about particular geophysical activities in the State. Proposed surveys will also be included in the database.

The survey information is contained in four parts (figure 5) which are displayed over six screens. These are:

1. Survey-General 1 - general information about a survey. This will include location, operator, type, dates, etc.

2. Survey-General 2 - more general information which did not fit on the first screen.

3. Related Activities (Survey) - a list of activities which are related to the particular survey. These can be all the tenements intersected by the survey and other surveys associated with it.

4. Survey line details - a list of all the seismic lines received and the storage position associated with the particular survey.

5. Survey mag tape details - a list of all magnetic tapes per seismic line received.

6. Accession - a list of all reports received for the survey.

There are 1262 petroleum exploration geophysical surveys that have been conducted or proposed in Western Australia.

This part of the database totals approximately 8 megabytes of computer memory.

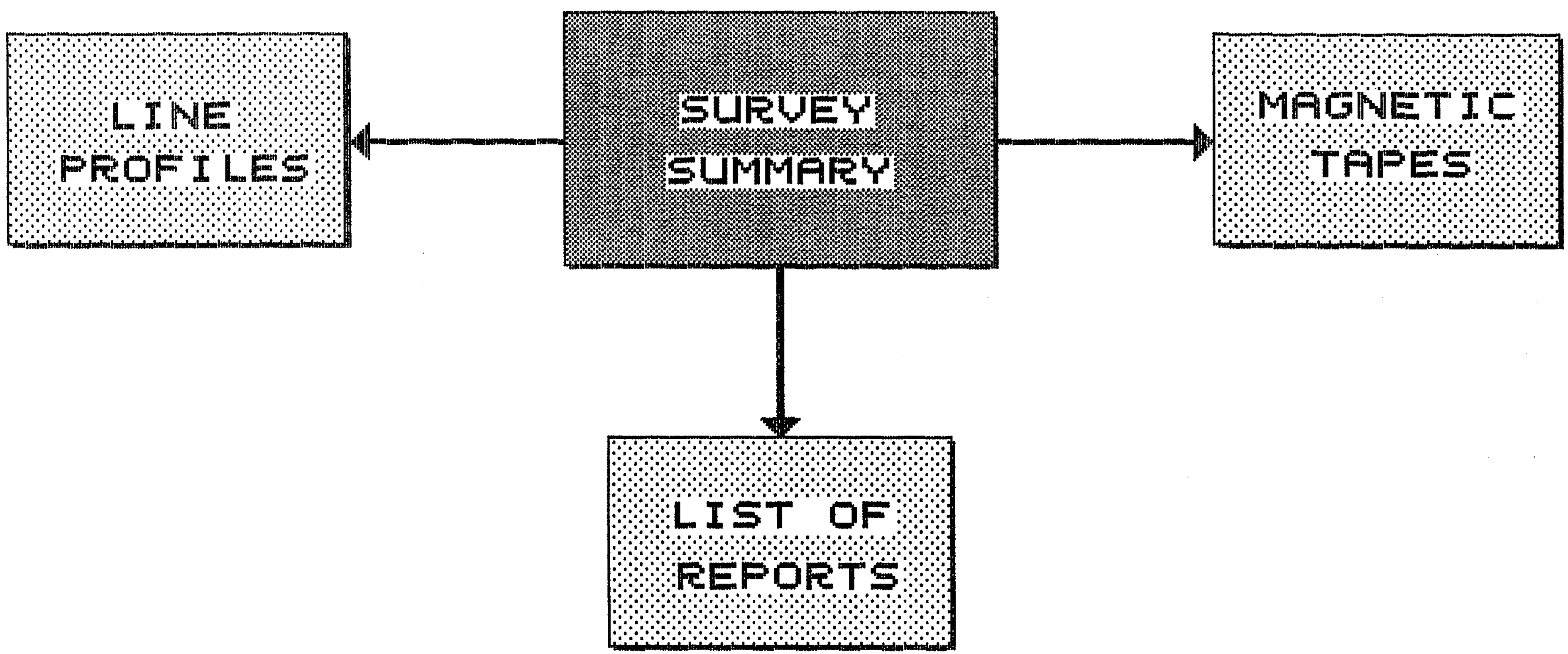


Figure 5. Survey content of database

General Reports

This category of reports include all miscellaneous reports. Eg Studies carried out by individuals or companies with regards to an area or a specific project, and reports submitted as a requirement after a study on core, cuttings or palaeontological material borrowed from the department.

The greater majority of these reports are interpretive. The reports based on material borrowed from the departmen are released within six months of sampling.

According to the reporting requirements, exploration companies are bound to submit a prescribed number of reports and data after having drilled a well or conducted a survey. Therefore the kind of reports and its contents are well known. This is not the case for General reports as they are not submitted as a requirement of the work commitments for an exploration permit.

Since these reports are not part of a well defined section of the database they are treated differently by including abstracts and keywords in the database. This addition will enable the user to search for reports using keywords as well as other attributes such as author and title.

The General Reports have been split up into ten broad classifications: geology, geophysics, environmental, field (oil or gas), geochemistry, hydrogeology, palaeontology, petrology, photogeology and petrophysics.

The General Report information is contained in three parts (figure 6) which are displayed over three screens. These are:

1.. Report General - this screen includes general information about the report, ie Title, author, Basin etc.

2. Report General 2 - this screen includes the location of the study, the abstract and the keyworks.

3. Related Activities (general reports) - Includes a list of all activities which were used in the study. For example a study on the North West Shelf may include a long list of wells.

There are approximately 800 General Reports held by the department which take up approximately 2 megabytes of computer memory in the database.

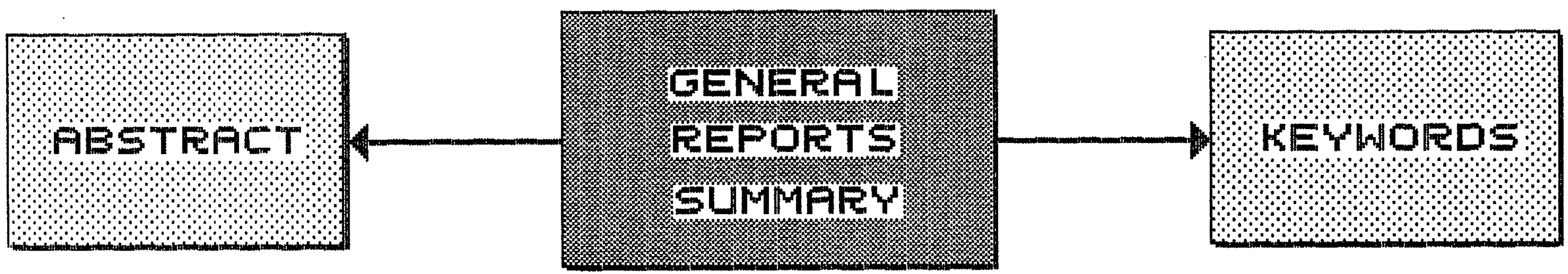


Figure 6. General reports content of database

Access and marketing of data

The database has four levels of access which are:

1. View and print non-interpretive data only.

2. View and print all data.

3. View, add and print all data.

4. View, add, modify and print all data.

The public will only have the first level of access, while inter-departmental staff will have the second, third and fourth level of access depending on the involvement with the database.

A number of reports with periodical updates will be made available to the public in the form of comfiche eg list of wells, list of surveys, and list of general reports releasable to the public.

Access to the database will be primarily through interactive queries, printouts and comfiche. Interactive queries and printouts will be available for sale at our public counter.

Since WAPEX is not yet in operation, prices have not yet been set, although it is envisaged that the price structure will be very similar to the WAMEX system. Presently the department charges $5.00 per search and $0.60 per page if printout is required. The WAMEX comfiche is sold for $72.40 for the initial package and $43.20 for each quarterly update. The update includes a copy of the full package to the date purchased.

The department does not provide data on magnetic tape or through a modem system, although it is actively looking at these alternatives.

Each of the four parts of the database can be accessed through a number of key fields. A list of records which satisfy the enquiry will be printed on screen or on hard copy and the user will have the flexibility to select the record of choice and obtain more detail information on that record.

The records listed will meet the conditions set by the user; eg if the "basin"field is entered as Caernarvon, then all the records in that basin will be listed. If a second condition is added, eg Woodside as the "operator", then the number of records will be reduced to satisfy the two conditions.

The field which will be available for enquiry in each part of the database are listed below:

Western Australia

Wells

The menu enquiry for the wells will be divided into two different sections - general and technical - which will list all wells which fit one or more of the following conditions:

1. General - well name, basin, sea-basin, operator, tenement, mapsheet, area defined by coordinates, dates, and microfilm number.

2. Technical - formation intersected, and available palaeontological material, core, and test results.

Geophysical surveys

An enquiry for surveys will be divided into three different sections which will construct a list of all surveys which fit one or more of the following conditions:

1. General - survey name, basin, tenement, operator, survey type, map sheet, dates and possibly area defined by coordinates, microfilm number.

2. Lines - all the fields in (1) with the addition of line number.

3. Magnetic tape - all the fields in (2) with the addition of tape number.

General reports

The enquiry for general reports will list all the general reports which fit one or more of the following conditions:

1. title, author, classification, abstract, keyword, field, mapsheet, basin, company, microfilm No.

Tenements

The enquiry for the tenements will list all tenements which fit one or more of the following conditions:

1. tenement, basin, operator, dates, map sheet and status.

Reports (for wells, surveys and tenements)

The enquiry for these reports will be accessed using either the enquiry menu for surveys, wells and tenements or by the same fields used with the general reports with the exclusion of abstract, keywork and field (oil or gas).

Manipulation of data

The database is an index of all petroleum data submitted, and, with the exception of the re- interpreted formation tops, only raw data is entered into the system; ie data extracted from reports without re-interpretation.

The re-interpretation of formation tops will only occur if a geologist within the department is working on a project and decides to re-interpret the formations of a particular well. It is not a systematic re-interpretation of all wells and therefore these data will be scarce.

Data backlog and entry procedures

A number of Divisions within the Mines Department are involved with the WAPEX project: the Computer Services Branch has the responsibility of designing and writing the programs; the Petroleum Division has the responsibility for the tenement management part, as well as the production data in the well part of the database; and the Geological Survey is responsible for maintaining the majority of the database since it curates all reports and data (figures 7 & 8).

The Basin and Fossil Fuel Section of the Geological Survey has the responsibility of capturing and entering all backlog information for the database. Four data capture staff and one keyboard operator have been hired on a temporary basis for this task.

The capture of ongoing reports began since the start of the capture of backlog data. This task has been the responsibility of a technical

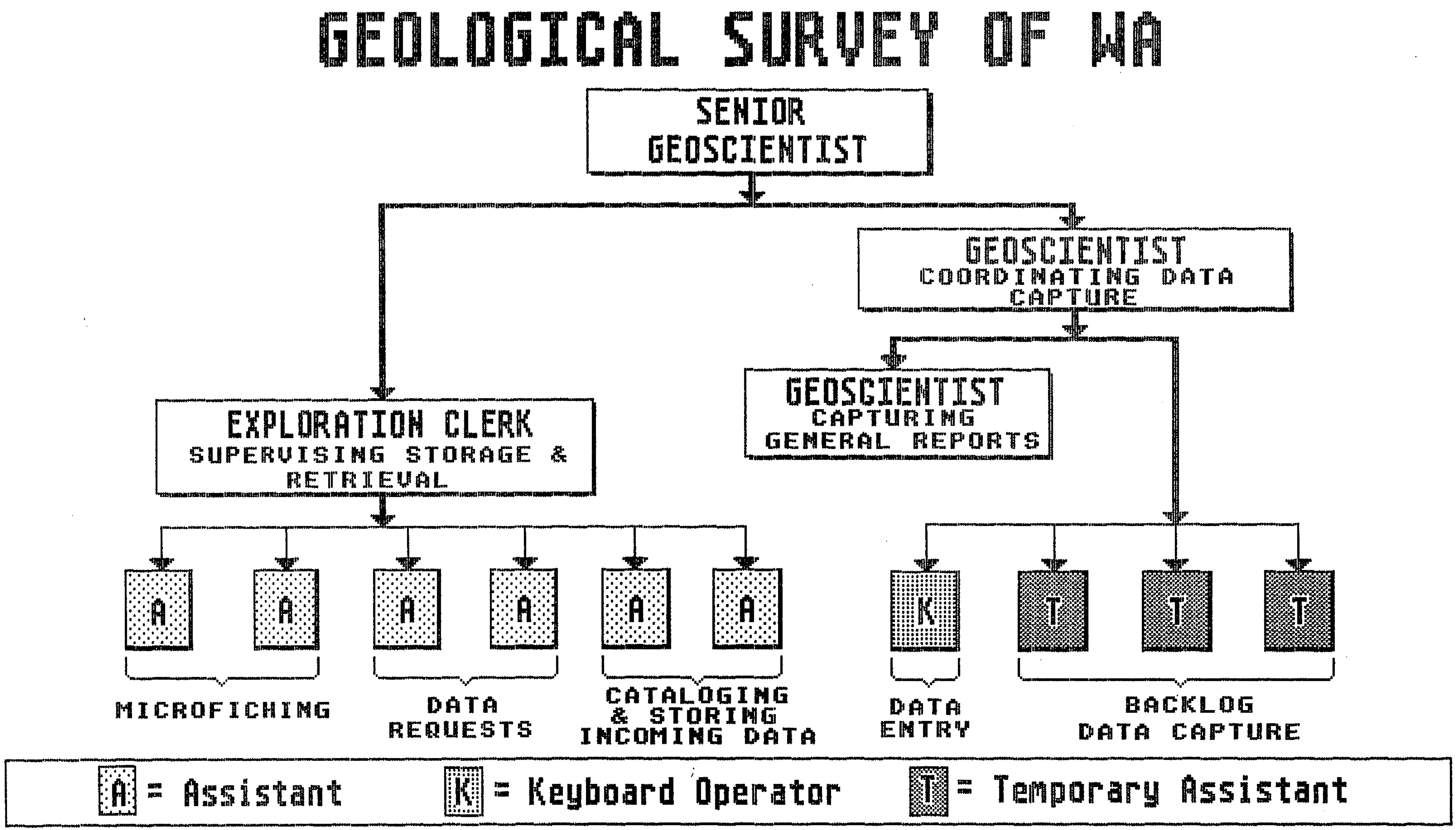


Figure 7. Geological Survey WAPEX staff structure

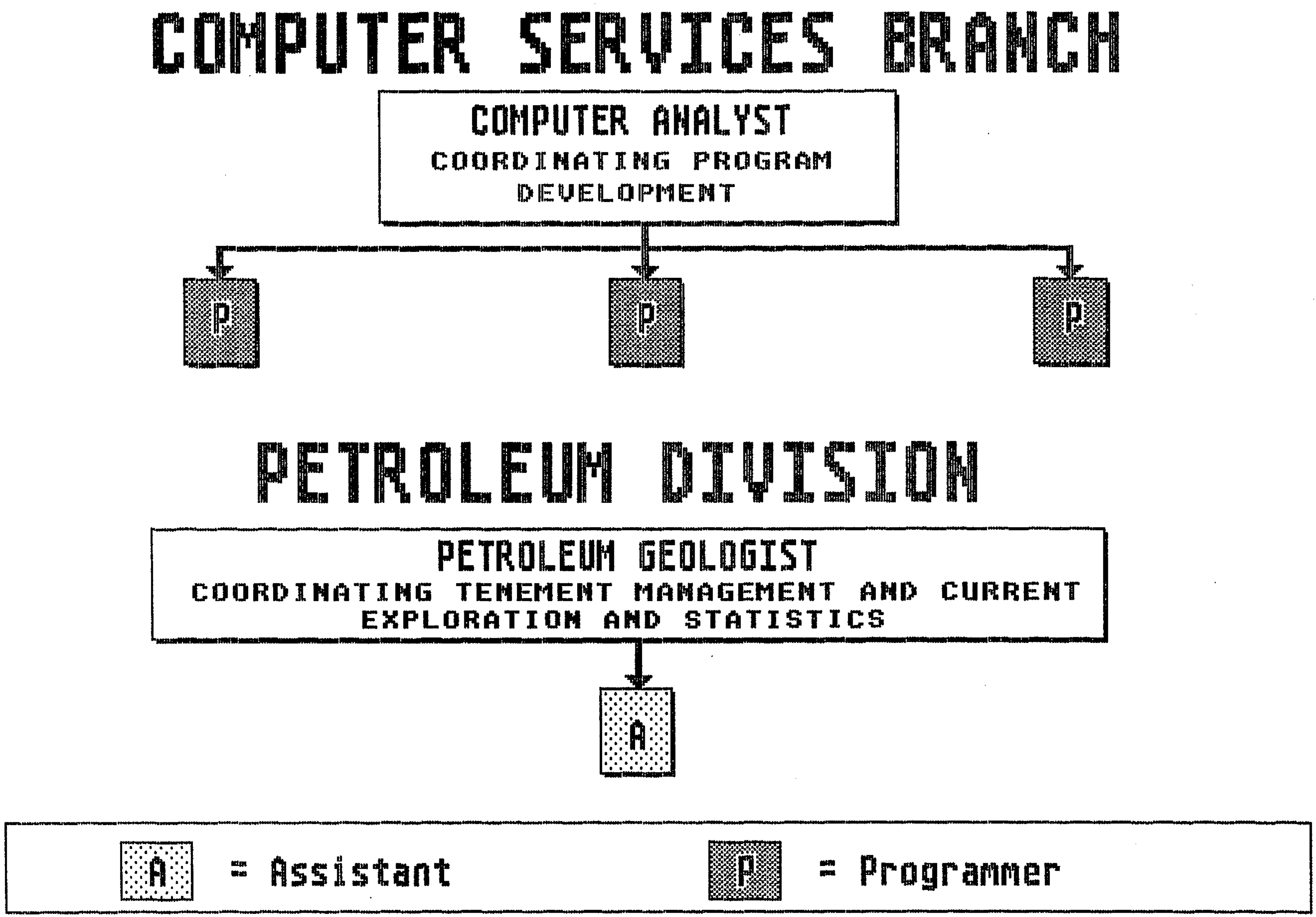


Figure 8. Computer Services Branch & Petroleum Division WAPEX staff structure

assistant. As the WAPEX programs become fully operational, the involvement of the additional five technical assistants will increase as each will be updating different portions of the database.

Petroleum Division staff have captured a major part of the data for the active tenements onto a PC relational database system - RBASE. These data will be transferred onto the mainframe computer once the programs are ready. The historical tenement data will be captured by the Basin and Fossil Fuel Section.

It has been necessary to use data entry sheets because the programs were not ready when data capture was started. In future incoming data will be typed directly onto the database when the programs are finished.

The data capture staff have been extracting data from reports and writing it onto data capture sheets. These sheets are an exact duplicate of each screen on the database to avoid confusion at the data entry stage. There are two stages of verification. The first is at the data capture level and the second at the data entry level.

Conclusion

The WAPEX database will provide an essential service to the public and enable Departmental staff to monitor exploration and production more efficiently.

The system has been designed to be an index to petroleum reports but it is envisaged that future developments of the database will include graphic capabilities as well as geological and geophysical data.

PRESENTATIONS - INDUSTRY

Abstract of paper published in Exploration Geophysics (1985)16, 123-138

ASEG-GDF: The ASEG Standard For Digital Transfer Of Geophysical Data

by

C.N.G. Dampney, G. Pilkington and D.A. Pratt

ASEG

The ASEG has developed an application-independent standard for the transfer of geophyscial data between different computers. This Standard has been termed ASEG-GDF which is an abbreviation for the ASEG General Data Format. An important feature of ASEG-GDF is that it conforms to both the Standards Association of Australia (SAA) and International Standards Organisation (ISO) standards for the transfer of data via magnetic tape.

geophysical data transfer

The most significant aspect of this Standard is its ability to define the contents of magnetic tape in a manner which is not constrained by any particular geophysical application. Thus it is possible for different State and Federal Governments to impose their various reporting requirements, on which tapes can still be read by the same computer program.

As part of the development of this Standard, the ASEG has developed a FORTRAN-77 implementation for reading and writing magnetic tapes in ASEG-GDF format.

THE CHAIRMAN: Are there any questions of Graham?

MR CUCUZZA: Joe Cucuzza from APIRA. Is this standard universally accepted now, or what is the situation?

MR PILKINGTON: The standard has been accepted by the Australian Society of Exploration Geophysicists, of course, since they help to fund it. Through them, they have been prompting all the organisations they belong to to accept it. Various state government departments are accepting it. The Mines Department in South Australia accepts it. There is preliminary acceptance from New South Wales. They are reprocessing all their airborne magnetics for the .... and every map that they complete will be out in ACGGDF. I think Victoria has accepted it and will be using it. I think Tasmania has said that they will go along with it, because they do not have one. BMR said that they will accept it. Western Australia have no legal force to enforce it, so they have said, "It would be nice, but..." Queensland, from what I hear, said, "It's a very nice system. Go ahead with it." What that means, I am not quite sure.

ASEG

There has been encouragement lately that virtually all the state governments and federal government will be using it for airborne data and for the majority of geophysics. It will not include seismic reflection data, which will be using the SEG formats, or for bore hole data, logging data, which will probably use the LIS format. But for everything else, it is proposed to use this.

geophysical data transfer

There are a few private companies beginning to use it. BHP are now using it heavily, because they have transfer problems with their own organisation, so they are beginning to use it.

I should have mentioned that the format is not a geophysical format; it is a data transfer format.

AUSTRALIAN EARTH SCIENCES INFORMATION SYSTEM (AESIS)

Information supplied by

Des Tellis

Manager, Information Services, Australian Mineral Foundation

AESIS

AESIS is the Australian national earth sciences data base developed by the Australian Mineral Foundation in cooperation with the Bureau of Mineral Resources - Geology and Geophysics, Commonwealth Scientific and Industrial Research Organization, State Departments of Mines and Geological Surveys, the National Library of Australia, the Australian Geoscience Information Association, and many companies. AESIS is coordinated by the Australian Mineral Foundation.

bibliographic data

AESIS covers Australian-generated published and unpublished documented material over the full range of the earth sciences, as indicated by the Broad Subject Categories listed on the inside back cover. From 1979 AESIS also covers material published on continental Australia by non-Australian sources.

AESIS is the world's largest data base on Australian earth science and resource information. AESIS Quarterly is the hard-copy current awareness service produced from this data base.

* AESIS Quarterly contains citations in-put to the system during the preceding quarter. Entries are arranged under broad subject categories. AESIS Quarterly is published in March, June, September and December. Each issue includes 7 associated indexes: Subject, Locality, Author, Map Sheet (1:250 000 / 1:100 000), Mine/Deposit/Well name, Stratigraphic name and Serials index
* Cumulations called AESIS Cumulation, re-sorted in main author sequence, with all 7 associated indexes, are produced separately on microfiche with the December issue of the Quarterly each year. Cumulative issues have been published covering the following years: 1976-1983, 1984-1985, 1986, 1987, 1988.
* Annual subscription to AESIS Quarterly for 1989 is $Aust 200.00. Subscription to AESIS Cumulation on microfiche for

1989 is $Aust 25.00 when subscribed to with AESIS Quarterly. For AMF member companies a subscription to AESIS Quarterly and AESIS Cumulation is automatically included in their membership fee. The cumulative fiche is separately available at the subscription rate for AESIS Quarterly for the respective year.

* AESIS is available for computer searches through AMF and on INFO-ONE International (ex CLIRS). Charge per search through AMF is $Aust 120/hr. plus systems cost, and 25c per printed citation. A separate reduced rate exists for AMF member organizations. Charges are subject to review. INFO-ONE has an independent charging schedule.

AESIS

* AESIS commenced in 1976, but coverage goes back to 1975 and earlier, especially for open-file reports and these, through an AMIRA sponsored programme which aimed to cover reports and theses back to 1965. Retrospective cover for published material has also been undertaken through special projects for the GSA and ASEG.

bibliographic data

* Other AESIS products include computer type-set cross-indexed and annotated AESIS Special Lists on various topics/commodities and AESIS Retrospective Lists covering open-file/unpublished reports/theses over the period 1965-1975. Indexes to publications of major organizations and state-wise open-file reports are also produced.
* A Selective Dissemination of Information (SDI) service is available on subscription, cost dependent on periodicity and nature of service.
* Earth science workers and organizations in Australia are encouraged to register material in AESIS to ensure that their contribution to the national information resource is both recognized and generally available to the earth science community. For unpublished material, this may be done by the use of Data Transmission Sheets, a copy of which is enclosed with each issue of the Quarterly. Material can include papers, reports, theses, maps, explanatory notes etc. For published material, please check that AMF is receiving copies.
* The Australian Thesaurus of Earth Sciences and Related Terms, 3rd edition (1987) is used for indexing in the system. Copies are available at $Aust 125.00 per copy, plus postage. A 20% discount applies for educational institutions and cost for AMF member organizations is $Aust 85.00 per copy, plus postage.

AESIS CITATION EXAMPLE

ENTRY NO.

TITLE

Q79-10 **The Proterozoic Barney Creek Formation and some associated carbonate units of the McArthur Group, Northern Territory.**

Brown, M C Claxton, C W Plumb, K A ← AUTHORS

SOURCE → *Bureau of Mineral Resources, Geology and Geophysics. Record* 1969/145, 59 pages; 12 fig, 15 plates, 40 ref, 5 tabels (1969)

(Available at all open file centres)

ANNOTATION

The stratigraphic setting and depositional environment of a massive sulphide deposit - the HYC.

Syngenetic deposits / Sedimentary environments / Stratigraphy - NT / Proterozoic / HYC deposit / McArthur Group / Barney Creek Formation / Northern Territory: McArthur River / SE5303 ← SUBJECT DESCRIPTORS

Editor's Note : An online demonstration of AESIS on the INFO ONE/GeoPac system was presented at the workshop.

CHAIRMAN: Thank you, Des. We will now hear from Paul Shelley on AGIA guidelines and standards for bibliographic databases.

MR SHELLY: Thank you. I will not keep you long. Agia - A-g-i-a is the Australian Geoscience Information Association was formed in 1976 and therefore has a bit of history now of activity behind it. It aims, essentially, to encourage the efficient and effective management and use of geoscience data. That is putting the terms of the objectives of AGIA very briefly. It is a multidisciplinary association and is essentially, therefore, aimed at anyone who pratices within the general field of geoscience information and that, of course, includes users as well as deliverers. The membership consists largely of librarians, geoscientists and computer specialtists.

AGIA

A couple of years ago we saw a need to be a bit more active in the area of standards and we set up a Standards Subcommittee. I was asked to chair that because it was appropriate that it was something BMR should also be providing some leadership in.

standards

Broadly, the role of the Standards Subcommittee is to develop and promote standards to facilitate the management and transfer of geoscience data. We certainly are not planning to get into competition with ASEG and we have left them to do what they are good at and that is handle the geophysical data side of things.

bibliographic data

The first thing that we tackled were bibliographic standards because we were faced with a national system which, at that stage, had been going for, I guess, close on 10 years. South Australia and New South Wales were both actively involved in preparing databases for public on-line access and in the case of New South Wales, they were already operating on the 1CLIRS network.

Also we were being faced with queries from members of AGIA and others who were seeking some guidance and assistance in setting up small bibliographic databases in companies. Is there something that you can show us? What can we use to help us do the right thing, do it the same as other people are doing it.

So we saw it as important that these bibliographic databases which all had a common aim, as Des said, of pointing to a particular document, be made as compatible as possible so as to make it easy for people

1 *At the time of publication, CLIRS operates under the name INFO ONE*

intergrating and using the different systems but also perhaps to assist in transfer of data between systems.

I have a handout here which, in fact, is the result of a year and a half of meetings and agonising and arguments and discussions both formally and also over a drink or two. This paper has been put together by Lorraine Gerdes and Kerry Smith who have been, I guess, two of the main protagonists in this particular area. It is still in its draft form although it is pretty close to what AGIA will bring out, hopefully within the next couple of months as a definitive set of guidelines.

AGIA

We are calling them guidelines, we are not calling them standards. Standards seem to have an aura about them of enforcement. We realise that people are locked in, in many cases, to a hardware and software environment that does not allow too much room to move or too much flexibility. We have been very pleased by the moves of South Australia and New South Wales and AESIS to try and have those three public systems as compatible or similar to each other aas possible.

standards

I will not discuss in detail what is in the paper, but it sets two things. Firstly, it sets out the types of elements that we believe are important in a bibliographic database, things like author, title, the journal name, the pagination, keywording, and so on. Then for each of those elements it sets out a preferred format or standard.

bibliographic data

For instance, simple things like the avoiding of punctuation. Puntuation can cause no end of headaches in computer systems. So we have gone for a system that avoids punctuation where possible.

It provides or points people to controlled lists of standard things. So, for example, where we decided on a set of abbreviations for Australian states we have a list in there that we recommend people use. We recommend the Australian thesaurus for the keywording vocabulary. We are hoping to make available at some stage on CLIRS things like the preferred list of stratigraphic terminology that could come out of the BMR's own system. Where there are existing standards laid down or have been recommended, we point people to those, such as the document that AMIRA brought out so I think I will leave it there, Mr Chairman. Please talk to me or Lorraine about the guidelines if you have got any comments. It is pretty close to the final document but we would still be happy to take comments. These things are dynamic and we do not see these as the be all and end all for the next 200 years. We would like to see it moving with the times.

THE CHAIRMAN: That is the end of the formal presentations today. We now have software demonstrations in the annex. On the workshop sessions scheduled for tomorrow, if you can give them some consideration tonight and just give us and indication which group you would like to be involved with first thing in the morning. As the programme points out, at some stage before we actually break into the groups I will be giving a run through of each of the topics and the things that we should be considering.

ADJOURNED 5:09 PM

Bureau of Mineral Resources, Geology & Geophysics

R E C O R D

Record 1989/28

GOVERNMENT PETROLEUM DATABASES WORKSHOP

ADELAIDE, 11-12 OCTOBER, 1988

EDITED TRANSCRIPT OF PROCEEDINGS

AND

PAPERS PRESENTED

Volume 2

Compiled by S.G. RADKE

WEDNESDAY 12 OCTOBER 1988

PRESENTATIONS - INDUSTRY

THE CHAIRMAN : We might as well get started since we have a very packed programme and there are no changes that I know of. I think Maurie wants to say a few words on the workshop topic before we get underway.

MR. BRIDGWOOD : Thank you, good morning all. Very briefly, having missed the opportunity of having Wayne Passloe from Geo-Vision talk to us last night when Geological Modelling Systems turned up at the last minute, we came up with an alternative approach, and that is to introduce a fifth workshop topic - perhaps more of a means of Wayne getting his message through to a few people in relation to what GeoVision in particular has got to offer, but also I guess we can call the topic something like "Linking Geographic Information Systems and Relational Databases". So it is a particular issue that John Laycock mentioned yesterday with what they are doing up in Queensland and it will give us the opportunity to discuss with Wayne what is happening in that particular area from his point of view and then later give him the chance to actually get up and talk to us very briefly about the same topic.

THE CHAIRMAN : Thank you, Maurie. The hardware around us is continuing to grow so it looks like we are in for a fairly hectic session today. The first speaker, according to your programme is Gary Coles from BHP. Thank you.

Paper Submitted

BHP PETRLOLEUM'S "EXPLORATION" DATABASE

by

Gary Coles

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INTRODUCTION

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The EXPLORATION database was set up by BHP Petroleum in 1983 in response to a request from mamagement for historical rates of discovery and drilling success in Australia.

The ORACLE Relational Database Management system installed on a Data General MV/20000 mainframe was chosen as the base because it was available, having been recently acquired to fulfil the needs of other divisions in the company, and more importantly, because its capabilities fitted the primary objective set by managment.

IMPLEMENTATION

Because of the time constraints imposed by management, it was decided to purchase a commercially available well data package and convert this for incorporation into ORACLE. the data recorded on the PI well data tapes closely matched the parameters we wished to capture intially.

The EXPLORATION database screens were set up and minor programming undertaken to ensure a smooth acceptance of the well base data into our system. some problems were experienced with missing data, data errors and incompatible coding on the PI tapes, and a decision was made, on quality control grounds, to thereafter collect and enter current well data manually. The principal data sources became the APEA Report and Who's Drilling. Details of the database development are shown in Figure 1.

At the time the initial well data was incorporated into the database, reserves information for 100 Australian wells was entered manually from published sources. These figures, used to address the original request, are of 1983 vintage and have not been maintained since.

SCOPE

The EXPLORATION database has a set of major subsystems. The most important of these are :

* Input/Edit
* Query (for on-screen simple searches)
* Validation Codes
* UFI or User Friendly Interface for more complex queries not covered by the screens, (using Language)

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and

* SAS, a statistics tool which allows analysis and plotting of data.

Figure 2 illustrates the access paths to the various types of data stored in the database.

The key to the success of a relational database is consistency of format within the captured parameters. Our sources for standards have been :

* PI tapes and cards
* AAPG (for well classifications)
* Schlumberger and other well logging companies for log abbreviations
* Australian Standard 2632-1983 for country codes
* Harland BW et al, 1982: <u>A Geologic Time Scale</u> for age abbreviations

and

* In-house generated codes for such elements as basins, companies, geololgic elements, and field

Depths for the primary well data are in metres.

All coded parameters coincide with the Validation Codes; other parameters e.g. permit number (licence) are entered according to an established format.

There are eight Input/Edit screens, subdivided into:

* Well Data (4 screens)
* Logs
* Cores
* Shows

and

* Tests

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Examples of these screens using a fictitious Australia 1 well are shown in Figures 3-10.

Points to note are :

WELL DATA SCREEN 1 :

Well Name: Well name and number are separated by a space not a hyphen (up to 20 characters).

Side Track: A two-number validated code e.g. 01 for Side Track, 21 for Re-entered, 31 for Work over.

Basins: Up to four three-letter codes describing the vertical sequence penetrated or the geologic area. The youngest basin is listed first e.g. ERO- COO, and ERO-GAL-ADA (Eromanga-Galilee-Adavale).

WELL DATA SCREEN 2 :

Classes: Three systems used viz PI (inherited), AAPG (widely accepted), and Numerical (generated by BHP to cover gaps in other classifications). For examples, in the final Classes, the Numerical system uses 20 separate codes versus 14 for PI a nd 8 for AAPG.

Well Status and Symbol: Directly related to allow plotting using specific mapping symbols.

Other Depths: Two-letter code used for non- vertical wells to record drilled depth, planned drill depth and the depth plugged back to.

WELL DATA SCREEN 3 :

Cost Estimates: The cost of drilling and production testing the well, noting the date to which the estimates are related.

Objectives: Two hundred characters to record formation names or ages and/or structures the well aimed to test.

WELL DATA SCREEN 4 :

Well completion report: Notes physical location of file in Exploration Information Centre. All WCR's are indexed on the in-house PETEX hierarchal database. **BHP**

LOGS :

HC: Hardcopy held or not held by BHPP. Only the primary log is marked, to avoid duplication of data when generating printouts in response to user requests.

OW: Division of the company responsible for inputting and maintaining data on this screen.

Hardcopy: Physical location of hardcopies.

CORES:

Type: Includes core, cuttings and sidewall cores.

Comments: Up to 100 characters available; it is common to direct user to source data e.g. WCR.

SHOWS:

Show Type: 1 letter code e.g. O (Oil stain), F (Fluorescence), G (Gas).

Most of the information on the eight screens, except for costs, bottom hole data and well completion report address is available from public sources, although this is dependent of what is passed on to the publishers.

There are approximately 4600 Australian wells in the EXPLORATION database; another 440 wells covering areas of interest in such countries as Papua New Guinea, Indonesia, New zialand and Oman have also been entered.

Extra dimensions have been mooted for incorporation into the EXPLORATION database. These include reserves, production history, seismic surveys, permit history, formation tops and structural elements, but given the limited manpower resources at our disposal, a deliberate decision has been made to concentrate on those elements which are of greatest benfit to our users. Now that the fundamental data is approaching perfection, we are investigating the collection and unputting of upgraded field reserves data, intially for Australia, and then ultimately for select other countries.

ACCESS

Searches are usually conducted by one of the two persons responsible for maintaining the database. Our clientele are the 100 or so geoscientists who work in the Melbourne office of BHP Petroleum.

Some examples of enquiries are

1. QUERY

   * All wells opertated by BHP Petroleum/Hematite
   * All wells with Santos as a partner and spudded in South Australia
   * All oil producing wildcats drilled in 1987
   * All wells spudded by the SEDCO 708 in the Browse Basin

2. UFI

   * All wells between 148-151 degrees longitude and 25-28 degrees latitude that are gas producers operated by Hartogen
   * Well name, latitudes and longitudes, operator, permit, status and objectives of all wells drilled onshore in Western Australia

CONCLUSIONS

The program achieved its original objectives in that graphs addressing the original queries were generated using SAS within six months of the initiation of the project.

By maintaining rigorous standards and the currency of the data we have ensured that the database is valued by the company's geoscientists. As a result, the EXPLORATION database has become the definitive data source for generating base maps for well locations.

The database is actively promoted by those staff responsible for its maintenance and ideas for enhancements are constantly sought. We encourage geoscientists and technical assistants to become familiar with search strategies to the extent of being able to query the database unaided. The proposed addition of reformated, current reserves data is in direct response to user request.

However, new screens are added only after thorough investigation of the validity of the request. For example, the value of an additional screen of seismic survey data could not be justified against the expense of collecting the basic information. Potential formation top and structural element screens lost their usefulness when convassing revealed that geologists prefered to make up their own minds on contentious interpretations by going to the source data such as is found in a well completion report. In other words, the EXPLORATION database fulfils a role as a pointer to the whereabouts of the raw, detailed geolgical data held in the 6700 Austalian reports filed in our Exploration Information Centre. Included in this total are 900 Well Completiton Reports.

The BHP Petroleum EXPLORATION database has thus become a highly valued, credible information bank for the company's geoscientists and mangement. We intend to maintain that reputation.

ACKNOWLEDGEMENTS

Preparation of this presentation would not have been accomplished without the generous assistance of Edwina Meszoly, Janet Beal and Jeanette McLennan.

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TIME LINE:
DEVELOPMENT OF EXPLORATION DATABASE

NOV 1983	a) Project mooted and objectives set b) Methods of solution investigated
DEC 1983	a) Decision on DBMS → ORACLE b) Database design, parameters for capture and screens established c) Well tapes ordered
JAN 1984-FEB 1984	Tapes arrive, codes translated, tapes loaded, editing begun
MAR 1984	First output
APR 1984	Rates of discovery and drilling success graphs generated via SAS
JAN 1985	Technical officer (Geologist) employed to maintain database and input current data manually
AUG 1985-SEP 1985	Development of extra well data screens (cores, tests, shows)
OCT 1986	Development of logs screen as an inventory of hardcopy logs held by BHP Petroleum
JUL 1988	Contents of database exceed 5000 wells including approximately 4600 Australian wells
AUG 1988	Investigation begins of proposal to supplement database with field reserves data (continuing).

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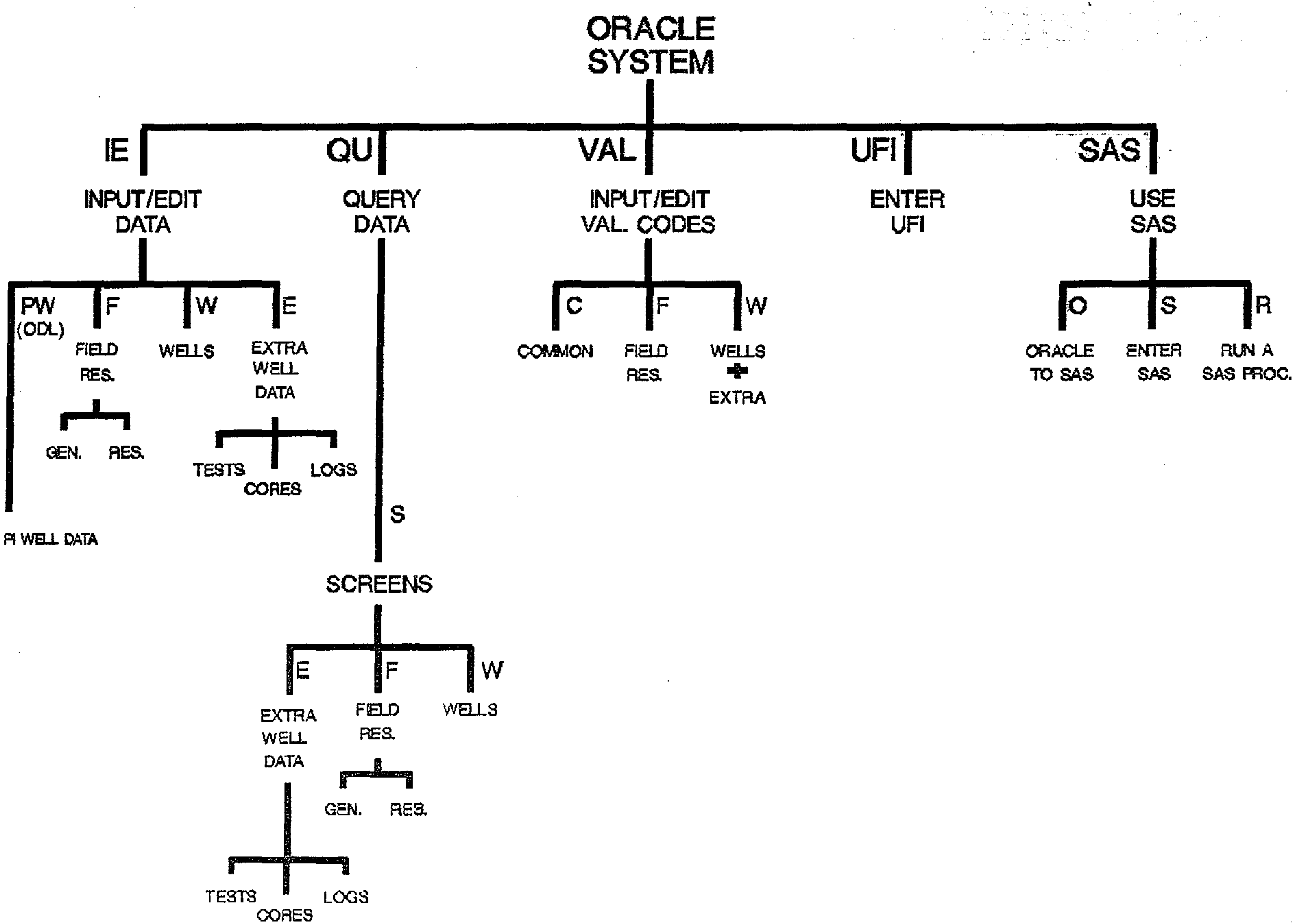
EXPLORATION DATABASE SUBSYSTEMS



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SUBJECT

BHP Petroleum   Well Data Input/Edit (Screen 1)

```
Well Name  :AUSTRALIA 1                              Grid Ref.   :D5511

Planned - Latitude   :14 37 15  SLongitude :51  14 30   E
Actual  - Latitude   :14 36 8    Longitude :51  10 2
ON/OFFshore:M Marine             Operations Base :DARWIN
Country    :AUS Australia                State : WA Western Australia
Field Name :AUSTRALIA              Code      :AUST
Platform   :
Side Track :01 Side-track          Deviated :Y
Licence    :EP 36                  Block    :ARCK ARCKARINGA
Operator   :PLT Plateau Oil & Gas  Interest Operator   :50   %
Interest BHP Direct :      %       Interest BHP Total  :     %
Partners   :ROM 30,SCA 20

Basins     : BRO                Geological Elements : CORO
             Browse                                   Corona Fault
             -                                          -
             -                                          -
             -
```

BHP Petroleum Well Data Input/Edit (Screen 2)

Well Name :AUSTRALIA 1

Dates - Spud :10-JAN-88 Completion : Total Depth :29-MAR-88
Suspended :02-APR-88 Abandoned : Rig Release :02-APR-88

Classes -		Initial		Final	
PI	WF	New Field Wildcat	WFD	New Field Discov.
AAPG	NFW	New Field Wildcat	NFD	New Field Discov.
Numerical	5	New Field Wildcat	14	Oil Well, Gas Shows

Well Status : OP Oil Producer Well Symbol : $
Test Validity: Y
Elevations (M) - KB : RT : Ground : Water Depth : 75

Total Depths (M) - Current :1952 Projected : 2000 Plugged Back : 1600
Redrill Date : Redrill TD: M.

Other Depths - Type : DD DRILLED DEPTH Depth : 2010 M
Type : Depth : M

BHP Petroleum - Well Data Input/Edit (Screen 3)

Well Name : AUSTRALIA 1

Contractor : DME. DIAMOND M EXPLORATN

Rig Name : DMEG Diamond M General
Rig Type : SS Semi Submersible

Logistics
:90KM NE BROOME, 1.5KM SE JACKSON-1

Drilling Problems
:CIRCULATION PROBLEMS AT 1000M

Cost Estimate - Drilling :$ 7500000
Date :02-APR-88

Production Tests :$ 100000

Objectives :FLOUNDER FMTN
:MINJOO SALT

Bottom Hole - Formation :OBSEHL Observatory Hill
Temp. (True) :95 oC Temp. Gradient :.1 oC/M
Basement Lithology :SNST,SLST

BHP Petroleum - Well Data Input/Edit (Screen 4)

Well Name : AUSTRALIA 1

Well completion report :63/1/AUSTRALIA-1/001

Report Author :PLATEAU OIL & GAS

Date :10-JUL-88

Last Update - Date :28-SEP-88
Source :BHP BHP Petroleum

Author:JB

PI Update - Date :

Type :

Well Reference - (a) :WHOS DRILLING #900
(b) :APEA #851
(c) :WCR

Comment : SEE CORES,SHOWS,LOGS & TESTS SCREENS.

SUBJECT

LOGS

Well Name :AUSTRALIA 1 **Country Code : AUS** **Depth Unit : M**

Type	Depth Top	Depth Bottom	HC	Ow	Ste #	Run #	Scale	Date	Comments/ Hardcopy EX	TS	BS
CDL	1620	1850	Y	EX	1	1	500	30-MAR-88	WITH LDL AND GR 28		
GR	1620	1350		EX	1	1	500	30-MAR-88	WITH CDL AND LDL 28		
LDL	1620	1850		EX	1	1	500	30-MAR-88	WITH CDL AND GR 28		
PRENGT	1700	1760	Y	EX	2	1	200	01-APR-88	28		

CORES

Well Name : AUSTRALIA 1 Country Code : AUS Depth Unit : M

Type	Top Depth	Bottom Depth	Number Taken	Percent Recovered	Comments
CORE	1700	1720	5	100	LITHOLOGY IN WCR
SIDE	1600	1650	15	85	LITHOLOGY IN WCR

SHOWS

Well Name : AUSTRALIA 1 Country Code : AUS Depth Unit : M

Top Depth	Bottom Depth	Show Type	
1670	1675	O	Oil Stain
1685	1690	G	Gas

TESTS					
Well Name : AUSTRALIA 1			Country Code : AUS		Depth Unit : M
Type	No.	Top Depth	Bottom Depth	Formation	Results
DST	1	1650	1694	ARUMBE	600BOPD
DST	2	1710	1720	BITSPR	400BOPD GAS TSTM
FIT	1	1700	1705	BITSPR	FAILED

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Session Questions

MR CUCUZZA: Joe Cucuzza from APIRA. Gary, did you say that you purchased some well management system and interfaced it with Oracle ?

MR COLES: Yes, PI tapes.

MR MEGALLAA: I wonder if you have applied, statistical operations and correlations? In other words, can you apply applications using the database correlations between wells?

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MR COLES: Yes, we can. But SAS is very complicated to work. There is only one person who is totally familiar with it, one of the people responsible for maintaining the database, and it is probably an under utilised component of the database, to be fair.

MR BONADIO: Mike Bonadio from AUSPET. Do you have work stations throughout the departments that the user can access or do they have to go to a central location to access?

MR COLES: No, we do have work stations that they can access the database with. Quite frankly, most geologists still tend to come to the two people who are responsible for operating and maintaining the database and putting their queries to them verbally, and then waiting for the answer. We have few geologists who are actually prepared to sit down and learn how to do it and run their own queries, despite our actively promoting that approach.

MR KENT: You have got 4,000 wells; what sort of response time are you getting.

MR COLES: It is becoming longer and longer because of the heavier and heavier demands placed on the mainframe. It is becoming quite frustrating.

MR IASKY: Robert Iasky from the Geological Survey in Western Australia. Do yo have all the wells in Australia, or a greater majority of them?

MR COLES: Yes, we believe so.

MR IASKY: Right up-to-date?

MR COLES: Yes. Having said that I will probalby go back and find there are a dozen or so missing.

MR LAYCOCK: John Laycock, Mines, Queensland. You say the database is available for your geoscientists in BHP, but I have not detected yet whether it is available for general users, the general public. Is that in fact the case?

MR COLES: No, it is not.

MR CUCUZZA: If you have to go back and start again, would you have tackled the problem the same way you have done, now using Oracle and other software, or would you have considered other products? Or start from scratch and start your own.

MR COLES: I do not know the answer to that. I would say we are relatively pleased with Oracle. I think the thing that upset us most, initially, was buying the PI package and finding that it had so many mistakes in it. An awful amount of time was spent in eradicating those. I think Oracle has basically fulfilled what we require of it. We have not got many complaints there, but I must admit I am not fully aware of what alternatives are available to answer your question.

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MR MEGALLAA: I notice that all the entries are very similar to the one we have on our database. What is the possibility of exchanging it?

MR COLES: I was very pleased to see that you planned to follow the basically the same line as us, too.

MR MEGALLAA: I did not know about yours.

MR COLES: We will have a talk afterwards. How about that?

MR CHAIRMAN: Thank you, Gary, for keeping to time so well. We might move on. We have Andy Gabb coming next from Kestral.

Paper Submitted

DATABASE SYSTEMS FOR THE CONTROL OF HARD COPY EXPLORATION DATA

by

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Introduction

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The challenge of controlling hard copy exploration data, in all its forms, invariably stresses the importance of the computer system which will facilitate the task. The design of such a system is obviously a key element to the control process, but it must be viewed within the broader spectrum of Data management System requirements.

physical data management

These requirements also include the following factors:-

* data policies
* physical storage techniques
* request procedures and controls
* security systems
* environmental controls
* data services
* human resources
* data categorisation
* in-house storage
* off-site storage

etc.

It is apparent from the above list that it will be necessary to involve more departments in the design of the system than simply data processing and the users of the data. In fact a multitude of disciplines is required if the resulting system is to address all the related issues successfully, and boast the virtues of expandability and longevity.

With this "organisational" view of the problem of hard copy data control in mind, we will examine the major issues to be addressed in developing an effective databasing system to contribute to the solution.

Some of the techniques and recommendations presented may seem basic and obvious. No apology is offered for this. Almost without exception, the design suggestions made have been found absent from systems developed by government and corporate data processing departments.

SIMPLE SYSTEMS

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As computer people, we are often guilty of losing sight of our goals, such that the performance of wondrous feats with computer code sometimes overshadows the actual requirements of the poor unfortunates who have been assigned the responsibility of operating the systems that we develop. Simplicity must therefore be the watchword for our databasing system.

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Users of data management systems require the answers to only two simple questions:-

(1) What data exists?

(2) Where is it?

Consequently the software system should have two primary modules. We will call them:

(1) Data Cataloguing to answer the question "What?"

and

(2) Data Control to answer the question "Where?"

1. DATA CATALOGUING

Data Types and Information Sets

The Cataloguing System should recognise the need to categorise data into types and information sets. Grouping of data into types offers clarity to the user and improves the efficiency of the cataloguing process. As our cataloguing module will only concern itself with what data exists, we can ignore the type of media used to hold the data. Media only becomes important when we want to retrieve selected data items.

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Data Types are further grouped into Information Sets to afford the user a global view of data availability.

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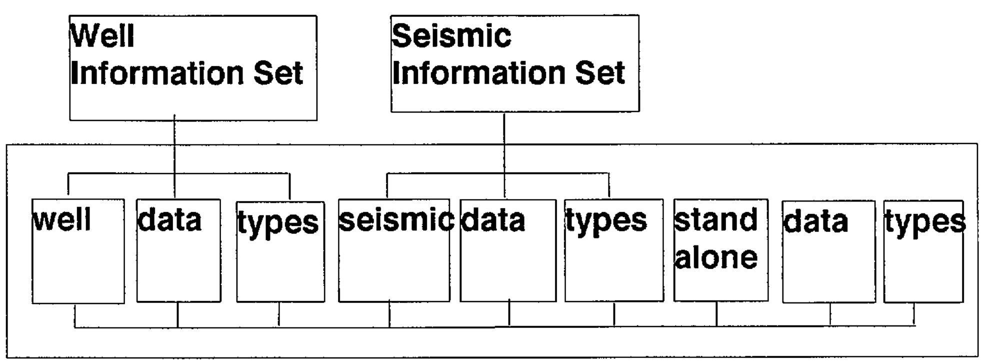
The example here shows typical data types and the two most commonly used Information Sets, namely Seismic and Well. Under this scheme the user can search for single data types or request details of a number of data types relating to a seismic line or a well.

This simple relationship obviously does not stretch the powers of today's file management systems. However, the structure has been found to be



sufficient. Anything more sophisticated would demand a price to be paid in another area - typically in system performance or disc storage capacity or both.

Data Parameters

Having established data types and information sets, the next design step is to select the parameters which will be extracted from the data and captured. Again, simplicity is the key. The object of capturing the parameters is to enable us only to:-

a) search for particular items and

b) distinguish between two similar items as far as is necessary.

It is easy to become over-ambitious with the amount of information to be captured. Too much will prolong the capture exercise and occupy unnecessary disc storage. Remember that the cataloguing system is only the means to identify the data, not an information base to be used as an end product. The parameters captured from each document vary according to geographical location and definitions, and to a certain extent particular user needs. While there are a lot of commonalities between requirements of different organisations, there are differences in all cases. Here are some examples, showing seismic sections and maps from three real systems. The companies referred to as A, B, and C are located in the Middle East, Africa and Australia respectively.

Seismic Section Parameter Examples

Company A	**Company B**	**Company C**
Operating Company	Country	Operating Company
Area	On/Offshore	Country
Line Prefix	Area	State
Line Number	Block Number	Survey Name/Number
Line Suffix	Original Owner	Basin (up to 5)
First Shotpoint Number	Line Prefix	Sub Basin (up to 4)
First Shotpoint Suffix	Line Number	Permit
Last Shotpoint Number	Line Suffix	Acquisition Contractor
Last Shotpoint suffix	First Shotpoint Number	Spl. Map
Section Type	First Shotpoint Suffix	Line Prefix
Section Scale	Last Shotpoint Number	Line Number
Energy Source	Last Shotpoint Suffix	Line Suffix
Fold	Acquisition Contractor	First Shotpoint
Survey Contractor	Acquisition Month	First Shotpoint Suffix
Survey Year	Acquisition Year	Last Shotpoint
Processing Contractor	Energy Source	Last Shotpoint Suffix
Processing Year	Vertical Time Scale	Year of Survey
Remarks	Horizontal Scale	Section Type

Section Process	Processing Date
Processing Contractor	Processing Contractor
Processing Month	Vertical Scale
Processing Year	
Processing Fold	
Remarks	

Map Parameter Examples

Company A	**Company B**
Operating Company	Country
Area	On/Offshore
Map Title	Area
Author 1	Block Number
Author 2	Map Type
Author 3	Title
Map Scale - Vertical	Original Owner
Map Scale - Horizontal	Vertical Scale
Map Date - Month	Horizontal Scale
Map Date - Year	Report Date - Month
Top Left Latitude	Report Date - Year
Top Left Longitude	Drawing Number
Bottom Right Latitude	Processing Contractor
Bottom Right Longitude	Author
Map Type	Source Type
	Formation
	Age
	Spheroid
	Projection

Data Take-on

The process of transcribing parameters from original data onto our cataloguing system is long and can be tedious. The accuracy of it however is to make or break of the computer database. This Data Take-on process needs to take account of both the initial data take-on, as well as the ongoing job of cataloguing new data. Initial take-on requires large volumes of data to be loaded to the system (and the storage facility) as quickly and accurately as possible. New data procedures must address the aspects which will ensure that the system does not lose its consistency and accuracy over the time.

Despite the search for alternative methods, the process of manual transcription of parameters to coding sheets and subsequent data entry continues to prove the most satisfactory. Direct data entry from original items, omitting the coding form, causes problems when data items are large and awkward to handle. Also, it is impractical for a supervisor to check an input listing against original data items, and the need for accuracy demands effective double-checks. Discussions continue about bar coding data items at source with the parameters to be captured. To date they have not yet produces a satisfactory solution.

Transcribing parameters from the data is often viewed as a potential weak link in the system, as it relies on human interpretation and concentration. Ensuring that the manual coding exercise is performed accurately is a function of good training and supervision.

Data Entry Techniques

Several data entry techniques contribute significantly to the speed and accuracy of the data take-on exercise. A simple example is to ensure that the data entry screen layout matches the manual coding form. Another, the use of abbreviated codes, is fast and lends itself to validation against tables. Typical examples of these are codes for contractors, document types, display formats, scales, areas, concessions, etc. Full descriptions should be held in the tables for use on displays and reports.

An issue requiring particular thought is the circumstance in which a parameter value occurs an unpredictable number of times for a single data item. Seismic lines which may cross concession boundaries or a report relating to a number of areas are good examples. Depending on the computer indexing technique that you use, a graceful solution that is economical of space and performance may be available. This problem becomes accentuated for items such as navigation tapes where data for 50 or more lines may reside on a single tape. The value of being able to access a tape by reference to any of the lines contained on it must then be weighed against the difficulties of capturing the information.

Often data can be grouped physically prior to coding, such that certain parameters are constant for a batch of items. With these fields so defined in the system, values can be automatically carried forward during data entry. Once again, this improves both speed and accuracy.

Time spent building validation checks into the data entry function will always be well spent. These can include:-

- Existence and availability of storage location

- Date formats
- Range, size and content checks
- Comparisons between fields in the same record
- Compulsory/Optional entry

The system should not require that the data entry operator must correct validation errors before continuing. Often he/she will not know what the correct value should be. Provide a warning only and the option to correct the error. The operator should be compelled to run a validation report after data entry for submission to the coder or supervisor.

Use Batch Controls

Control over data take-on is more easily exercised if items are grouped into convenient batches. The system should mirror this and logically group the items until entry and verification are complete.

Each batch will be supported by the coding sheets, a validation report and an item listing, which may all be retained to provide an audit trail of data take-on. Data records on file should also hold permanently the batch reference used for their accession to the system.

Data Indexing

It is difficult to conduct a discussion on data indexing without involving the techniques involved in computer indexing. Particularly difficult to avoid is a discussion about the extent to which a system may be relational.

The approach taken here is to study only the indexing needs of the system to achieve the cataloguing and tracking aspects of hard copy data management. It is possible to implement the requirements shown here using a traditional hierarchical indexing system and achieve very satisfactory results. If you, as a system developer, prefer to choose a development system which is more relational, then this is of course possible, though a careful consideration of the requisite computer resources should be made.

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The major indexing needs of a cataloguing system can be largely determined in advance. Armed with this information, it is possible to build a system which generates the requisite indexes to avoid frequent sorts or sequential searches, and yet forgoes the need for (and therefore the resource overhead of) a truly relational file management system.

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In defining data indexing requirements, the following areas should be addressed:-

a) Physical Retrieval

This is a unique reference which identifies the physical item of image, thus facilitating retrieval. This is covered in greater detail later.

b) Catalogue Interrogation

In discussions with users, it is commonly found that the great majority of data requests can be made using pre-defined search criteria. For example, a geophysicist will make an initial request for seismic data on the basis of Area/Line/Shot point references. The resulting item selection may then require refinement by one or two further parameters (e.g. display type or date). After this the user is often quite satisfied to peruse a list (on paper or screen) which he can refine down to a final selection.

The desire to search based on any combination of references and comparison operators is rare and often does not justify the time, software and/or machine overhead necessary to supply such a facility.

c) Catalogue Reporting

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Circumstances sometimes still dictate a requirement to list catalogues in printed form. As online systems become more affordable, this becomes less and less necessary. The most common use today for printed listings is as a new data notification.

physical data management

Catalogue reports are normally considered to be an alternative method of enquiry and therefore may share the catalogue interrogation index.

As users become more demanding, the format in which reports and enquiries are requested becomes more varied and complex. Fortunately for the system developer, modern languages invariably offer SQL-based query facilities which ease the development load in this area.

d) Links to an Information Set

The Information Set concept discussed earlier affords an opportunity to take a global view of data availability, based on an entity (such as a well, survey or seismic line). Such a view should then present all available data relating to the entity regardless of Data Types. This facility requires a link between Data Type and Information Set which may be different from those used for interrogation and reporting. Consequently a further index may be required for this purpose.

e) Keyword Searching

For textual data such as reports, some form of keyword searching is a useful additional interrogation technique. A spectrum of possibilities exist, ranging from simple string matching in a sequential search, to automatic indexing of "significant" words in given fields. Both have their impact on computer resources, which can be significant.

In the arena of exploration data, a middle position is often appropriate. The number of keywords required is anyway reduced through the process of well designed parameter extraction. This enables a restricted keyword indexing facility to be applied, using guidelines such as the following:-

* establish a dictionary of permissible keywords, and validate these on entry.
* decide on a maximum number of keywords per data item, between 5 and 10 are suggested.
* limit the wordlength. In an English dictionary of 24,000 words only 1000 are longer than 12 letters. With planned abbreviations, such a length limitation need not be inconveniently restrictive.

Adopting such an approach to Keyword Searching provides a beneficial tool which can achieve satisfactory performance without an excessive use of computer resources.

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Storage Location Referencing

The only link between a catalogued item and its physical disposition is the item's storage location number. The design and use of location references therefore deserves particular attention.

The first important concept to establish is that location references should be non-specific. In other words the system should employ a universal location numbering systems which satisfies all types of data and all types of storage media, be it physical storage or in image form. Furthermore the reference should identify an individual item as well as the location in which it normally resides.

Within these guidelines the numbering structure should allow some flexibility to account for the different storage systems into which we delve to locate the data items. Let us look at some examples:-

a) Tapes may be stored in bays of 8 shelves high, 30 tapes to a shelf. Depending on available space, bays could be arranged in rows of 10.

Locating a tape thus involves seeking the bay, the row, the shelf and the tape itself. A structure therefore might be:-

Bay Row Shelf Tape

1-50 / 1-10 / 1-8 / 1-30

and a typical reference:-

25/04/6/22

b) Documents stored on microfilm are normally referenced by the frame containing page 1. Reel number and frame suffice as a reference, a typical one being:-

Reel Frame

1233/0049

c) Film maps or sections stored in tubes can be referenced with a simple tube and item number, thus:-

Tube Item

1094/12

Experience shows that a referencing system using all numerics and allowing a maximum of 12 digits with up to 5 sub-divisions works well. Software editing techniques can be used to display a number in its correct format, as per the examples, for the convenience of the user.

To optimise the use of storage space, strictly random allocation of storage slots within each storage type should be adopted. In practice however this approach tends to increase retrieval times, so a compromise may be made by grouping items physically where they are commonly requested together. The temptation to carry this grouping logic into the location referencing system should be avoided. Doing so produces a significance in the references which will sooner or later cause problems when a new consideration is encountered which cannot be accommodated by the referencing system.

As new storage technology is utilised, the referencing system can continue to be used without change. For example, images on optical disk are stored as files which can be named using numbers on most operating systems. Thus an optical disk image can be referenced as

OD Volume Nbr/File (Image) Number

91004/86124

2. DATA CONTROL

Kestrel

Because of the readiness of modern database languages to provide us with good file handling facilities, more concentration is often given to data cataloguing, to the detriment of functions which maintain control over the physical movement of items being databased.

physical data managemet

From a systems design viewpoint, the data control aspects can be integrated into the same files as are used for Data Cataloguing. The Data Control functions are separated here however to highlight their importance. The functions themselves are not particular to oil exploration data, and in fact share many aspects of systems used in libraries and records management facilities.

The primary object of Data Control is to answer the question "Where is the item now?", whenever it is not in its normal designated location. The starting point is to automate a request procedure so that movements can be traced to source. Normally, this will call for requester's ID's, authorisation, request instructions, etc. It is useful to have the system log dates and times of requests and their fulfillment, to provide evidence for periodic praise or recrimination for performance.

Policy will dictate whether or not items may leave the storage facility, varying according to data type, security classification, etc. Where originals are reproduced only and then returned to their storage location, item tracking of this event may be necessary if request volumes are high and/or queues may build up for reproduction. Data leaving storage on loan should naturally be logged out, and if appropriate provide for the facility to transfer an item from one borrower to another.

The use of bar codes has become common where data movement is high. This provides a good low-cost technique for improving both the speed and accuracy of input relating to data transfer.

Again from policy, the system should implement data return reminders. The longer data remains on loan, the higher the risk of loss or damage. Loan periods may vary in length, often associated with the security level assigned to the data. Periods may vary between same day return and several weeks or even months.

Increasingly users demand online access to their database, including the facilities to request data. This implies several issues not least of which is the implementation of security controls on data access, and procedures to verify bona fide requests received online.

Kestrel

A Data Management team which is keen to maintain its reputation, will find enormous benefit from the accumulation by the system of information relating to activity. Performance data covering both data take-on and request activities constitute a useful planning tool in sustaining a responsive service to the user.

physical data management

Data Exchanges Issues

The exchange of hard copy exploration data is increasingly required for such purposes as data trading, relinquishment to government and sale of data packages by government as an enticement to operators.

Ideally, the recipient of the data items should also take delivery of a transmittal and some form of computerised catalogue. In reality, usually only the actual data is received and the laborious task of cataloguing is required. Often it is not done, further aggravating the recipients' data management problem.

In the ideal world, the solution to this problem is overcome by universal cataloguing standards to which all parties conform. In reality, there are many barriers which stand in the way of this, so we must seek a position in the middle ground. A number of suggestions are made here which are borne of experience in converting databases in conjunction with data exchange.

> **1. Source databases should be designed with a high degree of input validation.**
>
> The most common problem faced in data conversion is the poor validity of the incoming data files. Several validation techniques have been discussed which would relieve data recipients of the headache of unscrambling meaningful information from data records. Tables of codes are particularly relevant as these can be submitted also as part of the data exchange.

2. Source database should contain sufficient well-defined parameters.

The quantity of parameters to transcribe is a subjective issue to be decided by the user. However, there should be enough to adequately (but not necessarily uniquely) identify data items. The number will vary also between data types. As a guideline, 5 is insufficient, between 15 and 25 is usually adequate, and 30 is probably too many.

More important is that the parameters are well-defined. For example, seismic lines invariably have prefixes and suffixes. These should be separated from line numbers by a standardised, validated method, and thus easily identifiable by the recipient. Also, well-defined parameters combined with data take-on discipline will avoid such practices as fields being misused as overflow for other inadequate fields. In other words, know the system used to generate the references and match it in the parameters used.

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physcial data management

3. Records should contain unique item numbers which can be matched easily with the data itself.

A lot of time is wasted matching data items with a database listing, so that received items can be allocated their new location. This is a relatively straight-forward task when items can be easily matched one-for-one with their respective database records. Items should be labelled or bar-coded for this purpose.

4. Standards for exchange data records should be established.

Basic agreement on standards between parties on a national basis will alleviate many data exchange problems. The detail of these will be determined by the volume of exchange. At a simple level, the following only are required:-

a) Coding (e.g. ASCII)

b) File format (e.g. sequential, fixed length records)

c) Delimiters (File, record, field separators)

d) Media (e.g. 1600 bpi tape, DOS format flexible discs)

e) File layouts (as a file header or submitted manually)

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CONCLUSION

physical data management

A well-designed software system is a integral part of successful hard copy data management. It cannot however be implemented in isolation of the many other considerations which must be addressed if the data management function is to be truly useful and sustainable. In addition, as the requirement of government and the industry to exchange data grows both in frequency and in volume, the need to accompany that data with meaningful computerised catalogues becomes more important.

For these reasons, data management must increasingly be recognised as a separate discipline. If it is not, then piece-meal and incomplete data management systems will continue to be the exception rather than the rule in exploration organisations throughout the world.

Session Questions

MR PARSLOW: Wayne Parslow from Geovision. As far as getting data transcribed have you tried to use optical character recognition to get the data sheets into your data base?

data capture

MR GABB: No. That is the short answer. I am just trying to think why not. At the moment the physical data is formatted in such a way that it is very difficult to do from the originals because you are not quite sure where things are going to be. The originals are often very large.

Therefore the equipment you need to be able to read it, it gets very expensive.

The other alternative, of course, is to try and read what has been transcribed from the data by somebody on to a coding sheet. That involves interpreting handwriting, generally, which again is a very inexact science as far as computers are concerned still.

Kestrel

I think the same issues arise as arise with bar-coding of original items. There needs to be an enormous amount of co-operation amongst processing houses, and so on, to try and establish something so that it would be feasible. But there needs to be a lot of standards in terms of physically where the information is going to be printed on the original item. The format that it is going to be, and the information that is actually presented. That still is not the case.

physical data management

data capture

We still find that we need to employ people with a graduate geoscience background to be able to interpret the data so that the perameters can be transcribed correctly which is a sort of dichotomy because you end up with very well qualified, intelligent people, doing a relatively mundane job. This is a problem that is continually faced.

I think yes, we would like to do it, but it needs human co-operation and perhaps a drop in the price of some of the technology for it all to happen, I think.

MR CUCUZZA: Can I assume that you have written all the software that you require in-house, or if not, have you considered using off the shelf and modifying that software for your requirements?

MR GABB: The answer to your first question is yes. Everything I have described is incorporated in our software systems - no, that is not quite true. I do not think off the shelf software exists. There is an awful lot of off the shelf softward which you can very quickly turn into a databasing tool. But you need to code to get the data control aspects of it. There is off the shelf software that will do the control aspects but none of it is sufficiently flexible to be able to allow you to do the cataloguing aspects that the exploration data requires. So if off the shelf software exists we have not come across it yet, other than our own product.

software

It is also the case that hard copy data management is a fairly specialised business; there are not that many people doing it and therefore you do not find a plethora of software houses keen to leap into the arena of marketing data management software.

Kestrel

MR IASKY: Robert Iasky from GSWA. Is Kestral primarily a storage facility or do you provide marketing for the data you store?

physical data management

MR GABB: Generally we do not - well, obviously that is up to the owner of the data. Generally we do not provide those marketing services. Having said that, our facility in Calgary stores data on behalf of data brokers who subsequently market the data out of the storage facility. Obviously the systems that we have got in place makes their life easier in terms of identifying and retrieving that data. But as an organisation we are not in the business of data marketing, data broking, no.Butifyouneedsome we could be.

marketing

MR KEMP: Dave Kemp from Digimat. What sort of volume are you looking at handling here?

data volume

MR GABB: What sort of volume are you holding at the moment, Mike? This is a fairly small facility, not to demean Mike's position.

MR EVETT: Hundreds of thousands of maps of seismic sheets, probably somewhere in the order of a quarter of a million. The total volume on catalogues in order of half a million items, probably.

MR GABB: It varies enormously. That is a relatively small commercial facility. Our Canadian facility stores on behalf of 300 oil clients and there are more items than they know about, I think. There are in excess of 400,000 tapes there. We only bought the company a year ago. Over a couple of million sections at a guess. That is at the top end of the scale. At the bottom end of the scale, a small data management, technical data 30,000, 40,000, 50,000 items. So the scale is vast in terms of that sort of volume.

data capture

MR WILTSHIRE: Mike Wiltshire, Wiltshire Geological. This is more of a comment on one of your earlier responses, Andy. With regard optical scanning, portable hand-held scanners are now emerging which will solve most of the problems of the physical dimensions of the object that you are searching. Certainly within the next year or so we are going to be investigating the use of those things. The other comment is I would absolutely endorse what you are saying about the use of qualified geoscientists to do you data acquisition; there is no substitute. You cannot do it by using technicians.

MR GABB: Right, thank you. I will talk to you later.

MS RADKE: Sandy Radke, BMR. With regard to tape storage, have you run into the problem with older tapes of loss of data, or deterioriation of data on tapes? And are there any guidelines you have for culling data or does storing data tapes go on ad infinitum?

Kestrel

physical data management

MR GABB: Hopefully so, yes. Several questions - to try and answer your question on what guidelines do we employ. We will do whatever a customer wants to have done to his tapes which is a very non- commital middle position.

We try and extract from the tape manufacturing companies what they recommend because they made the tapes and we will implement whatever policies are recommended. It is quite an expensive business to have an awful lot done with your tapes and there are schools of thought which say tape cleaning is a good idea and that should be done every year. Other people say if you take the tape out to clean it, then there is as big a risk that you are going to damage it as it would be if you just left it where it was. Tapes generally need turning. That again can be a long and laborious exercise and needs control and management. People say it is not worth paying the price of that, just to turn the tapes every three or six months, or whatever. So we do not come up with a list of recommendations other than what tape manufacturers would advise.

magnetic tape storage

Do we experience loss of data on tapes? We do not because - well, yes, we do in some circumstances. I say we do not because often we do not do anything with the tapes other than store them and catalogue them. But in Calgary, for instance, we have got a tape transcription facitlity. Obviously we are handling the tapes from that point of view as well. I do not know what the incidence is. In some circumstances you can have a tape which is only five years old and you cannot read it; other times there are tapes which are 20, 30 years old and they are fine. It is unpredictable. You can go back to the tape manufacturer and ask him why, and he often has difficulty coming up with the right answer.

Having said that there is quite a lot of movement in several countries to look at alternatives and the big alternative is obviously transcribing on to optical disc which appears to be a good solution, albeit an expensive exercise at the moment, but it is even more diffucult to get guarantees from the optical disc manufacturers as to how long their optical discs are going to last because they have not been arount that optical discs

long. Any more than 30 years and they get a bit jittery. I know, for example, none of the optical disc companies would sign anything to the British government as to how long their optical disc were going to last, because they were doing that exercise primarily to reduce storage costs.

That does not answer any of you questions at all, does it?

MS RADKE: It is still problem

MR GABB: It is still a problem; there are no easy answers, I think.

MORNING TEA

THE CHAIRMAN: Welcome back, we will continue the session, with Ron Richmond, from APEA.

Paper Submitted

APEA's PETROLEUM DATABASE

by

Ronald N Richmond

Assistant Director Information Services

APEA has been compiling industry statistics since its formation in 1959. Computerisation of the data only began in early 1983. In the context of this workshop it is worth keeping in mind the different objectives of APEA and its member companies versus the Mines Departments and the Bureau of Mineral Resources. **APEA**

Objectives

What is the Difference? APEA is a lobby organisation and our objectives are quite different from government departments: we do a considerable amount of political lobbying and much of our work involves government submissions. Thus we need to organise the computer data needed to support our main objectives.

First and foremost we need accurate statistical information on wells drilled and seismic recorded - both historic data and forecast data. Secondly, we need inforamtion for the monthly APEA Report and for the Quarterly Report. These provide current statistics on drilling, seismic and production activity. It is worth noting that the only other publication which reports production information is the Bureau's (BMR) Major Energy Statistices and the Petroleum Newsletter, but these are only summarised by basins and the Petroleum Newsletter is always a year or two behind.

Another information report is the APEA Well Location Index which is in some demand from member copanies. This is currently being totally rewritten for easier computer updating. The APEA conference is another activity that requires an annual database of its own. It is the premier petroleum industry conference held in Australia each year with about 800-1000 participants.

Equipment

APEA

The equipment at APEA is nowhere in the class of the mainframes and mini systems used by the Bureau and the Mines departments. We have small micro computers which are geared specifically for the needs of our small organisation. For the main statistical work we use a Hewlett Packard Vectra which is an IBM AT compatible system. For other work in the office we have IBM compatible Epson AT systems. The database is kept in Microrim's RBase on a DOS system, and most of our graphs are produced with Picture Perfect. Other software used include Lotus 123, Microsoft Word, and Diagraph. We find that these software are quite adequate to keep up-to-date statistics and to provide the high quality graphs needed to support our submissions to government.

Services

We also have to sevice our members. Apart from government submissions, we have to be able to satisfy queries of our member companies. The main types of queries we receive concern historical statistical data for wells and seismic by states and basins, and lists of discoveries, reserves, success rates in various basins, and so on.

Questions also arise concerning the cost of finding oil in any particular basin. This is not easy for us because we do not have data on finding costs. When we obtain information from companies, for example, for forecasting purposes, this is on the clear understanding that the information will remain confidential. We only present summarised totals on state, basin, or national basis.

A common question is the cost of finding in Australia compared with the United States, United Kingdon, Malaysia, Indonesia, etc. This kind of information is not on our database and we have to rely on published sources to supply this information.

Recently we have been a sked about permit sizes in the various states in Australia, particularly how the permit sizes have evolved over time. Again this is not kept on our database because of memory limitations so we have to use published sources. The Western Australian and South

Australian Mines departments put out a good summary of permit sizes each year and similar information from other states wuld be very helpful.

We get most of our well and seismic information directly from companies via fax or telex. Sometimes we have difficulty obtaining this information from the smaller companies, especially for single well programmes that are not well known. In such cases we turn to the BMR for informaiton on new wells. Infact we work quite closely with the BMR and often help each other out in putting out quarterly and annual statistics. We try to ensure that we are in reasonable agreement on wells drilled and seismic compiled at the end of any period. Any minor differences are usually due to difference in TD dates versus completion dates.

The Mines departments are also becoming important sources of information and we are building closer liason with them to allow for a better exchange of information between us.

Limitations

The physical limitation of a 40 Mb hard disk on the main computer restricts the amount of statistical data available at any time. Of course, only part of the 40 Mb is used for the database, and after accounting for word processing, graphics, spreadsheets, etc. only about 5 Mb remain for data compilation. For our purposes, we find it quite adequate to simply keep the current year's information on the hard disk, with previous years' information being kept on 1.2 Mb floppy disks. As most of the queries recieived relate to current activity, this practice will remain for some time. On the few occasions that requests arise for historical data, there is no trouble in obtaining this from the floppy disk.

The information on our system is available to companies as summary tables. There are no confidentiality restrictions on historical data.

Forcasting

Information for the APEA forecast is obtained by polling companies directly. A questionnaire is sent out to all member companies and other known operators. Returns are received form abou 75 percent of those polled, and these include the main operators. In our forecasting we have found out through experience that companies have never managed to drill the probalbe or maximum number of wells planned. Thus we have restricted our forecasts to the minimum number of wells planned. and have been proven reasonably successful over time. As mentioned earlier, forecast information is only released as summaries on state, basin, or national basis.

Problems

A problem that exists is in checking the available sources of data because, invariably, differences do show up when comared with other commercial data sources or with the Bureau. We have been working alot closer recently with the Bureau and the Mines departments to ensure that we are in agreement of the classification of the wells and the actual wells being spudded and completed.

APEA

Getting information from some companies is also not that easy, even if they are APEA members. Some companies do not have releasable data until the end of the month while others have bureaucratic regulation requiring their information to be released only through their public relations departments.

As mentioned earlier, one of our problems might be the computing limitation of our hardware and memory. This is not really a problem, however, because although we would all like to have bigger and better systems, our current setup is quite adequate for APEA's needs and is within APEA's budget. We provide the information that our Councillors need. We provide the kind of backup that APEA needs for its submissions to government and in no case can one say that we have been hampered in our work by computer limitations.

We acknowledge that a number of data sets are not kept on-line in our computer system. At the same time the demands on the system do not justify increasing capabilities for the sake of storing information. Many of our larger member companies have much bigger computer systems and the information they need is stored in them. Where necessay we prefer to use published information that is readily available, such as the Major Enery Statistics, and we maintain good working relationships with the Brueau of Mineral Resources and other Mines departments to ensure that we have access to additional data when needed

session questions

MR CUCUZZA: How long has your system been available and have you seen any benefits in your lobbying as a result of this information becoming available in digital form?

MR RICHMOND: We have implemented this since 1983 and there have been many benefits in our lobbying. Actually all of the graphs and things that have been put out now are much better and I have been amazed, going back at the older submissions, at how poorly they were presented. We find that the government uses our information quite a lot and so do companies. Companies often call us up for a hard copy of the data that we have been using in the submissions to use in their own work.

The only problem that we have had now is that the council or management gets used to what you can put out and the oldest thing is just to press of a button. That will give them what they need and that is the only area that is any problem. **APEA**

MR WILTSHIRE: There are two or three points. Obviously you are constrained with computer resources and you are using the computer to manage and organise your conference. I think your budgetting approaches $100,000 in profit out of this coming conference, and I would suggest that you ought to grab some of that and improve your computer resources straight away.

THE CHAIRMAN: Any specific questions before Ron relinquishes the top table?

Paper Submitted

DATABASE USAGE AT ESSO AND GOVERNMENT INPUT

by

Andrew Barrett

Esso

ESSO

In this very brief discussion I will outline the use of databases in the Exploration Department of Esso Australia and what we see as our needs and requirements from government sources.

The Exploration Department has been maintaining a number of databases for many years. Over time they have been developed into powerful tools to assist in our exploration efforts but we are always investigating ways of improving them. We see this workshop as a way of improving one of our data sources, namely government departments, and appreciated that you have the desire to provide us, that is industry, with an improved service.

The databases we use can be broken into two main categories:

-bibliographic/inventorial and,

-raw and interpretative data storage databases.

The first type is used to record details of books, reports, maps, logs etc in our Information Centre and the passage of seismic sections through our geophysical Operations Group. I will, however, be focusing my discussion on the second type; the data storage databases.

Our Evaluation, Planning and Analysis Group maintains a number of scouting databases that are oriented towards recording details of activity within the oil industry in Australia and Papua New Guinea.

WELL and DRILLING cover all petroleum wells drilled in Australia and PNG and contain basic data such as wellname, latitude/longitude, spud and completion dates, etc with other text-type data such as test results and core intervals.

PERMITS and LAND cover permit details such as equity holdings of the participants, relevant dates and permit outlines. PERMITS is used by our Drafting Group in producing permit outlines on maps.

SEISMIC contains information on where and when seismic was shot, how much was shot and by whom.

RESERVES contains details on all discoveries such as initial recoverable reserves, production histories and comments on data source and quality.

We also maintain a bibliographic database called EXNEWS in which we maintain an index to industry- related articles that have been published in newspapers, magazines and so forth.

ESSO

data sources

The data sources we use include government and industry sources. Looking at how government sources are used; BMR publications are used to check some of the basic data in WELL and DRILLING; some state governments provide reserves information, for example, the Western Australian Government published reserves data in a supplement to the Oil and Gas Journal December '87/January '88 issue; each state government provides tenement maps for input into PERMITS and LAND. This is not meant to be a comprehensive list of what data we use.

data manipulation

SAS is used to manage most of our data with other systems being investigated in an ongoing process to improve our data handling capabilities. Each database can produce its own reports or maps but the use of common core data such as well names and permit names allows us to crosslink data from one database with that from another. As illustrated here, linking WELL and PERMITS allows us to output quickly maps showing wells and permit boundaries; linking RESERVES with LAND allows us to generate a report of net reserves for any company; and linking DRILLING and RESERVES allows us to generate a report for any well with its associated reserves.

Esso's needs

What are our needs from government departments?

Our major need is to obtain accurate data in a timely fashion. A look through our filing system reveals that currently we subscribe to a large range of government publications including such items as tenement maps, listings of permit details, listings of available reports, journals, statistical reports and government gazettes. The usefulness, accuracy and timeliness of these publications cover the full range from useless, out-of-date data to extremely useful and current data.

What are some of the specific areas we would like to see effort being directed to and how should the government department be presenting the data for public consumption? I won't pretend to cover all aspects here but just some suggestions that would enhance our own databases.

ESSO

We would like to see the introduction of a "Scouting Ticket" concept where the appropriate government released basic data on well such as well name, spud date, latitude, longitude, etc within a certain time frame after each well has been completed. Whilst various scouting publications give these details, inconsistencies occasionally arise in such basic details as how the well name is spelled. The issue of a scouting ticket would remove these problems and become the standard for basic data reporting. The data would be of a non- proprietary nature and should not contravene any of the Stock Exchange reporting requirements.

Permit and licence boundary details are another area where we would like to see some improvement. Obviously when one drafts a map one would like to ensure that all details are accurate but obtaining descriptions of permit and licence outlines has not always been straightforward. A standard description format on either paper or disk would certainly remove some of the frustrations currently endured. We appreciate that keeping track of the boundaries of individual farmout blocks within a permit can sometimes prove a nightmare of a job but we see government departments as being in the best place to keep track of changes.

The question of whether we would prefer an "on- line" hook-up to public access databases or a "ring-in" service to request a hardcopy does not concern us too much at this stage; it would depend upon our perceived needs of such facilities. The only requests that we have are:

1. that databases be kept up to date with quality data,

2. that data be in a readily usable format, and

3. that response time be quick.

We endeavour to observe these criteria when maintaining our own databases so we would hope to see such a commitment from government.

Esso is prepared to pay for data but these is nothing to be gained by either the provider or user of information if the service does not adhere to the points I have just mentioned. We are certainly not after any free handouts and appreciate that government departments are more and more being asked by their respective governments to provide a service to industry and also generate some sort of income.

Thank you for this opportunity to address you.

Session Questions

ESSO

MR LAYCOCK: I am wondering just what you would be prepared to pay for data.

MR BARRETT: Well, obviously there is data available through commercial sources, and it is something that would be judged over time. If you were charging the earth for data that obviously was not very good, you are not going to be in business very long. It is just going to be something that is just going to have to be looked at on a constant basis. "Don't know," is the answer.

MR COLES: How comprehensive are your data bases? Have you got all permits, for example, right back to day 1? Your reserves data base, does that include all fields in Australia, etcetera?

database content and scope

MR BARRETT: I do not think I will get in trouble by saying the answer to some of those, but starting at the top of the list, WELL: we have got in excess of 5000 wells on that list. Now, you have got 4600, but ours is a database that goes back a long time. I think it was on hard copy to start with. But it contains a lot of water bore information, and we have not put the effort in to try and weed out some of those. In fact, you look in the Ottway Basin, Aramanga Basin, and a lot of the water bores are used as data points.

In the DRILLING database we have got about 2100 entries in, but that particular data base only dates back about 5 years, so it covers all the drilling done since about 1983 in pretty comprehensive detail, very much similar to your database that you described this morning.

ESSO

PERMITS started about the same time. We do hold some historic data in that. We have not attempted to go back to the year dot. We have just maintained the data that we have stored when it become available; no backlog in that - we have not gone back on that.

database scope

LANDS tends to be just what is currently necessary.

SEISMIC I really do not know. That is not one that I personally look after.

RESERVES: we pretend to cover every single discovery in Australia and New Guinea, and that one is kept up to date.

EXNEWS is about 5, 6 years old and contains a lot of information in it. I do not know how many pieces of information are in it, but it is very comprehensive newspaper coverage, journal coverage - business journal coverage - press releases, that type of thing.

database useage

MR COLES: A supplementary question: do you find all those data bases are constantly used?

MR BARRETT: No. EXNEWS gets used probably four or five times a day with various questions, mainly from management on business-oriented type topics. DRILLING is one that I use to generate a report that I give at a staff meeting each week on the latest excitement in the drilling scene, but it also gets used for assessment purposes, looking at drilling histories in various parts of Australia, that type of thing. PERMITS: useage varies, but a lot of its useage is invisible to me because the drafting have got direct access to it. The same with the WELL file; they have got direct access to that for plotting purposes, so I do not know exactly how many times they use it. RESERVES: I really cannot say; it varies. But it does get get used. SEISMIC has probably the least amount of useage.

THE CHAIRMAN: I might close it - sorry, have you got a quick one?

MR IASKY: Just a quick one. Beside SAS, do you use any other packages?

MR BARRETT: We use some proprietary packages developed by our parent company in the States for plotting purposes, but SAS is used for most of the report-generating type purposes. EXNEWS, by the way, is a STATUS database.

THE CHAIRMAN:, Well, thank you very much, Andrew. I think we have encroached a bit on the discussion time, so without further ado I will hand over to Murray, with apologies for taking some time there.

DISCUSSION

MR BRIDGEWOOD: Thanks, Des. Really, the objective pf this open forum discussion or session is to give an opportunity for others to have their say. We have heard from quite a few speakers over the last day and almost a half, but it is an opportunity for others to have a bit more of a say; perhaps make some observations as to how they see the workshop proceeding so far and what else perhaps they would like to see come out of this afternoon's session. I will have the opportunity straight after lunch to summarise and talk about the aims of the workshop before we break up into groups.

response time

It is also an opportunity for questions to be put in relation to all the previous presentations. I do not want to take up too much of the time. I just would hope that we can get some feedback from the group. Would anybody like to kick it off?

MR AUST: Terry Aust, from South Australian Department of Mines. What I think I would like a real feedback on is how quick people need access to data. My own feeling is that a response in terms of a week would probably cover 90 per cent of our needs. Anybody who got it back in a week would be quite happy. But I would like a better feel, particularly from some of the potential customers, as to how important that time scale is.

MR KEMP: David Kemp from Digimat. Yes, a week would be fine.

MR BRIDGEWOOD: Anybody else from industry like to comment on that?

MR WATTING: Tom Watting from Santos. I think it does vary, but a week is a realistic timeframe. Things that would be required in less than a week we would hope that we have a good enough relationship with the Mines Department to be able to get that in a hurry if we needed it.

data availability

MR BONIDIO: Michael Bonidio from Auspet. I would say a week would be very good, but if I could also tie that in with a comment going back to John Laycock. Speaking from a small company standpoint - we are a company of about 20 people - we have a fair bit of computer power - a couple of HP main frames and PCs. What we really need from the state departments is the sort of thing we can get from Queensland, where we can actually buy the information on a mag tape or on a floppy disc. Generally, that does not mean we have to have it within a week. I mean, that would be great, but what we really would like would be able to physically get the information so we can load it up on our machines. We do not have the resources of Esso or of Santos or some of the bigger companies, where we can actually sit down and physically input data. For us, we would be willing to pay to get the information and just load it up on our machines. That is the quick and easy way for us.

response time

MR WILTSHIRE: Mike Wiltshire. Terry, I think that the first thing you really have to say is what you mean by data when you are asking in terms of time of response, and I could go on for some time about my views on this discussion in generally, because I think that what we have been talking about here is not really petroleum data; we have been talking about petroleum data indexes and bibliographic reference systems and so on. It is not actually the data.

Now, if you are talking about data as such, my organisation does not, for example, store well information, log information, on tape, simply because accessing and retrieving tapes and duplicating tapes takes too long. And there are a number of people in this room whose companies are clients of ours who know that if there is a set of data that exists in our set, it is on disc and they can have it by courier overnight; and that means pulling from about 1200 wells now in Australia comprehensive log data. Now that, we find, with our customers, is the type of response that they want, and if you are looking at providing that sort of response you really are facing a pretty major problem in an organisation in terms of getting your priorities right, getting your data validated and getting it ready to duplicate.

It is a major problem; and as I say, the answer to your question really comes back to what you mean by data. If it is just a search of a reference system, that is almost trivial, and we normally do that on the telephone. Jack Davan can do that on the telephone out of a shoe-box of card files.

MR KEMP: Dave Kemp from Digimat again. I agree with that. I would just like to put a question to Kestral. What sort of response time do they have on producing a tape or whatever to their clients?

MR EVETT: Mike Evett from Kestral. Obviously the response time is entirely dependent on the volumes. If you are talking about something like a single individual tape, the retrieval time for the tape can be roughly, to the nearest minute - you know, I mean, it is just as long as it takes to access the location from the data base to physically retrieve the item. Certainly I would imagine that the vast bulk of the time would be the actual time it takes to physically courier it from A to B. But obviously, I mean overall it is entirely dependent on the total volumes.

Discussion

MR LAYCOCK: John Laycock from Mines. I am not too sure that people are aware of what sort of data they can get from the Queensland Department of Mines, and particularly on this petroleum aspect. What we are talking about is basic data, not bibliographic data, although we can provide that as well. But we will provide you all the open-file data on our energy resource data base on tape at very, very reasonable cost.

data availability

On Andrew's thing, I will give him a hypothetical. If I was to supply to you current data on the location and holdings of all the current petroleum titles in Queensland, then you can have that on tape tomorrow or each month as they are generated, what would you pay me for that? Because we can do that for you. In fact, one company takes that data, and what it does is provide their own graphics to keep their things current.

Not only that; we go further. We can also, if we chose to, supply you with the dates that those particular areas, or part of them, are going to be relinquished, and I think that is a very powerful sort of a tool to have available to you. Furthermore, we also provide as output hard copy, called quest maps, showing the current tenements.

MR BARRETT: On that, I do not know how much we would be prepared to pay, because I have never been involved in any cost estimates for - or costing of that sort of thing, so I really cannot answer it.

Now, in Queensland there is probably a lot more tenement data than any other state, considering the number of A to P's you have got, the size of permits in the Bowen and Surat, and it would be very useful to get it on a disc or a tape. Now, as I said, I am not a computer expert so I do not exactly what sort of format we would want it in, but one of the problems has been that we just have not been aware of what data has been available, as you mentioned, and the fact that you have got that information available is great. You might get a phone call in the next day or so.

MR LAYCOCK: Just for people's information, we do actually supply the data on tape and we provide them also on fiche, so you can take your choice. You can buy all the open-file petroleum data from the Energy Resource Database as a hard copy computer listing, and we would charge you $30 for it. You could get the very same thing on fiche and we would charge you $100. And if you saw the fiche out here, they were examples of the sort of output. If you got all of that data on tane, which you then can manipulate, we would charge you $300. We think that is a fairly low figure, and it may be reviewed, so I suggest you get in quick.

Discussion

The other thing is that some of th data can be suppied on floppy discs, and that applies to the petroleum well registered data and certain other data. So it is basic data I am talking about.

However, if companies do not have a computer system and they want to do some interrogation of the Energy Resource Database, and it involves a specific enquiry, for example, all the wells within a particular bounds of lats and longs, and you wanted to have with that all the formation picks and drill stem tests, we will produce that output for you and charge you $30 - tomorrow.

MR BRIDGWOOD: I do not think we particularly want to use the rest of this session as a marketing exercise. Is there any different topic we might move on to?

data standards

MR CUCUZZA: I would like to say something, if I may. One of the reasons why I am here is that AMIRA was asked late last year and early this year to fund, with ACADS, a feasability study on setting up standards for data transfer, - geological data, tenement data, etcetera, and of course I thought it suitable to come to this workshop and find exactly what people are doing in the various departments. And I guess it confirmed, what I was told and suspected: that in general, everybody is doing their own thing in terms of software, where they are going, and without sort of due collaborations to the objectives, or even in setting up basic standards of terminology, because people are using different standards in this case.

If one has to cost the amount of money that has been put into this, it obviously runs into millions, and it is a pity that there has not been an effort to collaborate and produce a software that people can use in some fashion, even though it can be modified locally. I guess the excuse has been in the past that, "we've got our own hardware and we have to do our own thing because of this," or indeed, " Our requirements are different." I am yet to be convinced, in fact, whether these two are any hindrance to a collaborative effort; and of course, being in the real world, I expect that this is not possible, because a lot of people have gone a long way down the road doing their own thing.

data transfer

What I would like to say is that there should be some effort, now that people have gone down the road to do their own thing, to try to standardise the data transfer, so that people in companies can get access to the information in the same way as they can get access to various government departments, whether it is Northern Territory or Queensland or whatever, and also the transfer of information between the government departments is the same.

Discussion

Now, that means, of course, that you may have different software in house but you may have the right tools downstream to translate that in a data format in a way that is a standard throughout Australia, and I would like to see some effort and some thought put into this area.

The other point I guess I wanted to make is that it was the Geological Survey in Victoria who came to us with this proposition, and when I first heard about it I very much wanted to see an approach where the the metalliferous question was incorporated in this; and that is another aspect that perhaps one should keep in mind, because although the basic data may be slightly different I am sure that an approach can be developed that can cater for both sets of data.

co-ordination

MR BRIDGWOOD: Perhaps I will just make a couple of comments on what Joe said. This is the first conference that I have been involved in in relation to petroleum data and databases. I suppose I found it a bit interesting to the comments made last night as to how good it was to actually get together and find out what people elsewhere in Australia are doing in relation to the development (if we are just talking software development for the moment) of these petroleum databases. I find that a little bit surprising, that it has to wait for an opportunity like this before that sort of data or the message does get around as to what other people are doing. So that was reasonably interesting.

You also mentioned that there is obviously a lot of duplication of effort going on. Even if we ignore the fact that there is different hardware and different software tools available in the various states, there is a great deal of work that is environment independent that goes on in relation to the development of the various data bases. All of the planning and the logical design of the various data, the data sets, is something that should be environment independent. So there is that sort of duplication that is certainly going on, and that is the sort of information that could easily be shared around the states and the BMR.

standards

Certainly I went along some months ago to hear Sandy give the presentation on PEDIN and there is opportunities for making use of the effort that the BMR put in, that South Australia have put in, and the other states have put in in relation to the development of these data bases.

I think the other point you mentioned in relation to standards - the other thing that I found perhaps confusing, because I am not particularly familiar with the industry - is the number of different bodies that have some responsibility for standards, and just where the actual break or the various - what the various roles of those groups are. We heard from Graeme Pilkington from ASEG, and from GGDPAC, from AGIA and from a number of other bodies that all have some responsibility for development and promulgation of standards, but exactly where the roles and responsibilities finish from one and move on to the other is very unclear to me.

Discussion

standards

MR MEGALLAA: Maher Megallaa, DITR. Just to answer your question, back in 1983, 1984 there was a sub subcomitee of AMIC, called the Government Geophysicist Conference, and that conference used to look at standardisation of databases. Unfortunately, it was abolished, because of political reasons and so on, so I would like to concur with Joe. It is - you know, it is very important to have a standardisation of databases, to make life easier for companies, government to exchange data.

MR BRIDGWOOD: We have got - we do not want to dwell too much on any one of these topics, especially when they are the subject of this afternoon's work, but certainly that will be discussed this afternoon.

data transfer

MR WILLOCKS: Alan Willocks from Geological Survey in Victoria. I was going to expand on that statement. Just to go a little bit further with Joe's comments: the Department did contact ACADS and AMIRA to put forward a feasability study for the transfer of geological data. At present we are waiting for responses back from government departments and industry to go ahead with a feasability study. AMIRA will not go ahead with that study until there is a commitment from government departments to support it and also to put forward some money to fund that study.

The feasability study is estimated to cost about $5000, and the full study I think was estimated at about $70,000 to $80,000. So the costs that we are looking at - or the funding that we are looking at from the various departments is pretty small compared to, I think, the benefits that could be gained from this, and I am asking here that support be brought forward to - or that people go back to their departments to push to support this feasability study.

MS RADKE: Sandy Radke from BMR. I just want to make a few comments about all the discussion we have just been having, particularly arising from what Joe was saying. Firstly, I can understand the frustration from somebody who has not been involved with database development and sees all of what has been going on in the last day and a half, but I think it is important to realise that historically this was inevitable.

Discussion standards

It is very nice in hindsight to say, "We have spent so much money and everyone has done their own thing," but if you look at the major databases that are fairly advanced at the moment, when they did start it was difficult to co-ordinate, really, and a lot of this has to do with management decision.

I know that the people who are at the work-face here can say, "This is all very nice and we would like to do this and that," but basically we have to go back to the BMR or our departments and have management decision on this in terms of support, and the resources that we have. What I do hope comes out of this is in effect become a little bit of a lobby group in terms of having management understand what is involved in terms of co- ordination. I think that is a big step forward in what we are doing here.

I think that is very important to realise that in the days when a lot of these major databases were being conceived, management had very little idea of what you can and cannot do and the costs involved. So although it seems sort of lots of duplication of effort, it probably was something that was somewhat unavoidable.

I think this has been brought out before, but having different software nowadays is no longer what it was 10 years ago, and data can often be manipuated and put into different formats. It is the standard of the data and what one means when one says an appraisal well or an extention well that is important.

In terms of duplication of effort, I suppose the BMR, you might say, is the one that is duplicating what all of the states are doing, athough, I know I am trying to keep a bit of emphasis on more regional BMR studies. But duplication of effort is somewhat necessary unless we have extremely good communications in terms of say computing networks and other data online facilities. Everyone has to use their databases in house, and until we have some other co-ordination, which takes a lot of funding, I think duplication has to be to some degree accepted.

MR PASSLOW: Wayne Passlow from Geovision. I would like to give the commercial response to this lack of standardisation. I think it is a very, very important question. I agree with some of the comments Sandy made there, in that I think standardisation in some ways may not be an acceptable path because there are many tools for many jobs and often people need to have different tools within the one organisation.

What is happening, particular in our company (and our competitors are doing the same thing, as are Oracle and competitors of Oracle) the

Discussion

private industry is supplying the investment to make these products compatible with each other. So a lot of work is being done. In our case, for example, we write translators to our competitors' products. We cannot wait for the standards groups. I am not saying they are all of the government departments - many private industry groups sit on standards committees as well. However, to get that agreement takes too long from a pragmatic point of view, and private industry is often forced, to get the business, to provide that interface and it does so commercially, and I do not see that as a problem.

The second comment I would like to make in response to Joe's comments: he started mentioning the need not only to make data sets communicate in the petroleum world, but he started to mention also the minerals world as well. As a company that makes its living out of all geographically-referenced data, be it defence, be it utilities, be it transport or mining or resources of any kind, I know that you people frequently do need data, for example map layers, relevant to other geographically-referenced data. Please keep in mind not only to link your geological data but all data that is geographically referenced, because if you do not need it now then you most certainly will in the near future.

benefits to exploration

MR SENYCIA: Payl Senycia, Mines and Energy, Darwin. I would like to change the subject a little and look at what I believe is the bottom line, and address a question to the other state representatives, particularly those who have recently developed a database, and ask them whether they believe that the development of a database for petroleum has seen an increase in exploration, and if so what particular aspects?

MR BRIDGWOOD: Is anybody game to answer?

MR AUST: Specifically on exploration, I do not think we have seen any real input there yet. One would hope that getting the data out faster, or maybe even getting it more targeted to certain markets, would help. Our database has mainly been helping us on internal work at the moment, in giving us data for other surveillance activities. In many ways we have the same needs as companies, of wanting to know production data, reference to wells, reserve data and that sort of thing, rather than being specifically exploration-orientated. Nonetheless, that is another target area that we are into and we hope to learn how to use that access to data in order to market our exploration prospects a lot better.

MR COLES: I am not in any way associated with any department, but I will speak for the Queenslanders here to answer Paul, because it may not spring to mind.

Discussion

The requirement, Paul, is for access to ground as well as access to data, and Queensland has a beautiful example. About 7 years ago Queenslanders changed their access to basic exploration data from effectively an indefinite, confidential period to a 2-year maturation to open-file status, and effectively 3 years after that happened there was a string of discoveries in the Eromanga Basin. I would suggest to you and to everyone around here, maybe some of that was fortuitous but certainly some of it was simply that more people had access to basic data and could get at the ground, and they tested new ideas and it worked.

MR KHAIAMI: Rhamat Khaiami from New South Wales Department of Mineral Resources. To partly reply to your question, I would like to say that development of databases in itself is not sufficient, but the experience in New South Wales has been that availability of data, as the other gentleman said, in conjunction with other incentives - such as availability of land and other government incentives - has helped increase the exploration activity; and the availability of data in the form of either data base or hard core products has certainly helped.

benefits to exploration

MR LAYCOCK: Just a couple of observations: one is, the exploration activity, I guess, is related to world prices, and that is really the main thing. But there are two sides of activity. One is field activity in the drilling of new wells. The other one is the office activity. We find that if one is not going the other one is. In fact, when the wells are not being drilled, companies are in our office hammering our database system. So which one are we talking about? Both are active all the time, and we find when the mineral companies put off staff they end up coming into the office and go like crazy on our database systems, using our company reports. The same is the case with the petroleum companies.

MR MEGALLA: Well, from the Victorian point of view, I believe that the end result for using a database is to help not only all exploration but to help ourselves. We have two responsibilities: first, mapping existing gas and oil fields to determine how much is left in the ground and what will be the optimum method of producing the reserves. This is a responsibility for our department, and our division is being agent to the Commonwealth. To do that you need to have a sophisticated database which has, ideally, data from all the well completion reports so you can do correlation and othr applications such as, what different reservoir are producing from different fields.

The second part is: if you get 150 or 200 wells, it is impossible just to go and to do any detailed studies by going to the compactus, getting the information, and standardising the information, changing it from feet to metres and so on . So in all honesty we are helping ourself first, and then helping the exploration community. So what I am qettinq at is that, if we are going to exchange data between departments and companies, we have to have the standardisation.

SUMMARY

MR BRIDGWOOD: Well, we have now reached, I guess, the home strait, with just the work sessions to go. Perhaps what I will do is quickly review what the aims of this 2-day workshop were and make some comment about how we are going at achieving those particular aims.

The aims were to identify the key elements and applications of petroleum databases. Well, I think we have discussed the key elements pretty well. I am not too sure whether we have really covered the applications, and I think that was probably behind one of the questions asked just prior to lunch.

Summary

We have talked about what should be in petroleum databases, or what is in petroleum bases that have been developed, but not too much about what they are actually used for or planned to be used for, so we have perhaps slipped up on the application side of things of the petroleum databases.

The second aim was to share experiences, problems and solutions in the development of petroleum data bases. I think we have achieved that reasonably well, if not during the sessions then over drinks and a meal last night. I hope we shared a few other experiences, as well.

The third was to establish procedures and communications and links for the sharing and exchange of petroleum data. I am sure we have not achieved that as yet, but hopefully in some of the topics this afternoon we will make some progress along that particular route. And to encourage the development and implementation of the necessary standards to facilitate this exchange. Again, we have spoken a lot about standards. I would hope that we can make some further progress in the remainder of this afternoon.

So that was just a quick run-down of what the aims were. Prior to going on and talking about the workshop sessions, I will just run through what I perceived to be some of the major issues that have come out of the last day and a half. I suppose some of these might reflect my own ignorance. What I might consider to be issues may not be issues to yourselves. I have just jotted down a number of things that came up during the course of the particular presentations, and I will just run through them. We will not discuss them in any detail. Hopefully, a lot of them will be further addressed in the group sessions.

I put down the role of the BMR and the states in relation to petroleum data, and not being too sure myself as where the roles of the states stop and the role of the BMR takes over. So I found that to be a little bit confusing. I am not too sure whether you share that confusion.

The actual one I raised just prior to lunch: who actually has responsibility for what standards; and I listed off a number of different groups, be they committees or associations or whatever, that have got some responsibility for standards, but it is not particularly clear to me as for which particular body has responsibility for which particular standards. So I considered that to be an issue.

Summary

The need for standard codes and abbreviations for such things as companies, stratigraphic units and ages and those sorts of things were mentioned. A number of the different databases have adopted particular standards. I am not too sure whether those standards are uniform. I would perhaps be a bit surprised if they were uniform throughout the country.

Along the same lines, standardised data definitions to be adopted across the whole of the country so that, as Sandy mentioned, we know what we mean when we talk about an appraisal well. So those sorts of things could perhaps do with some standardisation of the actual definitions of those data items.

I mentioned before the interchange of information, with particular reference to the development of systems across the country. It is important that we do make each other aware of exactly where we are at and perhaps, if we come up with things like systems plans and system definitions and the logical design of our database systems, that we actually distribute those reports around the country so that the others can share those particular experiences rather than having to wait for a conference such as this.

A particular issue, I guess reflecting my background in some previous consulting work, is the actual lack of uniformity of legislation. I have done a considerable amount of work in the corporate affairs arena, and they have similar problems to yourselves. I guess the advantage they have is that they do have uniform legislation across the country, and that is of some benefit to them. It certainly does not overcome all of their problems, and many of the problems I have heard today are very similar to the corporate affairs arena. But I suspect that if the legislation was a bit more uniform across the country, it would also be of assistance.

We have spoken a lot, too, about database systems, and I suppose that is what the session was all about. We have not spoken very much about data analysis and interpretation type systems. I actually had expected Terry Aust, when he was talking about the South Australian progress, to make mention of a particular system that is up and running here in South Australia called the ? G-pic system, which is a well log analysis system. It carries out a lot of interpretation-analysis work on geophysical down-hole logs. That system - I think it has got geophysical logs on something like 700 drill holes, occupies about 400 megabytes of disc storage, and it is used extensively by the petroleum staff at Mines and Energy here in South Australia. So there has been a lot of emphasis on the actual data basesystems; not so much on the actual analysis and interpretation of those systems.

Summary

Certainly, from this morning onwards, we have heard a fair bit about the hard copy data management issues, and we certainly cannot ignore it. I guess they are just as significant, if not more significant, than the issues related to the electronic database development work that is going on.

We have heard a lot about data integrity over the last day and a half. I guess that covers a number of separate issues. The quality of the data is one, and we have heard a lot about the validation and checking against standard codes and all of that sort of thing. Data integrity, though, also includes the quantity of the data; that if data is not entered into the databases, then obviously our database is not as complete as it could be.

The third issue related to data integrity is the timeliness of the data, so even if we have got good quality and good quantity, if it is not kept up to date then the information is of lesser use.

Another issue that came up just prior to lunch was the issue of making it known just what data is available from the states and from the BMR, and I think a bit of conversation or communication between John Laycock and Andrew Barrett indicated that Andrew certainly was not fully aware of what was available from Queensland; and I think that would be a fairly clear example of what needs to be done in making sure that the industry does know what is available from the states and from the BMR.

Hopefully, we will run through most of those issues, or address a number of them, anyway, during the sessions this afternoon, but I thought it was just worthwhile running through them very quickly.

WORKSHOP PRESENTATIONS

Workshop Presentations

Introduction

On to our group workshop sessions, then. Just to run through the process that we are going to adopt this afternoon, I will give a broad overview of each of the four or five topics - we will decide whether we have got a fifth one in a minute. I will also suggest that the groups appoint a leader and a scribe.

We will break into groups for about 1 hour from hopefully about 2.00 till 3.00, and then get back together again from 3.30 till 4.30; and in that last hour, I will get each group leader to spend around 10 to 15 minutes to give a presentation on the outcome of their particular group discussion, to give a bit of a summary of the discussion, to let us know what their recommendations are from that particular group. And they may just be identification of further work that needs to be done.

As Paul made clear to me yesterday, and as I had jotted down myself, anyway, coming up with recommendations is of little use if we do not identify who should be responsible for actually following on with those particular recommendations. So we would also want to give some indication of what the group feels - or who the group feels should be responsible for following through with the recommendations, and that may be a committee that already exists or some other suggestion that is made.

Very quickly, then, I will run through each of the five topics, just to give perhaps a little bit more information about each one.

The first one is: the facilitating of data exchange. I guess what we are mainly referring to in that is the three categories of exchange of data; that is the exchange of data or the furnishing of information from companies into the government bodies; the supply of information from government back to the industry; and then also the exchange of data between the various government authorities. I do not think we need to concern ourselves with company-to company transfer of information

So that is the facilitation of data exchange. Perhaps within it we have got a number of different issues that we have put down as suggested things that should be discussed. Perhaps another one, following on from what I just mentioned in terms of issues, is uniformity of legislation.

The second topic is: minimum requirements of an electronic petroleum database. That is pretty major challenge. Perhaps if I can just discuss again my background with corporate affairs. They have similar problems, as I have indicated, in that legislation is administered by the states, separately, and they all wandered off and were developing their own individual computer systems, using various hardware and software, I would suggest, spending heaps more money than you have been spending in development of petroleum databases. The corporate affairs arena is fairly complex arena. They were, however, all part of an overall co-operative scheme, the National Companies Securities Scheme, that most of you probably would have heard of, but there was very little actual co- operation between the states. And they saw as perhaps one approach that they could use was to start developing standard inquiry screens and reports for providing their corporate affairs information back to the back to the public. So although all their systems were different, using different hardware and software, the actual way that they were presenting information back to the public was uniform across the country. That is their aim, and that is what they are working towards at the moment and have got some way towards achieving that.

Now, perhaps we can actually start thinking of that in this particular industry as well, and start looking at perhaps making information available to the industry in a more uniform way. We do not have to in this particular session start looking at individual screens, but it will tie us back to identifying what particular major categories of data should be held within the databases. I could go on for hours on that particular topic, but if we can at least have that group start thinking about that particular issue when we start looking at identification of data that needs to be stored, we can obviously start work at a reasonably high level and talk about wells and permits and survey summaries and that sort of data and then perhaps get down to whatever level we can get to within the time that is available. But it may just be, as I said, coming up with an indication of further work that we think may need to be done.

I guess we should also consider whether all this is really worthwhile, with all of the five issues, I suppose - the five topics.

I would also think that standard codes and abbreviations should also come in within that particular topic.

The commercial and servicing aspects: I think it is fairly self-explanatory from the subtopics that are listed there. Perhaps another one that could be included is some sort of uniform fee schedule to be adopted across the country. Again, if I can refer to the corporate affairs arena, they do have uniform fees for searches. If you want to go and do a company search in Queensland and do a company search in Western Australia, you will get the same information at the same cost, whatever that might be. So some sort of uniform fee schedule for supply of information back to the industry.

Storage and retrieval of physical items: well, we have heard a fair bit about that over the last half a day, and I think the subtopics are sufficiently clear. Storage and location numbering perhaps is an additional item that could be considered under that particular topic.

The fifth topic is the geographic information systems and the land information area. I have not got any subtopics down there, but I think Wayne would have a fair idea of what he particularly wants to talk about in that particular one.

There is obviously a danger of some overlap of these topics. We cannot really avoid that in the time that is available. I just would ask the group leaders to try and stick as closely as they can to what they consider their topic should include, and not start drifting off into areas that would be covered by one of the other groups.

Within the group sessions, I think the first thing that should be done is to define the purpose of what we mean by this particular heading, and perhaps the first question asked in at least the first couple do relate to that. Why do we need to facilitate the exchange of data, or why do we need to exchange data for a start? So try to define the purpose of each topic.

As I have mentioned, we should be discussing these topics with a view to coming up with particular recommendations; and as I have also mentioned, the recommendations on their own will be of little benefit if we cannot identify who should be responsible for following through with the recommendations.

I think that is all I have got to say. Are there any questions?

MR MEGALLAA: At one stage the DITR hired a consultancy and they recommended that in future we should obtain digital data. There are a lot of free-text data in well completion reports, geology descriptions and so on. The move now is to receive this information on magnetic tapes. I wonder if it can be also included in discussion. In other words, a lot of information can be submitted to the government in the standard format on magnetic tapes, so can be loaded to databases, and that would save a lot of typing and entry into database.

MR BRIDGWOOD: Yes. I would have seen that as something that we should discuss in the first group as the lodgment of data in digital form. I have for that particular group as well - and I am not too sure how widely it was made available, but a letter did come through from Bond Petroleum mentioning the fact that they were unable to attend and wishing us all the best of luck, which was very good of them, but actually raising an issue very similar to that, and it was actually referring more to the lodgement of data on optical discs rather than magnetic tapes. So I will make that letter available to that group as well.

Workshop Presentations

THE CHAIRMAN: Well, we have got not very long left, so we are going to have the presentations by the group leaders. We are down to round about 10 minutes each so it is not very long. What I would suggest is, as the group leaders are giving their presentations, if other members of the group take exception with what is being said, then we will allow some interjections. We will start with Group 2 as Group 1 is not all here yet.

Minimum Requirements of an Electronic Petroleum Database

MS STUBBS: We were looking at, why have an electronic data base, so we thought we would start off with some of the basics, and although this first sheet tends to reiterate what most of us would know anyway, we thought in light of the fact that some people have said, "You've got to convince management of certain points," it is worth going back to basics and stating the reasons that you want to have an electronic database :

1. You can organise your information easily;

2. It is cheaper to store;

3. It takes up a smaller area physically to store;

4. You can arrange to have multiple users, also remote access for those users;

5. The speed of access tends to be increased, bearing in mind what sort of system you have got.

That is just the actual physical use of the system, but also once you have got your data in there, you can select it, manipulate it, and present it in a more effective way than another system, and preservation is something that can be considered as well; paper data or tapes could perhaps disintegrate more quickly than if you have the information in your data base.

Secondly, we looked at what the requirements would be. This was very difficult to decide and I do not think we have come up with anything conclusive, apart from saying that really there is obviously a minimum and a maximum position.

Workshop Presentations

The minimum that you would have in a database would be just very basic locations of the data which is telling you really, this exists. So if you were looking at a well, you would say, "Right, there's a well and we know that this information exists on that well." That would be a really basic position to take.

Minimum Requirements of an Electronic Petroleum Database

Coming right over to the maximum position, you would say, "Well, we want so much more than just whether something exists. We want actually the data - the factual data, as well as perhaps interpretative data - in the database, so it is there without having to go and find the location of it." We have expressed that by saying that we want the database to be able to deliver the information, as you might need to if you had to give it to one of the departments involved in administrating the Act.

We realise that that still did not give a very good maximum position because of the fact that the different state departments and the BMR have different requirements. So an area that we did not discuss, but someone would have to, would be what you already mentioned - the different legislations. So we decided that an essential minimum would be dependent on your work situation. You could not even say that the companies - private companies - will have a different essential minimum to the government bodies. A lot would depend on things like how much information you are dealing with and how many people are using it - those sorts of factor.

What actual requirements in terms of the data itself: here is probably where we should have made some really hard recommendations, but we could not. We just said that you can work it out perhaps into

1. Tenement data where, very simply, you would want the boundaries, the dates of the tenement, who is in it, and hopefully, some sort of history to backtrack through that tenement;

2. Well data, is perhaps the biggest area that has come up in the last day or two - everything really, from the very basic data, name of the well, where it is drilled, who drilled it, through to interpretative data, and the tests that were run on that well.

Workshop Presentations

3. Surveys: I feel personally that surveys perhaps were not covered as much in the last day or so as the wells were, but here we thought not just seismic or the big marine surveys and land surveys that are done, but any survey, including airborne surveys. The basic information here would just be the location and the dates of the survey, but there is room there for expansion as well.

4. Production and reserves data: that was particularly for the government departments we felt because most private companies tend to want to keep their own reserves data and work on that themselves, but it would still be a requirement if you are going to try and encompass all the petroleum information.

Minimum Requirements of an Electronic Database

I do not know if you can see the bottom one but we have got down as a fifth basic requirement

5. Something to do with reports or perhaps a bibliographic file which related back to each of these through a common link, and we did see a couple of those sorts of systems described earlier.

Then tried to look at what would be some of the ideal things we would like. We summarised it by saying we would like an output. The question we were trying to look at was what sort of an output would we like and all we could really say was we do want one. Some suggestions were made, but we couldn't really decide if this was even the sort of thing we should be looking at. Do we want standard screens? For example, should we all photocopy the screens that we are using, and pass them around to each other, and try and get one standard input and output format? Should we try and get a standard output, but then somebody piped up and said, no, they would much prefer to have the flexibility that they have got. So really we do not know if there is any ideal output that on would want from the database.

Standards are necessary and I think Group 1 have probably discussed that much more than we did. We only suggested that they should be developed by the BMR and perhaps maintained by the BMR. We wondered whether standards can be enforced, and should they perhaps be called guidelines, and again that is an enormous area.

Also the comment was made when we were talking about output and also the input to a database, that really the future is electronics, so if somebody would ideally like to see everything transmitted electronically - just wipe out the paper stages in between. Other people still feel that there is going to be some people who want to stand back from that position a little, but eventually should we look at all data being transmitted electronically?

We have not made any specific recommendations, apart from throwing the BMR in here, as to who should more specifically look at this. I suppose I would speak for all of our group if I say that perhaps this area is one which needs much more discussion, and we did not feel that we had time to do it justice, so we have just tried to pick out the basics which I feel is really just a summary of what has been said in the last day. Any questions?

MR MEGALLAA: I just wonder how the libraries get access to databases? I mean, there are a number of databases world-wide, and there must be standards among them that the libraries know about. In other words, if someone in Perth would like to access our database, is there a certain code that is uniform?

Mimimum Requirements of an Electronic Database

MS STUBBS: Yes, as far as I know. Are you saying that, of all the databases that are already in existence world-wide, is there some sort of standardisation already?

MR MEGALLAA: Well, the whole idea, by establishing databases, is to serve the express community. So there is no need for a guy to ring up from Perth to know what sort of data we have got. What he has to do - - -

MS STUBBS: Is plug into the database.

MR MEGALLAA: Plug into the database and know how to use the database, because there are standards in the database, and he knows exactly what to do, how to search the database and so on.

MS STUBBS: I would agree with you that is probably the sort of thing we should aim for.

THE CHAIRMAN: Just on that last one - on the standards in the BMR - what the group was actually discussing was the use of standard codes and abbreviations, not the general standards that I would hope that the first group would actually have discussed. So these are the use of standard codes for such things as companies and the stratigraphic units and - - -

MS STUBBS: It crossed my mind, though, that if one group is going to discuss standards, that they might as well bring it all the way down to the standards at the level of input codes as much as just standards of definitions.

THE CHAIRMAN: Are there any other questions on that one? Well, we will now Group 1.

MR CUCUZZA: Actually, surprise, surprise, Elizabeth said a lot of things that we said in our committee. I think the issues were sufficiently broad to ensure that there was going to be a degree of overlap.

Workshop Presentations

We followed, the questions as set out in this workshop topics and the first question was: why do we need to exchange data?

Well, obviously there are legislative requirements even though they are different from each state. That is one issue.

There is also cross-checking of data sets, where government-to-government exchange of data results in each checking the data set to ensure validity and integrity.

Facilitating Data Exchange

Promoting of exploration: clearly that is uppermost in exchanging of data.

Advising of relevant managers: we are here thinking in mostly in terms of government; people advising the relevant ministers. In the equivalent company situation, people need to advise their corporate managers.

Minimise duplication of effort: I guess that is pretty self-explanatory, too, because if an organisation is down the track in developing its own system and someone has already made the necessary effort of getting the data in a database, then all they have to do is to access or obtain that information and incorporate it in their own system. So that is obviously going to save them some duplication of effort.

The next issue : what data do we need to exchange? I think actually as a matter of fact these are the same five that Group 1 talked about so I am not goin to go throu them because it is pretty self- explanatory.

What is the most cost effective method?

We came to the conclusion of course that digital media, particularly for database to database transfer would be the optimum way. This includes tape, floppies, optical disc etc.

We also agreed that on-line access for interrogation and the availability of hard copy is also a good method of changing data, particularly where one does not need to have access to a large part of the database.

Ease of use - we had a little difficulty actually trying to decipher what that question really meant in relation to facilitating data exchange. But we assume that it was really part of what minimum set of standards needed to be agreed to. That would have led to the next question, so we dealt with those two together. We probably did not address all the issues but we came up with:

Standardised company report and summary in digital form. Now, we talked about this quite a lot and it was felt that because we wanted to get companies to provide the necessary information and then transfer that information in a database, which we were then going to feed back to companies, it would help a great deal if there is a standard summary form whereby people can just automatically - whether it is some scanning device or by hand - key in the basic information in to the database. The report itself could also be supplied in digital form on floppies or tape.

Consistent nomenclature. We discussed the existing standards that we would need to consider in coming up with the answers. The AAPG has suggested some sort of standard for geological exchange. I think a paper was written in Geobyte a couple of months ago, and this is something that obviously has to be considered. AGIA, company codes, Australian thesaurus, ACG standards, Australian standard country codes, map standards and so forth. So I think what we are saying here is that there are standards already available, and there is probably no reason why we cannot implement these without too much difficulty.

What security is needed? We ran out of time on this topic but the security issue is very important because companies are supplying their information to governments and governments are going to be supplying data based on that information to other companies. We did not have time to define the elements of the database that would be confidential. If we are talking about exchange of indexing data or data that points to the raw data then perhaps most of that information is not subject to confidentiality, whereas the raw data itself - the interpretation is a different issue. So I guess the simple answer is we really did not look into it in any depth.

Who to implement the standards? I the mentioned the AAPG exchange of geological data standard. Obviously there is some thought being put into this in the US and it is something that we need to consider very seriously. We decided it would be best to convene a committee represented by state governments, the BMR, APIRA, APEA, AMIRA, AMIC. Although AMIC is on the mineral side we should consider that because a lot of the standards and nomenclature and various other issues are going to be in fact relevant to the mineral industry too. The committee should provide guidelines and a budget to employ a consultant as has been proposed by the DITR. Of course we need to emphasise the recognition of existing standards, setting up new ones only where necessary.

Workshop Presentations

What we did not touch on was how data is to be transferred, in terms of something like the SEG standard developed for airborne geophysiccal tapes. However this obviously has to be addressed, perhaps at a later stage in resolving this entire issue.

I think I will conclude with that.

THE CHAIRMAN: Any questions?

Facilitating Data Exchange

MR MEGALLAA: Well, I happen to be on two committees concerned with these matters which is why I am interested. Regarding DITR, I was not aware, before this meeting, that DITR has approached your people regarding the standardisation of data or exchange data. Was that from the mineral side or petroleum or what?

MR CUCUZZA: Well, the idea came from the Survey in effect about the time that I was given the job to look after this area. I asked the question whether it was going to be a joint effort for the mineral and petroleum exploration activity. At the moment in Victoria, the thinking has been that the Geological Survey - I believe that is the right term, is it not, the Geological Survey is a department within DITR?

MR MEGALLAA: Yes, but the Geological Survey does not look at the petroleum bit at all.

MR CUCUZZA: No, that is right. It is in fact from the mineral side of things. But there is no reason to say that they cannot address both issues, because as I said before the indexing of the data in many ways is much the same. It is just a matter of perhaps determining what specific information from the petroleum and mineral industry is going to be relevant to a particular department. But when it comes down to it - it is a geographic type database. You are pointing to the information. You are pointing to the availability of reports, what was provided, what was in the reports. We are talking ahout an indexing database. We are not talking about raw data. So I think, you know, there is no reason why it cannot be addressed as both petroleum and mineral. I mean although we are talking about petroleum both the mineral and the petroleum areas would be equally benefiting from this exercise. A lot of the nomenclature problems, a lot of the standards would apply in both cases.

THE CHAIRMAN: Thanks. Group three.

MR SHELLEY: I was almost last into the room and consequently was chairman. It life, I am afraid. We had a somewhat frank and full and free discussion on commercial servicing, I think largely due to Maurie's late inclusion of uniform fees. In fact that was the last one on the list but it occupied about 55 minutes, I think, of the hour. But in the process of that we did look at the cost effectiveness aspect, storage and retrieval cost, valuated data and suchlike. We certainly did not get around to looking at ownership and very little on marketing.

Workshop Presentations

The minimum fees, I think, occupied a large part of our time because out of the eight of us, four of us were from government organisations and the idea of uniformity and suchlike tends to bring out the best and the worst in us.

Commercial Servicing

I will just touch on the general points that we looked at. We only sort of homed in, I think, a little bit towards the end and we have a recommendation that I think most people agree is bland enough to be agreed to.

It was recognised that the Petroleum Submerged Lands Act and the regulations under that act do lay down rates or fees, recommended fees, that can be applied and the actual dollar amounts are set by the regulations which are reviewed from time to time. Of course these are not uniformly applied. It is up to the relevant minister to agree to those sorts of things and we believe that it is in operation in Western Australia but certainly not elsewhere to our knowledge.

On the question of charging for services generally, there was a general rationale that data should be readily available at the lowest possible cost, the highest possible quality, that this in turn led to new ideas, which in turn led to new discoveries, which led to the flow of wealth and so on and that somewhere along the line that wealth could be tapped off to pay for the first stage. Coming up with a recommendation on that was somewhat impossible. But it was recognised, I think, that the cost had to be kept at a level which did not count against smaller companies, that it was prima facie okay for the BHPs and ESSOs and so on of this world to pay perhaps higher prices for things because of the scale of operations. But there are a lot of small operators and small explorers around that set prices for government type products at a very high level. Perhaps it would have an inhihiting effect on exploration.

At the same time I think people recognise that each government has its own rationale behind its cost recovery policy. In some cases such as BMR we are sort of told by our Department of Finance that we will have to raise X dollars of revenue. If that is not raised then we lose it from our appropriation. In other words, they will still get it off us one way or the other. On the other hand, and this information comes from a different meeting some months ago, I understand the Northern Territory have a specific policy of not charging or having very low costs for things for the simple reason that they wish to encourage development in the Territory. So you have got to look at two extremes really. While we might agree that uniform costing at a low level or realistically low level is ideal, I think we recognise the considerable difficulties by which that could be put into practice.

We focussed very much on data quality. We had well logs out on the floor and were looking at at their quality, having had pointed out to us some of the problems that exist with data that is lodged with government and the limited capacity in resources in government to do other than assure themselves that data being lodged is in accordance with the Act. Consequently we spent some considerable time looking at the matter of data quality - who should perhaps be responsihle for monitoring the quality, making corrections, tidying things up, preparing stuff for a market.

There were various schemes put up, such as, okay, you just sort of make the customer aware that there could be deficiencies in data and leave it to them to sort it out; on the other hand, perhaps something a bit more organised could be established to make someone responsible - some organisation responsible - for doing this. So I guess that within the general framework of saying that we all agree the data should be made widely available at low cost and at a high quality, and that it should be released on a systematic basis by the relevant government organisations, and its availability widely publicised, a recommendation reads like this: the group recommends that more effort be made to ensure the highest possible quality of data and suggests that one mechanism by which this could be achieved is through co-operative arrangements between government agencies and other information disseminators.

As someone said to me, "What does that mean?" I just wrote it, but they all looked at it and said, "Well, yes," . Is there any marked disagreement from my group? That is all, Mr Chairman.

THE CHAIRMAN: Any questions?

MR PASSLOW: Did your group address the question, Paul, of leaving the marketing of that data completely in private hands?

MR SHELLEY: We did not really discuss marketing in its broadest sense. I think we recognise that governments themselves have a responsibility to publicise the availability of their own data and that that should be perhaps as widely disseminated as possible. But in terms of marketing campaigns and that sort of promotion, we just - at about 3.05 or 3.10 we decided to give it away.

MR PASSLOW: But surely private industry could be more involved than really just marketing plans. Surely there is a possibility of them being involved in the dissemination of that data?

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MR SHELLEY: Well, we recognised that in the recommendation - certainly with the quality side of things.

MR PASSLOW: Recognition or was it ___

MR SHELLEY: The data comes from government. I can only speak from my personal experience in BMR; that we have people that approach us from time to time wishing to obtain, purchase - whatever - our data; do things with it which enhance its value, and then sell those as their own products. Now, we have had problems with those sorts of questions in the past and we have thrown them to our Attorney-Generals Department and other groups to get some clarification on data ownership and ultimate responsibility for the data and its use and so on, and I think only now we are starting to come up with a few answers and a few policies in- house as to what the line might be that we would adopt, and each of our states is a sovereign entity, and unfortunately, while we might all agree that things should be uniform - I mean, I agree with you in - - -

Commercial Servicing

MR PASSLOW: Well, I am not talking specifically about BMR; I am talking states and BMR.

MR SHELLEY: Yes. Well, I think each state has their own attitude towards this. Some of them like to hang on to the whole thing themselves and make their money from it. Others are only too happy to co-operate with third-party vendors. I think that we would all recognise that such co-operation would need to be of a non-exclusive basis, too; that you let one person in, you let anybody in to do it; that you do not sort of tie it up to one particular vendor or data processor.

I do not know whether that answers your question but - I think government more and more will be trying to work with industry in providing the service. The simple reason is we are all losing staff and resources at a high rate, and in order to make things happen we need to work with groups that can see a dollar in it for themselves and work closely with them in ensuring that industry get the best service they can. That is a personal view, but I think it is shared by my organisation.

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MR COLES: I would like to make a comment because I was in this group. But I would like to quote an example that does not involve Australia and there are no representatives here, and it is the Papua New Guinea government. My organisation is working up a comprehensive data set for PNG, and I would point out that the data does not originate from the government; it originates from companies and it is lodged with government, and hopefully can come hack to the companies. In PNG there are tremendous deficiencies in the data that now resides in the geological survey, simply because sticky-fingered people have walked out of the department with the interesting pieces of well logs and so on, and we are actually now at a point where we are acquiring print data - original print data - from BP London. BP Melbourne is facilitating that, sending it to us; we are processing the data, sending originals back to BP, digital copies back to BP; providing copies of the digital data to the PNG government and plotted data to any customers of the PNG government.

Commercial Servicing

So it is a round-robin affair, and that is extreme, but it is an example of collaboration between industry and government, and it is a typical example of what is required to ensure the preservation of the data in the best form. We cannot just accept what is in the archives now and say that is where we will stop because there is big holes in it, and we - all of us; it is encumhent on all of us in the industry to do our best to ensure that 20 years from now the data that has been generated in the past and will be generated in the ensuing 20 years, is accessible to the next generation of explorationists.

MR SHELLEY: If I just might clarify something I said earlier about the ownership problems as far as BMR is concerned. I was talking ahout BMR's own data, not company data.

THE CHAIRMAN: Thanks. Right, fourth group.

Storage and Retrieval of Physical Items

MR PILKINGTON: Okay. Briefly, just to run through who was in our group, there were two from Kestrel, Mike and Andy- and David Kemp from Petroconsultants, and then two from the Department of Mines here in South Australia which probably is not all that broad a group so in light of that, I think we recommended a number of things that the BMR should look after. It might have been beneficial if we did have a bit more of a broader group, and I just wanted to raise that up front.

We discussed in general the Australian Archives and its relationship to the states with regards petroleum data, and how well they are doing it. We also discussed the AMIC report on data storage that Maher had a hand in and it was unfortunate perhaps he was not there, and we subsequently toned down some of our comments. We went through our questions in some form of detail initially and we cleared them up pretty quickly, and then sort of waffled for a long time, and then came up with some recommendations ahout 3.15. One initial item that was raised was just how important is the physical data to the states and the BMR, and that would be a question I would like to have of put to everybody here.

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We responded - or the people within the DME responded - quite strongly that it was, but we,the only two representatives there, are from the geophysics section. I think the majority of people within the Department feel it is important that we should be looking after it, but the way we do look after it is quite deplorable in most instances. In some ways it is improving, and I think that is a general comment about all physical hard-copy data - all physical data, that is - which includes mag tapes.

Storage and Retrieval of Physical Items

Just to quickly run through the questions: why store physical items. I was looking at the reasoning behind this data exchange side of things, and it was pointed out that really we are storing physical items for review and also to be able to have the capability of generating data into format for exchange. So necessarily the need to actually store data in your exchange format is not necessary. That was one item.

The long-term storage of data: we actually solved a number of these questions quite simply. We felt that the optical solution was the way to go, and long-term storage of data was solved that way; the integrity of stored data was solved that way; speed of retrieval would be, too; the storage environment, quite small; the storage media - well, that was the optical; the indexing of storage would be quite simple, and that solved all the questions that were asked.

Okay. So we ran down and came up with the recommendations: Firstly, more often than not we can meet - well, we meet people's requests by telling them that either we do not have it or we have got it, so the output is generally pretty clean - if we have got the stuff there we can give it to them; if we do not have it, they are told that we do not, and there is no real problems at this time. The real problem arises if we do not get it in in the format that we want it, or we cannot access it fully. Then you have got a huge problem getting it into the system, indexing it. So we were looking at - perhaps first cab off the rank was actually getting a data transmittal form standard set up and we did mention the archive standard that has been doing the trip around the system. It has only just been released, I believe, Maher.

MR MEGALLA: Yes ....

MR PILINGTON: We just got a copy. That really as been established to help Archives do their job, and their job does not really manage data storage at all. They have got - I do not know how many people here know about it, but it is not all that flash. Effectively, it is unacceptable, I think, and what we feel should happen is that there should be a national transmittal form that virtually any department could send in and it would really aid indexing and storing that physical item.

The responsibility: well, it was recommended the BMR, but I think perhaps really it should he a review committee; whether it is quite as extensive as Joe's I query; it could quite simply be made up of relevant people from each state department, the BMR, and perhaps Archives. I think they are missing here. They should be here, although I think also it is a reflection of what their capabilities are that they, one, do not have any people to send here and, two, perhaps do not have the interest.

Data verification by appropriately qualified people: that was raised earlier on; I do not really think we need to go into that in any more detail. The responsibility would be within each department and in fact each department does recognise there is a real need for that person to be qualified.

We jumped on to four - the use of alternative media - and that was where we mentioned optical. I think our group in general would disagree with the fact that magnetic media would solve, or be the most cost-efficient way of handling data. Right now perhaps it is, but looking towards the future whether it is optical tape or optical disc or whatever it might be, it needs to be looked at, and we have recommended the use of alternative media data be looked at and reviewed.

MR COCUZZA: We alluded to that.

MR PILKINGTON: Right, okay. Well, we are in agreement then. The other critical item that was ___

MR GABB: Can I add one further thing? To put a bit more of an international perspective on it, I think without exception in all the countries where we have been involved in establishing a national data storage facility, one of the reasons that it had not happened before it did happen was the fact that data management as a discipline had not been recognised, and nobody had actually said, "We need to combine all these things together to the databasing aspect, the storage aspect, the servicing of it, the preservation of it, the security," and so on - put them all in to one head and recognise that somebody needs to he responsible for looking at that subject, and perhaps hesitantly I would suggest - you might like to add a recommendation whereby at a fairly senior level there needs to be a recognition that data management is a concept which needs to be addressed, because all of these are aspects of data management, and perhaps the reason that they have not been looked at is because they would normally be handed out to individual people, locations, departments, whatever, rather than be put under one head and therefore give the thing some focus, and I think that would perhaps be a good kicking-off point to address the situation, either on a state basis or a national basis.

MR MEGALLAA: I will just make some comments, actually being involved in this storage data. First of all, the magnetic tapes are stored with the Australian Archives on behalf of BMR. Now, the Australian Archives said, "Well, listen, we're not receiving any money from BMR." They need to have a service. In other words, the exploration community has to pay for the storage, and that is why the Australian Archives are not hiring enough staff to handle the data.

There is no geophysicist whatsoever to look after the material. In fact they do not know what is going on with all the hard copies they receive. It has been used as a dumping station. A lot of seismic sections - just name it, you know. Boxes and boxes of data which has nothing to do with the storage of magnetic data. That is number 1.

Number 2 is, we looked at the - using the optical discs for the storage of media. Talking to the seismic contractors and other people in the industry, they believe it has not reached the standard - efficient standard.

My understanding of the manufacture of seismic hardwares is they are not using optical discs because of problems of deterioration. The actual surface has not been properly tested and they do not know what is the duration for storing the seismic traces on optical discs. Is it 2 years or 5 years? There is some problems there.

Another area we looked at is using the bar coding. Oil industry would be happy to have a standardisation of bar coding. In other words, we have to come with a certain format. All the seismic manufacture in Australia can use it, whether it is GSI or Digicon or whatever. That is what I want to say, thanks.

MR LAYCOCK: I would like to just put perhaps a parochial view. I think that one thing that has to be borne in mind is the practicality of this hard copy storage. I see that it is necessary to go and have the hard material, whether it is core cuttings or whatever it might happen to be, fairly close to where the other databases happen to be. Now, I do not know where the state archives is but I do not think it very practical for somebody to come to Brisbane, look at our company report system, and then want to extract core and go down to Canberra to pick it up for example.

Now, I do not know if there is any alternative, but it would seem to me that, because of the size of the Australia, that we are probably better off having it distributed in this manner the way it is at the moment. Our core library at Zillmere near Brisbane is fairly close to where our ordinary database access happens to be.

Storage and Retrieval of Physical Items

MR CUCUZZA: There is no reason probably why you cannot store that hard copy material at each state location and still have it accessible in any place in Australia. If you are going to do some exploration in South Australia, you can do the interrogation in WA, but you can pick up the hard copy, core, whatever, in South Australia. You also probably are minimising the enormous space required in getting all the Australia-wide information in one spot.

MR SHELLEY: I think it definitely needs further discussion, but moving core libraries I guess is a problem, but beyond that I do not see that there are heavy constraints on the electronic media being stored elsewhere. The sepia sections are a problem, but if you have all that data electronically and you can regenerate that section, then that is the solution, and Liz, I think, mentioned the longer term aim is to transmit everything electronically. Well, that is the aim, but whether that will he the case in 20 years, and, you are right, core will not be.

MR COLES: I would simply like to endorse what Maher said ahout the stability of optical disc storage. I think it is way too early to presume that disc storage is going to be safe for anything more than ahout 5 years. There have heen a numher of reports very recently about particular aluminium coatings corroding and ink dispersing from pretty pictures printed on tops of discs and I really think that we ought to stay with magnetic media for some time until we can be assured of the security of optical media. The other comment I would like to make is to suggest to Andy Gabb that he ought to go and talk to Australian Archives at Villawood because they have a problem.

THE CHAIRMAN: Okay. Have we got anything to say, Wayne, on Group 5?

MR PASSLOW: Well, there were a lot of recommendations made, I guess, Maurie, but they were basically based on the experiences we have had on doing systems in the past, so it would be wrong to class them as recommendations from the group back to this meeting. So unless you would like to have them, I think it is - it was more an information passing session than a workshop group, if you like.

Concluding Remarks

THE CHAIRMAN: Okay. Well, that just about winds things up. Paul, just in relation to these recommendations, if we can call them that, out of this last hour or so, can you make any comment about what might happen to them in the future?

MR SHELLEY: A good question. You mean as a consequence of who might have carriage of making something happen or - -

THE CHAIRMAN: Yes.

MR SHELLEY: I guess in many respects it is a question for BMR, given that we were suggested as a possible group to do certain things, but also I think the issues that have been raised should be summarised and conveyed to the Government Geologists and Data Base Policy Advisory Committee. I think it may be also appropriate for someone - probably either BMR or GGDPAC - to also convey those further up the line to whatever AMIC standing committees are appropriate. I am aware of the fact that the Standing Committee on Onshore Petroleum Legislation supported this seminar and as they are aware that it was going on, I think it is useful to build as many bridges as we can with other groups, particularly those that might have perhaps some form of power or money control; for instance, I think it would be appropriate for us to let NERDCC know as as well of some of the broader issues that have come out of this meeting - just to put them in the picture. They are within our own department - or the secretariats anyway. So where we go to from there, I am just not sure. We did not really address what might come out of this meeting in terms of ongoing activity, but I think that as a first pass, is fairly important.

MR TELLIS: A short PR report in APEA newsletter or something like that will not go astray, I think.

THE CHAIRMAN: Thanks. If I made an attempt to thank everybody who was involved in putting this thing together, I am sure I would forget people, so I think, though, there is a couple of key people that should be thanked and Lorraine in particular; organising this activity was more or less forced upon her. I am sure if she had the chance to say yes or no, she would have said no, but she did take on the responsibility and I think she did an exceptionally good job in getting this all organised, so I think we all should be thankful to Lorraine for that, and in anticipation of the proceedings that will be generated from this exercise, we should also thank Paul.

MS GERDES: Maurie, can I just say that the reason I was asked to do it was because of being a member of the GGDPAC Committee, and the reason that Paul has been given the job of doing publishing is because he is the secretary of GGDPAC. So GGDPAC is doing something

Appendix A

FINAL PROGRAM

AND

LIST OF DELEGATES

GOVERNMENT PETROLEUM DATABASES WORKSHOP - PROGRAMME

Seminar II Room, Australian Mineral Foundation,
63 Conyngham Street, Glenside, South Australia

DAY 1 - Tuesday, 11 October 1988 - GOVERNMENT PRESENTATIONS

Chairman: Maurie Bridgwood (Bridgwood Consulting Pty Ltd)

9.30-10.00	Morning tea
10.00-10.10	Opening, introduction and objectives of the workshop. - Bob Laws, (Director, Oil Gas & Coal Div, SADME)
10.10-10.20	Role of GGDPAC. - Paul Shelley (Secretary, GGDPAC)
10.20-11.15	PEDIN and related BMR petroleum databases. - Sandy Radke, (PEDIN Database Co-ordinator, BMR) Denis Wright (Petroleum Reservoir Engineer, BMR)
11.15-11.25	10 minute break
11.25-12.10	PEPS Petroleum Exploration Production System and online demonstration. - Terry Aust (Senior Petroleum Engineer) and Bob Frost (Project Manager, SADME) Petroleum reports in SAMREF database. - Lorraine Gerdes (Senior Geologist, SADME)
12.10-12.20	Present developments in setting up a petroleum database for the Northern Territory. - Paul Senycia (Senior Petroleum Geologist, NTDME)
12.20-12.30	Current status of the future options of the Tasmanian petroleum database. - Peter Baillie (Petroleum Geologist, TDM)
12.30-1.30	Lunch at AMF
1.30-2.30	Petroleum-related databases of the Queensland Department of Mines and online demonstration. - John Laycock (Principal Geologist) and Brad John (Senior Geologist), QDM
2.30-3.00	Existing systems and future directions for petroleum data. - John Walsh (Acting Senior Geologist, NSWDMR) Petroleum information in Minfinder. - Rhamat Khaiami (Senior Geologist, NSWDMR)
3.00-3.30	Afternoon tea
3.30-3.45	DITR petroleum indexing system. - Maher Megallaa (Chief Petroleum Geophysicist, DITR)
3.45-4.05	West Australian Petroleum Exploration Data Base (WAPEX). A library indexing system. - Robert Iasky (Geophysicist, WAGS)
4.05-4.20	ASEG general data format for data exchange. - Graham Pilkington (ASEG)
4.20-4.30	AGIA guidelines for bibliographic geoscience databases - a brief outline. - Paul Shelley (Chairman, AGIA Standards Subcommittee)
4.30-4.50	AESIS demonstration. - Des Tellis (Information Services Manager, AMF)
	10 minute break
5.00-6.00	Vendor software demonstrations (in AMF Annex lounge): . SAS Software Pty Ltd - Kathy Fry . Geological Modelling Systems - David Gasmier
7.30	Dinner

DAY 2 - Wednesday, 12 October 1988 - INDUSTRY INPUT, OVERVIEW AND WORKSHOP

Chairman: Des Tellis, Information Services Manager, (Australian Mineral Foundation)

9.00-9.30	BHP Petroleum Oracle exploration database. - Gary Coles (BHP Petroleum Pty Ltd)
9.30-10.00	International experiences and pitfalls in implementing data management software. - Andy Gabb (Deputy General Manager, Kestrel Overseas)
10.00-10.30	Morning tea
10.30-12.00	Comment by industry on information needs:
10.30-10.50	- Ron Richmond (Assistant Director/Information Services, APEA)
10.50-11.10	- Andrew Barrett (Senior Petroleum Geophysicist, Esso Australia Ltd)
11.10-12.00	- Open forum discussion - M. Bridgwood (leader)
12.00-12.30	Vendor software demonstration (in AMF Annex lounge) . Insight software system of Kestrel Management (Australia) Pty Ltd - Andy Gabb
12.30-1.30	Lunch at AMF
1.30-2.00	Summary highlighting issues. Aims of each workshop. - Maurie Bridgwood
2.00-3.00	Workshop - identification of problems and suggestions for solutions for each group on: Facilitating data exchange Minimum requirements of an electronic petroleum database Commercial/servicing Storage and retrieval of physical items
3.00-3.30	Afternoon tea
3.30-4.30	Summary of workshop discussions and recommendations by workshop leaders - chairman: Maurie Bridgwood

VENDOR DISPLAYS AND DEMONSTRATIONS

The following vendor displays will be open for viewing by the local petroleum industry in the AMF Annex Lounge on both days:

Petroconsultants Digimap (Geodata Services) Pty Ltd
Geological Modelling Systems.

Vendor presentations from 5-6 pm, 11 October, and 12-12.30 pm, 12 October are in the AMF Annex lounge. They are open to visitors with an interest in petroleum data.

GOVERNMENT PETROLEUM DATABASES WORKSHOP

		TITLE	ORGANISATION	TELEPHONE
AUST	TERRY	Sen.Petroleum Engineer Oil & Gas	SA Dept Mines & Energy PO Box 151 EASTWOOD 5063	Org : (08) 274 7500 Individual : (08) 274 7686 FAX : (08) 272 7597
BAILLIE	PETER	Petroleum Geologist	Tas. Dept. Mines PO Box 56 ROSNY PARK 7018	Org : (002) 30 8011 Individual : FAX : (002) 44 2117
BARRETT	ANDREW	Senior Petrol. Geophys Exploration	ESSO Australia Ltd GPO Box 4047 SYDNEY NSW 2001	Org : (02) 236 2911 Individual : FAX : (02) 236 5085
BONADIO	MICHAEL	LIBRARIAN (AGIA Representative)	Aust. Petroleum Managmnt PO Box 909 CROWS NEST NSW 2065	Org : (02) 430 1600 Individual : FAX : (02) 437 5075
BRIDGWOOD	MAURIE	Consultant	Bridgwood Consulting c/- Mines & Energy PO Box 151 EASTWOOD 5063	Org : (08) 274 7500 Individual : (08) 274 7637 FAX : (08) 272 7597
COLES	GARY	Coordinator Exploration Services	BHP Petroleum GPO Box 1911R MELBOURNE 3001	Org : (03) 652 7222 Individual : (03) 652 7325 FAX : (03) 652 7744
CRABB	TERRY	Computer Controller Oil & Gas	SA Dept Mines & Energy PO Box 151 EASTWOOD 5063	Org : (08) 274 7500 Individual : (08) 274 7619 FAX : (08) 272 7597
CUCUZZA	JOE	Research Coordinator Exploration	APIRA 9th Floor 128 Exhibition St MELBOURNE Vic 3000	Org : (03) 654 8844 Individual : FAX : (03) 654 8661
EDWARDS	IAN	Sen.Syst.Geoscientist	Western Mining Corp. 168 Greenhill Rd PARKSIDE 5063	Org : (08) 274 8200 Individual : FAX : (08) 271 7137
EVETT	MIKE	Managing Director	Kestrel Management 5B/170 Forster Rd MT WAVERLEY VIC 3149	Org : (03) 544 3399 Individual : FAX : (03) 544 0475

GOVERNMENT PETROLEUM DATABASES WORKSHOP

		TITLE	ORGANISATION	TELEPHONE
FROST	BOB	Project Manager Oil & Gas	SA Dept Mines & Energy PO Box 151 EASTWOOD 5063	Org : (08) 274 7500 Individual : (08) 274 7525 FAX : (08) 272 7597
FRY	KATHY	Product Manager	SAS Software 3rd Floor 55 Grosvenor St NEUTRAL BAY NSW 2089	Org : (02) 908 2244 Individual : FAX : (02) 909 3509
GABB	ANDY	Deputy General Manager	Kestrel Overseas Nicosia CYPRUS	Org : Individual : FAX :
GASNIER	DAVID		Geological Modelling Sys 96 Parry St EAST PERTH 6000	Org : (09) 328 9588 Individual : FAX : (09) 227 8178
GERDES	LORRAINE	GGDPAC member	SA Dept Mines & Energy PO Box 151 EASTWOOD 5063	Org : (08) 274 7500 Individual : (08) 2747531 FAX : (08) 272 7597
HUDSON	Dr GEOFF	Operations Manager Information Services	Aust. Mineral Foundation 63 Conyngham St GLENSIDE 5065	Org : (08) 379 0444 Individual : FAX : (08) 79 4634
IASKY	ROBERT	Geophysicist	Geol.Survey W. Aust. 100 Plain St PERTH WA 6000	Org : (09) 222 3326 Individual : (09) 222 3326 FAX : (09) 222 3633
JOHN	BRAD	Senior Geologist	Qld Dept of Mines PO Box 194 BRISBANE Qld 4001	Org : (07) 224 2111 Individual : (07) 224 7438 FAX : (07) 229 7770
KEMP	DAVID	Database Coordinator	Petroconsultants Digimap Level 4 186 Blues Point Rd NORTH SYDNEY 2060	Org : (02) 923 1112 Individual : FAX : (02) 929 0260
LAWS	BOB	Director Oil,Gas&Coal	SA Dept Mines & Energy PO Box 151 EASTWOOD 5063	Org : (08) 274 7500 Individual : (08) 274 7612 FAX : (08) 272 7597

GOVERNMENT PETROLEUM DATABASES WORKSHOP

		TITLE	ORGANISATION		TELEPHONE
LAYCOCK	JOHN	Principal Geologist	Qld Dept of Mines PO Box 194 BRISBANE Qld 4001	Org : Individual : FAX :	(07) 224 2111 (07) 224 7089 (07) 221 9517
LONERGAN	TOM	Geologist	Santos Ltd 39 Grenfell St ADELAIDE 5000	Org : Individual : FAX :	(08) 224 7304 (08) 223 7962
MEGALLAA	MAHER	Chief Pet.Geophysicist Petroleum Division	Vic Dept Ind,Tech & Res 151 Flinders St MELBOURNE Vic 3000	Org : Individual : FAX :	(03) 412 8000 (03) 412 8041 (03) 650 9525
PILKINGTON	GRAHAM	Math. Geophysicist (ASEG Representative)	SA Dept Mines & Energy PO Box 151 EASTWOOD 5063	Org : Individual : FAX :	(08) 274 7620 (08) 274 7620 (08) 272 7597
RADKE	SANDY	PEDIN Database Coord	Bureau Mineral Resources GPO Box 378 CANBERRA ACT 2601	Org : Individual : FAX :	(062) 49 9111 (062) 49 9512 (062) 48 8178
RICHMOND	RON	Asst. Director Information Services	APEA GPO Box 3974 SYDNEY NSW 2001	Org : Individual : FAX :	(02) 27 9651 (02) 27 9651 (02) 27 2826
SCIOBIORSKI	JOE	Geologist	Western Mining Corp. 168 Greenhill Rd PARKSIDE 5063	Org : Individual : FAX :	(08) 274 8200 (08) 271 7137
SENYCIA	PAUL	Sen.Petrolm.Geologist	NT Dept. Mines & Energy GPO Box 2901 DARWIN NT	Org : Individual : FAX :	(089) 89 5511 (089) 89 5342 (089) 81 4806
SHELLEY	PAUL	A/g Asst Director Geoscience Computing	Bureau Mineral Resources GPO Box 378 CANBERRA ACT 2601	Org : Individual : FAX :	(062) 49 9111 (062) 49 9398 (062) 48 8178
SUTTILL	RICHARD	Senior Geologist	SAGASCO Resources GPO Box 2576 ADELAIDE 5001	Org : Individual : FAX :	(08) 223 4711 (08) 223 1851

GOVERNMENT PETROLEUM DATABASES WORKSHOP

		TITLE	ORGANISATION	TELEPHONE
TELLIS	DES	Manager Information Services	Aust. Mineral Foundation 63 Conyngham St GLENSIDE 5065	Org : (08) 379 0444 Individual : FAX : (08) 79 4634
WILLOCKS	ALAN	Geologist Basin Studies	Dept Industry,Tech & Res PO Box 173 EAST MELBOURNE 3002	Org : (03) 665 0580 Individual : FAX : (03) 663 6325
WILSON	MARK	Team Leader Information Services	Shell Company of Aust. GPO Box 872K MELBOURNE 3001	Org : (03) 609 5182 Individual : FAX : (03) 609 1865
WILTSHIRE	MICHAEL	Manager	Wiltshire Geol. Services c/- AMF 63 Conyngham St GLENSIDE 5065	Org : (08) 79 3246 Individual : (08) 79 3246 FAX : (08) 79 4634
WRIGHT	DENIS	Princ.Resvoir.Engineer	Bureau Mineral Resources GPO Box 378 CANBERRA ACT 2601	Org : (062) 49 9111 Individual : (062) 49 9619 FAX : (062) 48 8178

RECORDS PRINTED = 35

Appendix B

WORKSHOP QUESTIONNAIRES

GOVERNMENT PETROLEUM DATABASES
WORKSHOP QUESTIONAIRE

DEPARTMENT : Bureau of Mineral Resources

DIVISION : Resource Assessment Division

BRANCH : Petroleum Branch

ADDRESS : G.P.O. Box 378 Canberra, A.C.T. 2601

TELEPHONE : (062) 49 9111 FAX : (062) 48 8178

CONTACT NAME :

Sandy Radke PEDIN Database Coordinator (062) 49 9512

HARDWARE : mainframe: DG MV/20000 PC: Compaq Portable III

CPU	:	: Intel 80286
MEMORY	: 32 Mbytes	: 2.688 Mbytes
ON_LINE STORAGE	: 7 Gbytes	: 40 Mbytes
TAPE DRIVES	: 3 (1600/6250 BPI)	: -
TERMINALS	:150	: -
WORKSTATIONS	:150	: -

SOFTWARE :

OPERATING SYSTEM	: AOS/VS, UNIX	: MSDOS 3.31
LANGUAGES	: FORTRAN, Pascal, C	: -
DBMS	: Oracle V5	: Oracle V5.1A
OTHERS	: SAS, 2020, NAG, CEO GKS	: -

PETROLEUM DATABASES : PEDIN, AUSRES, RESERVES, EOR

SYSTEM DESCRIPTION: see attachments

PETROLEUM DATABASES cont : PEDIN

STAGE OF DEVELOPMENT :

Operative : On-line access available to BMR users; open file data available on request.

1988 drilling and seismic data up-to-date. Basic data available for all wells/surveys in Australia.

Retrospective entry of additional data (tests,stratigraphy,BMR holes, seismic etc) ongoing.

STANDARDS USED :

Software validation imposed for many fields to control vocabulary. Some "standard" lists were derived from selecting the most commonly used, correct entry in the database and standardizing all other entries to that form. Where available BMR, AAPG/APEA conventions are used. Validation imposed for :

UNIQUE WELL/SURVEY NUMBER
OPERATOR
CONTRACTOR
STATE
1:250 000 MAP SHEET
WELL TYPE/CLASSIFICATION/STATUS
RIG MAKE
OFFSHORE RIG TYPE
OFFSHORE RIG NAME
HC SHOW
BASIN
GEOLOGIC AGE
STRATIGRAPHIC UNIT

DATA VOLUMES :

	ON-SHORE :	OFF-SHORE :
TOTAL SURVEYS:	2095	888
SEISMIC :	933	667
WELLS :	4031	880
EXPLORATION :	1783	477
STRATIGRAPHIC:	591*	29
DEVELOPMENT :	750	303
APPRAISAL :	181	34
UNDECIDED ** :	457	22
UNKNOWN :	269	15

* BMR Strat hole entry in progress

** Undecided well type but pre-drill classification may be EXT, SPT or DPT. Retrospective data checking is clarifying the data.

DATA MARKETING POLICY :

It is intended to market PEDIN in early 1989 with options to purchase subsets or the entire the database (open file data) as an ASCII file, an export of Oracle tables or hardcopy printout. Digital data will be updated and costed on an annual basis. The database may also be produced as a BMR publication with the database on microfiche. Details of marketing and costing policy are currently under consideration.

It is hoped that data will also be available in DBASE II and Lotus 123 format with the release/acquisition of these add on features to PC Oracle.

PROBLEMS EXPERIENCED/ENVISAGED :

Although the database is currently operative, retrospective data entry and checking is a continuing process. Meaningful assessment of the quality of the data will have to be undertaken at the time of release to the public and a manageable system for handling and pricing updates to the database will have to be developed for previous purchasers' of the data.

It will be important to establish and maintain standards once the database is marketed for the product to be as consistent as possible.

In general, maintaining standards, data consistency and data quality requires constant control, particularly as different people contribute to the database. Good documentation, training and continuity in database management are essential but often suffer from lack of resources and management support.

PETROLEUM DATABASE(S) cont: EOR

STAGE OF DEVELOPMENT:

Public loaded data in single table (using ORACLE data loader) from edited CEO file. Most oil fields included. Further refinement of data progressing. Access restricted to single BMR user.

STANDARDS USED:

None. Data as received. Standards to be developed.

DATA VOLUMES:

ON-SHORE : Number

Fields/Accumulation: 112

OFF-SHORE

Fields/Accumulation: 54

DATA MARKETING POLICY:

None. Confidential data.

PROBLEMS EXPERIENCED/ENVISAGED:

ORACLE data loader difficult to use with CEO files due to CEO delimiters.

COMMENTS:

Currently being used for NERDDC EOR study.

Where possible, attach sheets with more detailed information - eg. database screen dumps.

PETROLEUM DATABASE(S) cont: RESERVES

STAGE OF DEVELOPMENT:

Operative. Access restricted to authorised BMR users. Currently reserves up to date as at end 1987. Features being upgraded for easier use (particularly output to 20/20).

STANDARDS USED:

Field names consistent with company and state reporting, and used for PEDIN well-to-field correspondence. No validation as yet.

DATA VOLUMES:

ON-SHORE	:	Number	
Fields/Accumulation	:	287	
Commercial	:	174	
Non-Commercial	:	128	
Other	:	19	See Note
OFF-SHORE			
Fields/Accumulation	:	91	
Commercial	:	21	
Non-Commercial	:	65	
Other	:	5	See Note

Note: Some accumulations have commercial and non-commercial areas.

DATA MARKETING POLICY:

Internal use only. Basin summaries issued free to interested parties on six-monthly basis.

PROBLEMS EXPERIENCED/ENVISAGED:

ORACLE data loading-severe problems! Adequate balance between standardisation with PEDIN data, useful query format and ease of production of hardcopy reports.

COMMENTS:

Where possible, attach sheets with more detailed information - eg. database screen dumps.

GOVERNMENT PETROLEUM DATABASE WORKSHOP QUESTIONNAIRE

DEPARTMENT	:	S.A. MINES AND ENERGY
DIVISION	:	OIL, GAS AND COAL
BRANCH	:	PETROLEUM
ADDRESS	:	191 GREENHILL RD., PARKSIDE
TELEPHONE	:	274 7500 FAX : 272 7597

CONTACT NAME :	TITLE:	TELEPHONE:
1. TERRY AUST	ENGINEER	274 7686
2. BOB FROST	COMPUTER SYSTEMS OFFICER	274 7525
3.		
4.		

ORGANISATIONAL STRUCTURE:

Please attach organisational structure with staff allocated.

HARDWARE:

CPU	:	DATA GENERAL MV 20000
MEMORY	:	8 MB
ON-LINE STORAGE	:	4 @ 592 MB, 1 @ 192 MB (removable)
TAPE DRIVE(S)	:	2
TERMINALS	:	35
WORK STATIONS	:	25

SOFTWARE:

OPERATING SYSTEM	:	AOS/VS
LANGUAGES	:	F77, C
DBMS	:	
OTHERS	:	SAS, MINEX, GPICK

PETROLEUM DATABASE(S):

SYSTEM DESCRIPTION:

PETROLEUM EXPLORATION AND PRODUCTION SYSTEM (PEPS) USING SAS FOR DATA STORAGE AND ANALYSIS

PETROLEUM DATABASE(S) cont:

STAGE OF DEVELOPMENT:

STANDARDS USED:

DATA VOLUMES:

ON-SHORE : Number: Kilometres/metres :Storage Type (number)

SEISMIC :

WELLS : FULL DETAILS OF PETROLEUM AND DEEP STRATIGRAPHIC WELLS DRILLED IN SA. SINCE 1899

EXPLORATION:

PRODUCTION: FULL PRODUCTION DETAILS ON ALL WELLS IN SOUTH AUSTRALIA

OFF-SHORE

SEISMIC :

WELLS : SEE ABOVE

EXPLORATION:

PRODUCTION:

DATA MARKETING POLICY:

WELLS ON OPEN FILE ARE AVAILABLE

PROBLEMS EXPERIENCED/ENVISAGED:

COMMENTS:

Where possible, attach sheets with more detailed information - eg. database screen dumps.

GOVERNMENT PETROLEUM DATABASE
WORKSHOP QUESTIONNAIRE

DEPARTMENT : S.A. MINES AND ENERGY

DIVISION : OIL, GAS AND COAL

BRANCH : GEOPHYSICS

ADDRESS : 191 GREENHILL RD., PARKSIDE

TELEPHONE : 274 7500 **FAX** : 272 7597

CONTACT NAME :	TITLE:	TELEPHONE:
1. DRAGAN IVIC	GEOPHYSICIST	274 7665
2.		
3.		
4.		

ORGANISATIONAL STRUCTURE:

Please attach organisational structure with staff allocated.

HARDWARE:

CPU	:	DATA GENERAL MV 20000
MEMORY	:	8 MB
ON-LINE STORAGE	:	4 @ 592 MB, 1 @ 192 MB (removable)
TAPE DRIVE(S)	:	2
TERMINALS	:	
WORK STATIONS	:	APC IV PERSONAL COMPUTER

SOFTWARE:

OPERATING SYSTEM	:	AOS/VS
LANGUAGES	:	F77,
DBMS	:	NIL ON PC: TEO/3D ON MV 20,000
OTHERS	:	PETROSEIS ON PC: MINEX ON MV 20,000

PETROLEUM DATABASE(S):

SYSTEM DESCRIPTION:

Digital Seismic Shotpoint Location Database utilizing TEO/3D

Database contains x, y, z, locations in AMG of seismic shotpoints

PETROLEUM DATABASE(S) cont:

STAGE OF DEVELOPMENT:

Utilities to perform the following tasks exist and are functional. The driving software is continually being improved as deficiencies are realized:

- Data Capture - digital tape/ digitization
- Data Processing, reformating, /standarization, enhancement, final editing.
- Data Entry
- Data Integration with other systems
  - Petroseis
  - Minex - non existent at present
- Data Output - plotting/posting/ annotation/listings.
- Data Query - rudimentary enquiries available.

STANDARDS USED:

Incoming Digital Navigation data on Magnetic Tape should conform to ASEG, GDF but UKOBS is OK. and ASC II code is preferred but EBCLIC is acceptable.

DATA VOLUMES:

ON-SHORE	: Number: Kilometres/metres	:Storage Type (number)
SEISMIC :	95,000 km	Mag Tape * Analogue
WELLS :	N/A	
EXPLORATION:	N/A	
PRODUCTION:	N/A	

OFF-SHORE

SEISMIC :	82,000 km	Mag Tape * Analogue
WELLS :	N/A	
EXPLORATION:	N/A	
PRODUCTION:	N/A	

DATA MARKETING POLICY:

PROBLEMS EXPERIENCED/ENVISAGED:

- Inadequate GIS guidelines relating to spatial Vs attribute data.
- Realization that GIS system needs to be built rather than bought as a turn-key system.
- Long familiarization period for TEO/3D

COMMENTS:

Where possible, attach sheets with more detailed information - eg. database screen dumps.

GOVERNMENT PETROLEUM DATABASE
WORKSHOP QUESTIONNAIRE

DEPARTMENT : S.A. MINES AND ENERGY

DIVISION : OIL, GAS AND COAL

BRANCH : GEOPHYSICS

ADDRESS : 191 GREENHILL RD., PARKSIDE

TELEPHONE : 274 7500 **FAX** : 272 7597

CONTACT NAME :	TITLE:	TELEPHONE:
1. GRAHAM PILKINGTON	MATHEMATICAL GEOPHYSICIST	274 7620
2.		
3.		
4.		

ORGANISATIONAL STRUCTURE:

Please attach organisational structure with staff allocated.

HARDWARE:

CPU	:	DATA GENERAL MV 20000
MEMORY	:	8 MB
ON-LINE STORAGE	:	4 @ 592 MB, 1 @ 192 MB (removable)
TAPE DRIVE(S)	:	2
TERMINALS	:	2
WORK STATIONS	:	-

SOFTWARE:

OPERATING SYSTEM	:	AOS/VS
LANGUAGES	:	F77,
DBMS	:	
OTHERS	:	

PETROLEUM DATABASE(S):

SYSTEM DESCRIPTION:

PHYSICAL DATA CATALOGUE

PETROLEUM DATABASE(S) cont:
STAGE OF DEVELOPMENT:

CATALOGUING OF GEOPHYSICAL ITEMS; 80% COMPLETE
CHECKING OF CATALOGUE; 50% COMPLETE
CONVERSION INTO ORACLE DATABASE IN PREPARATION

STANDARDS USED:

DATA VOLUMES: APPROX 100 000 PHYSICAL ITEMS IN CATALOGUE

ON-SHORE

OFF-SHORE

DATA MARKETING POLICY:

PROBLEMS EXPERIENCED/ENVISAGED:

DATA INDEXING CONSISTANCY

COMMENTS:

Where possible, attach sheets with more detailed information - eg. database screen dumps.

GOVERNMENT PETROLEUM DATABASE
WORKSHOP QUESTIONNAIRE

DEPARTMENT : S.A. MINES AND ENERGY

DIVISION : OIL, GAS AND COAL

BRANCH : GEOPHYSICS

ADDRESS : 191 GREENHILL RD., PARKSIDE

TELEPHONE : 274 7500 **FAX** : 272 7597

CONTACT NAME :	TITLE:	TELEPHONE:
1. G. PILKINGTON	MATHEMATICAL GEOPHYSICIST	274 7597
2.		
3.		
4.		

ORGANISATIONAL STRUCTURE:

Please attach organisational structure with staff allocated.

HARDWARE:

CPU	:	DATA GENERAL MV 20000
MEMORY	:	8 MB
ON-LINE STORAGE	:	4 @ 592 MB, 1 @ 192 MB (removable)
TAPE DRIVE(S)	:	2
TERMINALS	:	1
WORK STATIONS	:	-

SOFTWARE:

OPERATING SYSTEM	:	AOS/VS
LANGUAGES	:	F77,
DBMS	:	
OTHERS	:	

PETROLEUM DATABASE(S):

SYSTEM DESCRIPTION:

GRAVITY SUMMARY AND DATA FILES

PETROLEUM DATABASE(S) cont:
STAGE OF DEVELOPMENT:

IN USE

STANDARDS USED:

DATA VOLUMES: 141000 STATIONS ON FILE; 50000 IN PREP.

ON-SHORE : 180000 STATIONS; 800 SURVEYS

OFF-SHORE : 10000 STATIONS; 12 SURVEYS

DATA MARKETING POLICY:

PROBLEMS EXPERIENCED/ENVISAGED:

PERMANENTLY MARKED CONTROL STATION MAINTENANCE
ELEVATION CONTROL
NETWORK RE-ADJUSTMENTS

COMMENTS:

FILES TO BE MERGED INTO A RELATIONAL DBMS WITH OTHER SADME DATA

Where possible, attach sheets with more detailed information - eg. database screen dumps.

GOVERNMENT PETROLEUM DATABASE
WORKSHOP QUESTIONNAIRE

DEPARTMENT	:	S. AUST. DEPT., OF MINES AND ENERGY
DIVISION	:	ADMINISTRATION AND FINANCES
BRANCH	:	INFORMATION SERVICES BRANCH
ADDRESS	:	P.O. BOX 151 EASTWOOD SA 5063
TELEPHONE	:	(08) 274 75000 FAX : (08) 272 7597

CONTACT NAME :	TITLE:	TELEPHONE:
1. Lorraine Gerdes	Senior Geologist	(08) 274 7531
2.		
3.		
4.		

ORGANISATIONAL STRUCTURE:

Please attach organisational structure with staff allocated.

HARDWARE:

CPU	:	NEC APCIV Powermate 2
MEMORY	:	640 k
ON-LINE STORAGE	:	130 MB
TAPE DRIVE(S)	:	-
TERMINALS	:	1
WORK STATIONS	:	1

SOFTWARE:

OPERATING SYSTEM	:	MSDOS
LANGUAGES	:	
DBMS	:	
OTHERS	:	PC-STATUS

PETROLEUM DATABASE(S):

SYSTEM DESCRIPTION:

SAMREF Bibliography incorporates references with abstracts to company and Departmental petroleums Reports from 1983-1988 and without adstracts from 1953-1983.

Formation - tops Data in well completion reports is being downloaded from PEPS into SAMREF and included in the abstracts.

References from 1983-1988 are also available on CLIRS as part of ARID (Australian Resources Industry Database), for online public access.

PETROLEUM DATABASE(S) cont:

STAGE OF DEVELOPMENT:

References from 1983-1988 are complete with abstracts. PRE-1983 references require upgrading and editing before being publically released.

STANDARDS USED:

AGIA guidelines for bibliographic databases.

DATA VOLUMES: 1500 Petroleum references

ON-SHORE : Number: Kilometres/metres :Storage Type (number)

SEISMIC :

WELLS :

EXPLORATION:

PRODUCTION:

OFF-SHORE

SEISMIC :

WELLS :

EXPLORATION:

PRODUCTION:

DATA MARKETING POLICY: SAMREF is available for public access on CLIRS. pre-1983 references can only be accessed by SADME staff until ready for transfer to CLIRS.

PROBLEMS EXPERIENCED/ENVISAGED:

Major problem is editing and upgrading pre-1983 references, as this work is labour-intensive.

COMMENTS:

Where possible, attach sheets with more detailed information - eg. database screen dumps.

GOVERNMENT PETROLEUM DATABASE
WORKSHOP QUESTIONNAIRE

DEPARTMENT : N.S.W. Dept. Mineral Resources

DIVISION : Mineral Development/ Information Division

BRANCH : Geological Survey/ Info & Extn Services Branch

ADDRESS : 8-18 Bent St., G.P.O. Box 5288, SYDNEY

TELEPHONE : (02) 231 0922 **FAX** : (02) 233 7017

CONTACT NAME :	TITLE:	TELEPHONE:
1. Ian Walsh	Acting Senior Geologist	(02) 240 4217
2. Rahmat Khaiami	Scientific Information Officer	(02) 240 4297
3.		
4.		

ORGANISATIONAL STRUCTURE:

Please attach organisational structure with staff allocated attached.

Petroleum does not have its own computer system - it shares or has access to other facilities - see below:

HARDWARE: GEOLOGICAL SURVEY NETWORK

CPU	: Burroughs B20 series LAN
MEMORY	: Distributed in each terminal 384-640 kb
ON-LINE STORAGE	: 120 MB
TAPE DRIVE(S)	: -
TERMINALS	: 8 (each has its own processor)
WORK STATIONS	: -

SOFTWARE:

OPERATING SYSTEM	: BTOS (can run MSDOS emulator)
LANGUAGES	: Fortran, Basic
DBMS	: Data Manager
OTHERS	: Multiplan, Business Graphics, Word Processing

PETROLEUM DATABASE(S):

SYSTEM DESCRIPTION: GENERAL USE COMPUTERS

Petroleum runs the equivalent of some pre existing paper systems on word processor files as an interium measure.

HARDWARE: DEPARTMENTAL LIS SYSTEM

CPU	:	DEC VAX 8250
MEMORY	:	24 MB
ON-LINE STORAGE	:	2 x 456 MB disks
TAPE DRIVE(S)	:	1 x 9 track
TERMINALS	:	13 x VT 220
WORK STATIONS	:	4 x Vaxstation 2000 with AO digitizers 4 x Tektronics graphic stations

SOFTWARE:

OPERATING SYSTEM	:	DCC / VMS 4.7
LANGUAGES	:	Informap III, Fortran
DBMS	:	Datatreive
OTHERS	:	Titles Administration System

PETROLEUM DATABASE(S):

SYSTEM DESCRIPTION: MRLIS is a cartographic/ and information system under development to integrate mining titles, mineral deposits, coal resources, geological mapping etc.,

HARDWARE: GEOLOGICAL SURVEY - GEOPHYSICS SECTION

CPU	:	Hewlett Packard 9000
MEMORY	:	1.5 MB
ON-LINE STORAGE	:	134 MB
TAPE DRIVE(S)	:	1 x 9 track 1600 BPI
TERMINALS	:	2 x HP terminals, PC terminal
WORK STATIONS	:	emulators, digitizer, plotter

SOFTWARE:

OPERATING SYSTEM	:	HPUX (UNIX)
LANGUAGES	:	Fortran, C, Pascal
DBMS	:	
OTHERS	:	

PETROLEUM DATABASE(S): -

SYSTEM DESCRIPTION: Geophysics data processing, graphics, plotting, etc.,

HARDWARE: CLIRS

CPU	:	IBM 4381 R14
MEMORY	:	6 MB
ON-LINE STORAGE	:	17.5 GB
TAPE DRIVE(S)	:	9 track 1600 & 6250 BPI
TERMINALS	:	approx 200 dedicated terminal
WORK STATIONS	:	and 45 dial up lines

SOFTWARE:

OPERATING SYSTEM	:	MVS - XA
LANGUAGES	:	Status
DBMS	:	
OTHERS	:	

PETROLEUM DATABASE(S):

SYSTEM DESCRIPTION:

CLIRS is a commercial contractor offering the Department's bibliographic data bases to the public. "MINFINDER" (12 MBytes) and "COREFINDER" (0.5 MBytes) cover the states mineral, petroleum and coal reportage and core library contents.

DATA VOLUMES:

ON-SHORE : Number: Kilometres/metres :Storage Type (number)

SEISMIC	:	7111 km since 1973; 150 surveys since 1949
WELLS	:	230 wells since 1885
EXPLORATION	:	230
PRODUCTION	:	ZERO

OFF-SHORE

SEISMIC	:	Approx 9000 km
WELLS	:	ZERO
EXPLORATION	:	ZERO
PRODUCTION	:	ZERO

GOVERNMENT PETROLEUM DATABASE
WORKSHOP QUESTIONNAIRE

DEPARTMENT : MINES AND ENERGY, DARWIN

DIVISION : NORTHERN TERRITORY GEOLOGICAL SURVEY

BRANCH : PETROLEUM GEOLOGY/GEOSCIENCE RESOURCES

ADDRESS : GPO BOX 2901, DARWIN, N.T., 5790

TELEPHONE : 089 89 5511 FAX : 089 81 4806

CONTACT NAME :	TITLE:	TELEPHONE:
1. PAUL SENYCIA	SENPETROLEUM GEOLOGIST	089 89 5342 *
2. JOHN FABRAY	GEOSCIENCE RESOURCE GEOLOGIST	089 89 5281
3.		
4.		

ORGANISATIONAL STRUCTURE:

Please attach organisational structure with staff allocated.

HARDWARE:

CPU :
MEMORY :
ON-LINE STORAGE: SEE ATTACHMENT
TAPE DRIVE(S) :
TERMINALS :
WORK STATIONS :

SOFTWARE:

OPERATING SYSTEM:
LANGUAGES :
DBMS :
OTHERS : SEE ATTACHMENT

PETROLEUM DATABASE(S):

SYSTEM DESCRIPTION:

CPU	SUN 2 * 8	
	SUN 3 * 50	MONOCHROME AND COLOUR
	SUN 4 * 4	
	HEURIKON * 4	
MEMORY	FROM 4MB - 1218 MB per CPU	

ON LINE STORAGE	9 x 474 FUJITSU EAGLE 9 x 344 CDC WREN IV
TAPEDRIVERS	1 x 1/2 " 1 600 bpi 6 x 1/4 " STREAMER CARTRIDGE 1 x 2GB 8 mm VIDEO CARTRIDGE
TERMINALS	70 ANSI STANDARD VDU's SOME WITH TEKTRONIX EMULATION 20 APPLE LASERWRITERS
WORK STATIONS	See CPU above

SOFTWARE

OPERATING SYSTEMS	UNIX (SUNOS 4.0; SYSTEM V.2, BSD 4.2/3)
LANGUAGES	C, FORTRAN PASCAL
DBMS	UNIFY
OTHERS	S, TRANSCRIPT, DSS, ULTRACALC, SUNLINK, SNA 3270, SUNLINK INTERNETWORK ROUTER, TITAN, NEXPERT, FRAMEMAKER, AUTOCAD, GEOVISION

Please return the following information by the 9th September, 1988 to:

> Lorraine Gerdes,
> Government Petroleum Databases Workshop,
> South Australian Dept. of Mines and Energy,
> P.O. Box 151,
> EASTWOOD, S.A., 5063.
> Tel: (08)274 7531 Fax: (08)272 7597

GOVERNMENT PETROLEUM DATABASES
WORKSHOP QUESTIONNAIRE

DEPARTMENT : Victorian Department of Industry Technology & Resources

DIVISION : Petroleum Division

BRANCH : Petroleum Resources

ADDRESS : 151 Flinders Street, Melbourne, Victoria, 3000

TELEPHONE : (03) 412 8000 FAX : (03) 650 9525

CONTACT NAME :	TITLE:	TELEPHONE:
1. Maher Megallaa	Mr	(03) 412 8041
2. Brij Agrawal	Mr	(03) 412 8001
3.		
4.		

ORGANISATIONAL STRUCTURE:

Please attach organisational structure with staff allocated.

HARDWARE:

CPU :
MEMORY :
ON-LINE STORAGE :
TAPE DRIVE(S) : See Attached
TERMINALS :
WORK STATIONS :

SOFTWARE:

OPERATING SYSTEM:
LANGUAGES :
DBMS : See Attached
OTHERS :

PETROLEUM DATABASE(S):

SYSTEM DESCRIPTION: See Attached

	Vax 11/780	Pyramid 9810	Prime 550/2
HARDWARE:			
CPU	6 MB Main	16 MB Main	3 MB Main
MEMORY	Memory	Memory	Memory
ON-LINE STORAGE	1.5 GB	1.5 GB	0.9 GB
TAPE DRIVE(S)	1 X 1600/6250	1 X 1600, 1 X Mega Tape	1 X 1600
TERMINALS	80 X VT 220/240	80 X WYSE 60/50	5 X WYSE 50
WORK STATIONS	10	Nil	Nil
SOFTWARE:			
OPERATING SYSTEM	VMS & utilities	UNIX	Primos
LANGUAGES	Cobal, Fortran, C	C	Cobal & Info/Basic
DBMS	I.G.D.B. (under Develop)	Today/Universe	Info
OTHERS	GKS, ob, PLXY-11 SPSSX, TSP, TEPLEL GPC, GEOLOG	Uniplex	
PETROLEUM DATABASE(S):			
SYSTEM DESCRIPTION:		Card Indexing System (Under development)	

PETROLEUM DATABASE(S) cont:
STAGE OF DEVELOPMENT:

STANDARDS USED:

DATA VOLUMES:

ON-SHORE	: Number: Kilometres/metres	:Storage Type (number)		
SEISMIC	: 15,348 Kms	Paper,	Transparencies,	Tapes
WELLS	:			
EXPLORATION:	268 Wells	"	"	"
PRODUCTION:				
OFF-SHORE				
SEISMIC	: 111,537 Kms	"	"	"
WELLS	: 420	"	"	"
EXPLORATION:	152	"	"	"
PRODUCTION:	268	"	"	"

DATA MARKETING POLICY:

$3/unit

PROBLEMS EXPERIENCED/ENVISAGED:

None

COMMENTS:

Where possible, attach sheets with more detailed information - eg. database screen dumps.

GOVERNMENT PETROLEUM DATABASE
WORKSHOP QUESTIONNAIRE

DEPARTMENT : W.A. MINES DEPT.

DIVISION : GEOLOGICAL SURVEY OF W.A.

BRANCH : FOSSIL FUEL RESOURCES & PHANEROZOIC GEOLOGY

ADDRESS : MINERAL HOUSE, 100 PLAIN ST, PERTH 6000

TELEPHONE : (09) 2223333 **FAX** : (09) 223326

CONTACT NAME :	TITLE:	TELEPHONE:
1. R. IASKY	GEOPHYSICIST	(09) 2223326
2.		
3.		
4.		

ORGANISATIONAL STRUCTURE:

Please attach organisational structure with staff allocated.

HARDWARE:

CPU :	4381 MODEL Q14
MEMORY :	32 MEGABYTES
ON-LINE STORAGE:	7.5 GIGABYTES
TAPE DRIVE(S) :	3
TERMINALS :	117
WORK STATIONS :	50

SOFTWARE:

OPERATING SYSTEM:	MVS
LANGUAGES :	COBOL, CICS, SAS
DBMS :	DB2
OTHERS :	

PETROLEUM DATABASE(S):

SYSTEM DESCRIPTION:

WAPEX. Index to all petroleum exploration and development reports and data.

PETROLEUM DATABASE(S) cont:

STAGE OF DEVELOPMENT:

Development of Data Entry Screen.s "Wells is in production, "Surveys" is due for implementation in late October, 1988. "General Reports" are also in production - Skeletal "Tenements" in production includes only tenement number, status, operator, start and end dates.

STANDARDS USED:

Standards are developed in house based on a number of other sites.

DATA VOLUMES:

ON-SHORE	Number	Kilometres/metres	Storage Type (number)
SEISMIC	598	135,875 km	3.2 MEGABYTES
WELLS	1301	1,022,952 km	5.9 "
EXPLORATION	656	983,267 m	3.0 "
PRODUCTION	645	39,685 m	2.9 "
OFF-SHORE			
SEISMIC	471	454,462 km	2.6 MEGABYTES
WELLS	280	809,385 km	1.3 "
EXPLORATION	263	757,168 m	1.2 -"
PRODUCTION	17	52, 217	0.1 "

DATA MARKETING POLICY: Releasable parts of the data base will be made available to the public through printouts and/or microfiche (compfiche)

PROBLEMS EXPERIENCED/ENVISAGED:

The system has not been operating long enough to experience any major problems. Because we are in a developing stage, we try to eliminate problems as they arise.

COMMENTS:

- Data Base screens are attached.
- Organisational Structure is also attached.
- Data Base outline is also attached.

Where possible, attach sheets with more detailed information - eg. database screen dumps.

Please return the following information by the 28th September, 1988 to:

Lorraine Gerdes,
Government Petroleum Database Workshop,
South Australian Dept. of Mines & Energy,
P.O. Box 151,
EASTWOOD, S.A., 5063.
Tel: (08) 274 7531 Fax: (08) 272 7597

GOVERNMENT PETROLEUM DATABASE
WORKSHOP QUESTIONNAIRE

DEPARTMENT : BHP PETROLEUM PTY LTD.

DIVISION : CORPORATE EXPLORATION

BRANCH :

ADDRESS : 35 COLLINS STREET, MELBOURNE 3000.

TELEPHONE : (03) 6527222 FAX : (03) 652 7325

CONTACT NAME :	TITLE:	TELEPHONE:
1. Ian Endersby	Manager Planning & Administration	(03) 652 7755
2. Gary Coles	Coordinator Exploration Services	(03) 652 7744
3. Edwina Meszoly	Supervising Information Officer	
4.	- Exploration	(03) 652 7459

ORGANISATIONAL STRUCTURE:

Please attach organisational structure with staff allocated.

HARDWARE:

CPU : Data General MV2000
MEMORY :
ON-LINE STORAGE:
TAPE DRIVE(S) :
TERMINALS : D460, D461
WORK STATIONS :

SOFTWARE:

OPERATING SYSTEM: AOS/VS
LANGUAGES : SQL, Fortran
DBMS : ORACLE Relational Database - EXPLORATION (Wells)
OTHERS :

PETROLEUM DATABASE(S):

SYSTEM DESCRIPTION:

The Exploration Database provides access to information on Australian wells and some overseas wells (mainly Oman, Papua New Guinea, New Zealand and Indonesia). Where possible extra well data such as cores, tests and logs are also recorded. The system is menu driven.

PETROLEUM DATABASE(S) cont:
STAGE OF DEVELOPMENT:

Fully Operational.

STANDARDS USED:

Schlumberger and other logging companies - log abbreviations
AAPG } Well Codes
PI }
BHPP devised abbreviations
Australian Standards - Country abbreviations

DATA VOLUMES:

ON-SHORE : Number: ~~Kilometres/metres :Storage Type (number)~~

	AUST	OVERSEAS
SEISMIC :		
WELLS :	3755	348
EXPLORATION:	3147	348
PRODUCTION:	608	-

OFF-SHORE

SEISMIC :		
WELLS :	831	91
EXPLORATION:	555	91
PRODUCTION:	276	-

DATA MARKETING POLICY:

- o Promote direct access by BHP Petroleum geoscientists
- o Development of additional screens to be in response to user needs

PROBLEMS EXPERIENCED/ENVISAGED:

- o Updating the backlog of Australian wells
- o Consistency of information from the various sources i.e APEA Weekly, Who's Drilling, PEX

COMMENTS:

NB 1) Following data volumes held offsite: 1400 Core boxes; 5400 Well Samples; 30,000 Magnetic tapes, 13,000 well log sepias; 76,000 seismic sections; 10,000 tape support documents. Accessed by faxed requests to Contractor's database.

2) The inhouse Map Retrieval system is an additional ORACLE database that allows access to the index of 20,000 maps held by the Drawing Office.

Where possible, attach sheets with more detailed information - eg. database screen dumps.

HARDWARE.

CPU : IBM 3081
MEMORY :
ON-LINE STORAGE:
TAPE DRIVE(S) :
TERMINALS : D460, D461
WORK STATIONS :

SOFTWARE:

OPERATING SYSTEM: MVS/TSO
LANGUAGES : FORTRAN
DBMS :
OTHERS : BASIS Hierarchical Database - PETEX

PETROLEUM DATABASE(S):

SYSTEM DESCRIPTION:

The PETEX Database (Exploration) is run on Basis and contains bibliographic references to Australian and Overseas exploration reports. The system is menu/command driven.

PETROLEUM DATABASE(S) cont:

STAGE OF DEVELOPMENT:

Fully Operational.

STANDARDS USED: Petroconsultants - Basins
Australian Standards - Countries
Australian Mineral Foundation thesaurus
Who owns whom
Australian Stock Exchange
Oil & Gas Directory
(Corporate sources)

DATA VOLUMES:

Australia ~~ON-SHORE~~ : Number: ~~[illegible] Storage Type (number)~~

SEISMIC : 1500
WELLS : 2700
EXPLORATION: 2500 (Geology)
REPORTS
PRODUCTION: --

Overseas ~~OFF-SHORE~~

SEISMIC : 300
WELLS : 1000
EXPLORATION: 1700 (Geology)
REPORTS
PRODUCTION: --

DATA MARKETING POLICY:

Promote individual query usage by BHP Petroleum geoscientists.

PROBLEMS EXPERIENCED/ENVISAGED:

Outgoing in-house storage space for reports.

COMMENTS:

Where possible, attach sheets with more detailed information - eg. database screen dumps.

GOVERNMENT PETROLEUM DATABASE
WORKSHOP QUESTIONNAIRE

DEPARTMENT : AUSTRALIAN PETROLEUM EXPLORATION ASSN. LTD.

DIVISION :

BRANCH :

ADDRESS : GPO BOX 3974, SYDNEY, N.S.W. 2001

TELEPHONE : (02) 27 9651 FAX : (02) 27 2826

CONTACT NAME :	TITLE:	TELEPHONE:
1. RON RICHMOND	ASS. DIRECTOR (INFORMATION SERV.)	(02) 27 9651
2.		
3.		
4.		

ORGANISATIONAL STRUCTURE:

Please attach organisational structure with staff allocated.

HARDWARE: 2 PC's : HEWLETT PACKARD VECTRA, EPSON A x 2

CPU :
MEMORY : 640 k
ON-LINE STORAGE: 40 MB HARD DISK
TAPE DRIVE(S) : -
TERMINALS : -
WORK STATIONS : -

SOFTWARE:

OPERATING SYSTEM: MS. DOS
LANGUAGES :
DBMS : RBASE FOR DOS
OTHERS : -

PETROLEUM DATABASE(S):

SYSTEM DESCRIPTION: 1988 DATA FOR WELLS AND SEISMIC STORED ON HARD DISK, 1984-1987 DATA STORED ON FLOPPY DISKS. OUTPUT AVAILABLE IN USUAL STANDARD FORMATS : I.E. ASCII DELIMITED AND FIXED, WKS, DIF, SYLK, DBASE III, LOTUS T-A-C

PETROLEUM DATABASE(S) cont:

STAGE OF DEVELOPMENT:

ADVANCED (FOR AREA PURPOSES).
PRE 1984 DATA NOT ON COMPUTERS BUT PLAN TO PUT STATE AND BASIN SUMMARIES ON COMPUTER.

STANDARDS USED:

A.P.I. - BARRELS AND CU.FT FOR PRODUCTION
- METRIC FOR DEPTH DRILLED AND SEISMIC

DATA VOLUMES:

ON-SHORE	: Number: Kilometres/metres :Storage Type (number)			
SEISMIC	: 1986, 87 ON FLOPPY; 1988 ON HARD DISK.			
WELLS	: 1984-87 FLOPPIES, 1988		"	"
EXPLORATION:	"	"	"	"
PRODUCTION:	NOT COMPUTERISED YET.			

OFF-SHORE

SEISMIC	: 1986, 87 ON FLOPPY DISK: 1988 ON HARD DISK		
WELLS	:	-	-
EXPLORATION:		-	-
PRODUCTION:	NOT ON.		

DATA MARKETING POLICY:

DATA USED FOR APEA REPORT AND FOR QUARTERLY REPORTS. NOT AVAILABLE ON LINE TO OTHER, BUT INFO IS NOT CONFIDENTIAL, SO CAN BE AVAILABLE TO MEMBER COMPANIES.

PROBLEMS EXPERIENCED/ENVISAGED:

LIMITED BY MEMORY, STORAGE AND COMMON-USER COMPUTER SYSTEM. THEREFORE ONLY CURRENT YEARS STATISTICS ARE AVAILABLE ON-LINE.

COMMENTS:

Where possible, attach sheets with more detailed information - eg. database screen dumps.

Please return the following information by the 28th September, 1988 to:

Lorraine Gerdes,
Government Petroleum Database Workshop,
South Australian Dept. of Mines & Energy,
P.O. Box 151,
EASTWOOD, S.A., 5063.
Tel: (08) 274 7531 Fax: (08) 272 7597

GOVERNMENT PETROLEUM DATABASE
WORKSHOP QUESTIONNAIRE

DEPARTMENT :

DIVISION :PETROCONSULTANTS DIGIMAP (GEODATA SERVICES) PTY LTD.

BRANCH :

ADDRESS : LEVEL 4, 186 BLUES POINT ROAD, NORTH SYDNEY, NSW, 2060

TELEPHONE : (02) 923 1112 FAX : (02) 929 0260

CONTACT NAME :	TITLE:	TELEPHONE:
1. DAVE KIRKHAM	MANAGING DIRECTOR	AS ABOVE
2. LES SULLIVAN	SOFTWARE MANAGER	AS ABOVE
3. DAVE REA	APPLICATIONS SUPERVISOR	AS ABOVE
4. DAVE KEMP	DATABASE COORDINATOR	AS ABOVE

ORGANISATIONAL STRUCTURE:

Please attach organisational structure with staff allocated.

HARDWARE:

CPU : VAX 11/750
MEMORY : 4MB
ON-LINE STORAGE: RA81 (450 MB)
TAPE DRIVE(S) : 2x 1600/ 6250 BPI
TERMINALS : 18
WORK STATIONS : 1xTEK 4107 GRAPHICS TERMINAL
3 DIGITIZERS. 1 COLOUR INKJET PLOTTER
1 CALOOMP 1077 BELTBED PLOTTER

SOFTWARE:

OPERATING SYSTEM: VMS
LANGUAGES : FORTRAN/MACRO
DBMS : INHOUSE
OTHERS : INHOUSE

PETROLEUM DATABASE(S):

SYSTEM DESCRIPTION:
EXTENSIVE EXPLORATION DATABASE SYSTEM BASED ON RMS ISAM FILES. WRITTEN IN PL/1, SUPPORTED BY PETROCONSULTANTS (GENEVA). ALSO GEOGRAPHICAL (SEISMIC) DB SYSTEM SUPPORTED INTERNALLY, WRITTEN IN FORTRAN. INCLUDES MAPPING SYSTEM. WELL LOG DATABASE

PETROLEUM DATABASE(S) cont:

STAGE OF DEVELOPMENT:

PRODUCTION SYSTEMS.
CONTINUING ENHANCEMENT

STANDARDS USED:

UKOOA INPUT AND OUTPUT
LIS INPUT AND OUTPUT

DATA VOLUMES:

ON-SHORE : Number: Kilometres/metres :Storage Type (number)

SEISMIC : 180,000 km

WELLS : 4153

EXPLORATION: 2967

PRODUCTION: 1186

OFF-SHORE

SEISMIC : 415,000 km

WELLS : 600

EXPLORATION: 454

PRODUCTION: 146

DATA MARKETING POLICY:

SALES OF TAPES, MAPS OR ON-LINE ACCESS

PROBLEMS EXPERIENCED/ENVISAGED:

CONSTANT UPDATING REQUIRES EXACT KNOWLEDGE OF DATABASE AT TIME OF SUPPLY TO CUSTOMER.

COMMENTS:

Where possible, attach sheets with more detailed information - eg. database screen dumps.

PETROCONSULTANTS DIGIMAP (GEODATA SERVICES) PTY LTD

ORGANISATIONAL STRUCTURE

- D.J. Kirkham - Managing Director
  - D.Rea - Applications Supervisor
    - D. Kemp - Database Coordinator
      - G. May - Senior Operator
        - D. Taylor - Operator
        - T. Stopic - Operator
  - L.F. Sullivan - Software Manager

Please return the following information by the 28th September, 1988 to:

Lorraine Gerdes,
Government Petroleum Database Workshop,
South Australian Dept. of Mines & Energy,
P.O. Box 151,
EASTWOOD, S.A., 5063.
Tel: (08) 274 7531 Fax: (08) 272 7597

GOVERNMENT PETROLEUM DATABASE
WORKSHOP QUESTIONNAIRE

DEPARTMENT : MINORA RESOURCES NL

DIVISION :

BRANCH :

ADDRESS : 55 ST GEORGES TERRACE, PERTH WA 6000

TELEPHONE : (09) 325 3188 FAX : (09) 325 5910

CONTACT NAME :	TITLE:	TELEPHONE:
1. ED KOPSEN	CHIEF EXPLORATIONIST	325 3188
2. PHILIP LAWRY	SENIOR GEOLOGIST	325 3188
3. TIM SCHOLEFIELD	GEOLOGIST	325 3188
4. PAUL CARTER	CHIEF GEOPHYSICIST	325 3188

ORGANISATIONAL STRUCTURE:

Please attach organisational structure with staff allocated.

HARDWARE: 3 x PC's

CPU : –
MEMORY : 640
ON-LINE STORAGE: NIL
TAPE DRIVE(S) : NIL
TERMINALS : NIL
WORK STATIONS : NIL

SOFTWARE:

OPERATING SYSTEM: DOS
LANGUAGES :
DBMS :
OTHERS :

PETROLEUM DATABASE(S):

SYSTEM DESCRIPTION: NONE YET - CONSIDERING OPTIONS

PETROLEUM DATABASE(S) cont:

STAGE OF DEVELOPMENT:

CONCEPTUAL

STANDARDS USED:

DATA VOLUMES:

ON-SHORE : Number: Kilometres/metres :Storage Type (number)

SEISMIC : 1380 km

WELLS : 370

EXPLORATION: 20 wells p.a. (2-3 operated by Minora)

PRODUCTION: NET 160 BOPD

OFF-SHORE

SEISMIC : 962 km

WELLS : 100

EXPLORATION: 1Minora operated p.a. next few years

PRODUCTION:

DATA MARKETING POLICY: Not Applicable

PROBLEMS EXPERIENCED/ENVISAGED:

- recognising options available to us.
- justification of cost.
- superseding of system
- getting information into a system initially

COMMENTS: - justification of time.

Where possible, attach sheets with more detailed information - eg. database screen dumps.

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 118 — ENTRY DATE :21/03/88

DATABASE NAME :AERIAL SURVEY DATABASE
ACRONYM :ASDAT

KEYWORDS :GEOPHYSICAL SURVEYS :AERIAL GEOPHYSICAL SURVEYS
:AERIAL MAGNETIC SURVEYS :AERIAL RADIOACTIVITY SURVEYS
:AERIAL EM SURVEYS :MINERAL EXPLORATION
:GEOPHYSICAL DATA :
: :

BROADSUBJECT :1344 :1445 :1230

DATABASE TYPE :R (S-SOURCE/R-REFERENCE)
DATABASE STATUS :A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)

AREA :QLD
PERIOD FROM :1983 TO :+
SYSTEM TYPE :C (M-MANUAL/C-COMPUTERISED/B-BOTH)
MANUAL TYPE :
COMPUTER TYPE :FLOPPY DISK, DBASEIII AND NECAPC 4
DATA VOLUME : 70 SURVEYS

CONTACT :R. HUBER
:GEOPHYSIST
: 2247400

COMMENTS:
AERIAL GEOPHYSICAL DATA COLLECTED AND SUBMITTED TO THE DEPARTMENT IN
DIGITAL
FORM BY EXPLORATION COMPANIES IN QUEENSLAND. PRIMARILY MINERAL
COMPANY ORIENTED BUT THERE
IS SOME PETROLEUM EXPLORATION DATA. GEOPHYSICAL METHODS INVOLVED ARE
MAGNETICS, RADIO
METRICS AND EM

DATABASE ACCESSIBILITY/AVAILABILITY:
OPENFILE INTEROGATION AVAILABLE TO PUBLIC. OPEN FILE LIST OF SURVEYS
DATA
STORED BY DEPARTMENTAL

INDEXED BY:
SEARCH ON SURVEY NAME, ATP, 100 000 OR 250 000 OR MILLION
SHEET DESIGNATION, SURVEY TYPE (MRE), OPENFILE/CONFIDENTIAL

OUTPUT PRODUCTS:
INTEROGATION LIST

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 134 ENTRY DATE :21/03/88

DATABASE NAME	:ALPHABETICAL LISTING OF SEISMIC SURVEYS	
ACRONYM	:	
KEYWORDS	:GEOPHYSICAL SURVEYS	:SEISMIC SURVEYS
	:DOCUMENTATION	:
	:	:
	:	:
	:	:
BROADSUBJECT	:1230 :1344 :1445	
DATABASE TYPE	:S (S-SOURCE/R-REFERENCE)	
DATABASE STATUS	:A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)	
AREA	:QLD	
PERIOD FROM	:1927 TO :+	
SYSTEM TYPE	:C (M-MANUAL/C-COMPUTERISED/B-BOTH)	
MANUAL TYPE	:	
COMPUTER TYPE	:MAGNETIC DISK, DBASEIII+, IBMPC	
DATA VOLUME	: 730 SURVEYS	
CONTACT	:V. SUCHOCKI	
	:PETROL RESOURCES ASSESSMENT AND DEVELOPMENT	
	: 2247438	

COMMENTS:
OPERATOR, SURVEY NAME, COMMENCEMENT YEAR, COMPLETION YEAR, LINE KM,
OPEN FILE REPORTS, CONF REPORTS
(ANY BASIC DATA AVAILABLE), A TO P, BASIN BREAKDOWN (18 BASINS)
ALL OF DATA IN THIS FILE WILL BE INCLUDED IN GEOPHYSICS LINDAT
DATABASE

DATABASE ACCESSIBILITY/AVAILABILITY:
ON REQUEST

INDEXED BY:
SURVEY NAME

OUTPUT PRODUCTS:
PRINTOUTS

DOCUMENTATION:

REFERENCE NO. : 41 ENTRY DATE :17/03/88

DATABASE NAME	:AUSTRALIAN MINERAL FOUNDATION DATA BASE	
ACRONYM	:AMFDATA	
KEYWORDS	:MINERAL EXPLORATION	:PETROLEUM EXPLORATION
	:COAL EXPLORATION	:REPORTS
	:COMPANIES	:
	:	:
	:	:
BROADSUBJECT	:1344 :1050 :1445	
DATABASE TYPE	:R (S-SOURCE/R-REFERENCE)	
DATABASE STATUS	:U (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)	
AREA	:QLD	
PERIOD FROM	:1930 TO :+	
SYSTEM TYPE	:C (M-MANUAL/C-COMPUTERISED/B-BOTH)	
MANUAL TYPE	:	
COMPUTER TYPE	:MAGNETIC DISK, UNIDAS, SPERRY 110/92	
DATA VOLUME	: 7500 REPORTS	
CONTACT	:P. MURPHY	
	:COMPUTER SERVICES	
	: 2247088	

COMMENTS:

DATABASE ACCESSIBILITY/AVAILABILITY:
CURRENTLY LIMITED TO COMPUTER SERVICES

INDEXED BY:
DOCUMENT NUMBER

OUTPUT PRODUCTS:
DATA CAN BE SEARCHED FOR ANY MATCHING STRING ENTERED (IE. AD-HOC)

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 35 ENTRY DATE :17/03/88

DATABASE NAME	:AUTHORITY TO PROSPECT	
ACRONYM	:MTDB	
KEYWORDS	:MINERAL EXPLORATION	:MINING LEASES
	:COMPANIES	:EXPLORATION LICENCES
	:EXPLORATION COSTS	:COAL EXPLORATION
	:PETROLEUM EXPLORATION	:
	:	:
BROADSUBJECT	:1344 :1350 : 0	
DATABASE TYPE	:S (S-SOURCE/R-REFERENCE)	
DATABASE STATUS	:A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)	
AREA	:QLD	
PERIOD FROM	:1968 TO :1988	
SYSTEM TYPE	:B (M-MANUAL/C-COMPUTERISED/B-BOTH)	
MANUAL TYPE	:CARD INDEX	
COMPUTER TYPE	:HARD DISK, BGCC, MTDB	
DATA VOLUME	: 0	
CONTACT	:LES WYNN	
	:TITLES AND TENURES ADMINISTRATION	
	: 2247527	

COMMENTS:
MANUAL - COVERS PERIOD 1968-1985 - AUTHORITIES TO PROSPECT CARDS IN NUMERICAL ORDER GIVES DETAILS OF HOLDERS, AREA, EXPENDITURE, DEALINGS, TERM, SECURITIES, AND RENTAL.
COMPUTER - COVERS PERIOD 1986 TO PRESENT - AUTHORITIES TO PROSPECT CARDS IN NUMERICAL ORDER GIVES DETAILS OF HOLDERS, AREA, EXPENDITURE, DEALINGS, TERM, SECURITIES AND RENTAL.

DATABASE ACCESSIBILITY/AVAILABILITY:
INTERNAL/ SEARCHES FOR PUBLIC

INDEXED BY:
WARDEN'S DISTRICTS (APPLICATIONS ONLY), HOLDERS, AUTHORITY TO PROSPECT NUMBER

OUTPUT PRODUCTS:

DOCUMENTATION:
HAVE BEEN REFERENCES MADE TO REPORTS PUBLISHED IN QGMJ

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 67 ENTRY DATE :17/03/88

DATABASE NAME	:AUTHORITY TO PROSPECT PLANS	
ACRONYM	:	
KEYWORDS	:MAPS	:INDEX MAPS
	:EXPLORATION LICENCES	:MINERAL EXPLORATION
	:COAL EXPLORATION	:PETROLEUM EXPLORATION
	:	:
	:	:
BROADSUBJECT	:1344 :1050 :1445	
DATABASE TYPE	:S (S-SOURCE/R-REFERENCE)	
DATABASE STATUS	:C (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)	
AREA	:QLD	
PERIOD FROM	:1966 TO :1975	
SYSTEM TYPE	:M (M-MANUAL/C-COMPUTERISED/B-BOTH)	
MANUAL TYPE	:VOLUMES - LOOSE LEAF	
COMPUTER TYPE	:	
DATA VOLUME	: 2461 RECORDS	
CONTACT	:SUPER. CARTOGRAPHER	
	:CARTOGRAPHIC SERVICES	
	: 2247469	

COMMENTS:

DATABASE ACCESSIBILITY/AVAILABILITY:
INTERNAL

INDEXED BY:
PLAN NUMBER - CROSS REFERENCE AVAILABLE - A TO P NUMBER

OUTPUT PRODUCTS:
COPIES

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 90 ENTRY DATE :18/03/88

DATABASE NAME	:BIBLIOGRAPHY OF THE EROMANGA BASIN	
ACRONYM	:	
KEYWORDS	:EROMANGA BASIN	:BIBLIOGRAPHIES
	:MESOZIOC	:
	:	:
	:	:
	:	:
BROADSUBJECT	:1185 :1100 : 0	
DATABASE TYPE	:R (S-SOURCE/R-REFERENCE)	
DATABASE STATUS	:A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)	
AREA	:EROMANGA BASIN (QLD)	
PERIOD FROM	:1872 TO :+	
SYSTEM TYPE	:M (M-MANUAL/C-COMPUTERISED/B-BOTH)	
MANUAL TYPE	:CARD INDEX	
COMPUTER TYPE	:	
DATA VOLUME	: 600 REFERENCES	
CONTACT	:B.H. JOHN	
	:BASIN STUDIES	
	: 2247474	

COMMENTS:

DATABASE ACCESSIBILITY/AVAILABILITY:
INTERNAL, EXTERNAL ON REQUEST

INDEXED BY:
ALPHABETICALLY BY AUTHOR

OUTPUT PRODUCTS:
GSQ RECORD 1984/17

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 42 ENTRY DATE :17/03/88

DATABASE NAME :COMPANY REPORT BIBLIOGRAPHIC SYSTEM
ACRONYM :

KEYWORDS :MINERAL EXPLORATION :PETROLEUM EXPLORATION
:COAL EXPLORATION :REPORTS
:COMPANIES :
: :
: :

BROADSUBJECT :1344 :1055 :1445

DATABASE TYPE :R (S-SOURCE/R-REFERENCE)
DATABASE STATUS :A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)

AREA :QLD
PERIOD FROM :1930 TO :+
SYSTEM TYPE :C (M-MANUAL/C-COMPUTERISED/B-BOTH)
MANUAL TYPE :
COMPUTER TYPE :MAGNETIC DISK, INHOUSE (FORTRAN), SPERRY 110/92
DATA VOLUME : 0

CONTACT :J LAYCOCK/P MURPHY
:COMPUTER SERVICES
: 2247088

COMMENTS:

DATABASE ACCESSIBILITY/AVAILABILITY:
SEARCHES DONE ON REQUEST

INDEXED BY:
CR'S CAN BE SEARCHED BY CNO. A TO P NO, 1:100 000 SHEET REFERENCE.
RETRIEVAL ON ENTRIES
IN FIELDS SUCH AS AUTHOR, COMPANY NAME, MINERAL, VARIOUS KEYWORDS,
SED/BASINS/
STRUCT/UNIT POSSIBLE FOR SOME UNPUBLISHED REPORTS

OUTPUT PRODUCTS:

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 3 ENTRY DATE :15/03/88

DATABASE NAME :COMPANY REPORT COLLECTION
ACRONYM :

KEYWORDS :MINERAL EXPLORATION :EXPLORATION LICENCES
:REPORTS :PETROLEUM EXPLORATION
:COAL EXPLORATION :COMPANIES
: :
: :

BROADSUBJECT :1344 :1055 :1445

DATABASE TYPE :S (S-SOURCE/R-REFERENCE)
DATABASE STATUS :A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)

AREA :QLD
PERIOD FROM :1930 TO :+
SYSTEM TYPE :M (M-MANUAL/C-COMPUTERISED/B-BOTH)
MANUAL TYPE :HARDCOPY
COMPUTER TYPE :
DATA VOLUME : 16000 COMPANY REPORTS

CONTACT :LIBRARIAN
:CENTRAL INFORMATION SERVICE
: 2247068

COMMENTS:
SYSTEM USED EXTENSIVELY BY STAFF AND PUBLIC. PUBLIC CAN OBTAIN COPIES OF REPORTS AS MICROFICHE OR UNDER SPECIAL CIRCUMSTANCES, AS HARD (PAPER) COPY.

DATABASE ACCESSIBILITY/AVAILABILITY:
AVAILABLE TO ALL STAFF; ONLY NON-CONFIDENTIAL REPORTS AVAILABLE TO PUBLIC AND MOSTLY ONLY AS MICROFICHE.

INDEXED BY:
COMPANY REPORT NO., A TO P NUMBER, 1:100000 SHEET NO.

OUTPUT PRODUCTS:
LISTS OF NON-CONFIDENTIAL CR's RELEASED MONTHLY FOR INCLUSION IN QGMJ.
LISTS OF ALL CR's WITH TITLES PROVIDED BASED ON REFERENCES TO CR NO.
A TO P NO. COM FICHE OF LSITS ALSO AVAILABLE

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 2 ENTRY DATE :15/03/88

DATABASE NAME :COMPANY REPORT INDEXES
ACRONYM :

KEYWORDS :MINERAL EXPLORATION :COAL EXPLORATION
:PETROLEUM EXPLORATION :COMPANIES
:REPORTS :EXPLORATION LICENCES
:MINES :
: :

BROADSUBJECT :1344 :1055 :1445

DATABASE TYPE :R (S-SOURCE/R-REFERENCE)
DATABASE STATUS :C (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)

AREA :QLD
PERIOD FROM :1930 TO :1970
SYSTEM TYPE :M (M-MANUAL/C-COMPUTERISED/B-BOTH)
MANUAL TYPE :CARD INDEX
COMPUTER TYPE :
DATA VOLUME : 19000 CARDS

CONTACT :LIBRARIAN
:CENTRAL INFORMATION SERVICE
: 0

COMMENTS:
SYSTEM VERY USEFUL FOR QUICKLY LOCATING A TO P/CR NOS FOR INDIVIDUAL MINES/PROSPECTS REFERRED TO IN CRS INDEXED WHEN SYSTEM

WAS ACTIVE. SINCE 1972, AESIS CUMULATION (CR FICHE) IN LIBRARY GIVES

SAME (OR BETTER) DATA.

DATABASE ACCESSIBILITY/AVAILABILITY:
ACCESSIBLE TO CIS STAFF AND OTHER STAFF ON REQUEST, SEARCHES FOR PUBLIC ON REQUEST.

INDEXED BY:
MINE, PROSPECT, DEPOSIT NAME, LOCALITY, WELL NAME , COMPANY NAME

OUTPUT PRODUCTS:
NIL

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 4 ENTRY DATE :15/03/88

DATABASE NAME :COMPANY REPORT SYSTEM
ACRONYM :

KEYWORDS :MINERAL EXPLORATION :EXPLORATION LICENCES
:REPORTS :INDEXES
:PETROLEUM EXPLORATION :COAL EXPLORATION
:COMPANIES :
: :

BROADSUBJECT :1344 :1055 :1445

DATABASE TYPE :R (S-SOURCE/R-REFERENCE)
DATABASE STATUS :A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)

AREA :QLD
PERIOD FROM :ALL TO :
SYSTEM TYPE :C (M-MANUAL/C-COMPUTERISED/B-BOTH)
MANUAL TYPE :
COMPUTER TYPE :MAGNETIC DISK
DATA VOLUME : 16000 REFERENCES

CONTACT :J. LAYCOCK
:COMPUTER SERVICES
: 2247089

COMMENTS:

DATABASE ACCESSIBILITY/AVAILABILITY:
ACCESS ONLY INTERNALLY

INDEXED BY:
COMPANY REPORT NUMBER

OUTPUT PRODUCTS:
MICROFICHE, FORMATED REPORTS (READING ROOM & SALE TO the PUBLIC)
AD-HOC SEARCHES

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 69 ENTRY DATE :17/03/88

DATABASE NAME	:DESCRIPTION PROFORMAS	
ACRONYM	:DP'S	
KEYWORDS	:EXPLORATION LICENCES	:MINERAL EXPLORATION
	:COAL EXPLORATION	:PETROLEUM EXPLORATION
	:	:
	:	:
	:	:
BROADSUBJECT	:1344 :1055 :1445	
DATABASE TYPE	:S (S-SOURCE/R-REFERENCE)	
DATABASE STATUS	:A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)	
AREA	:QLD (INCL. OFFSHORE)	
PERIOD FROM	:1972 TO :+	
SYSTEM TYPE	:M (M-MANUAL/C-COMPUTERISED/B-BOTH)	
MANUAL TYPE	:VOLUMES - LOOSE LEAF	
COMPUTER TYPE	:	
DATA VOLUME	: 5000	
CONTACT	:SUPER. CARTOGRAPHER	
	:CARTOGRAPHIC SERVICES	
	: 2247469	

COMMENTS:
INFORMATION ADDED TO MTDB

DATABASE ACCESSIBILITY/AVAILABILITY:
INTERNAL USE

INDEXED BY:
A TO P NUMBER, DEPARTMENTAL AREA NO. ETC

OUTPUT PRODUCTS:
PAPER PRINTS

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 105 ENTRY DATE :18/03/88

DATABASE NAME	:GSQ STRATIGRAPHIC BORES	
ACRONYM	:	
KEYWORDS	:DRILLING	:STRATIGRAPHIC DRILLING
	:INDEXES	:
	:	:
	:	:
	:	:
BROADSUBJECT	:1590 :1090 : 0	
DATABASE TYPE	:S (S-SOURCE/R-REFERENCE)	
DATABASE STATUS	:A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)	
AREA	:QLD	
PERIOD FROM	:1965 TO :+	
SYSTEM TYPE	:M (M-MANUAL/C-COMPUTERISED/B-BOTH)	
MANUAL TYPE	:CARD INDEX	
COMPUTER TYPE	:	
DATA VOLUME	: 0	
CONTACT	:T. NOON	
	:BASIN STUDIES	
	: 2247456	

COMMENTS:
LOCATION, DRILLING DATA STRATIGRAPHY AND REFERENCES ON STRATIGRAPHIC BORES. INFORMATION IN THIS SYSTEM IS IN QERDB

DATABASE ACCESSIBILITY/AVAILABILITY:
AVAILABLE TO PUBLIC ON REQUEST

INDEXED BY:
INDEXED ALPHABETICALLY BY BORE NAME

OUTPUT PRODUCTS:
QGMJ REVIEW PAPERS, USER SPECIFIED REQUESTS

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 83 ENTRY DATE :17/03/88

DATABASE NAME	:LIQUID FUEL STOCKHOLDINGS	
ACRONYM	:	
KEYWORDS	:ENERGY	:STATISTICS
	:FUEL STORAGE	:OIL STORAGE
	:PETROLEUM INDUSTRY	:PETROLEUM PRODUCTS
	:PETROLEUM STATISTICS	:LIQUID FUEL
	:	:
BROADSUBJECT	:1130 :1440 : 0	
DATABASE TYPE	:S (S-SOURCE/R-REFERENCE)	
DATABASE STATUS	:A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)	
AREA	:QLD	
PERIOD FROM	:1983 TO :+	
SYSTEM TYPE	:C (M-MANUAL/C-COMPUTERISED/B-BOTH)	
MANUAL TYPE	:	
COMPUTER TYPE	:CITECH MAPPER SYSTEM RID "B"	
DATA VOLUME	: 60 RIDS	
CONTACT	:D. GARLIPP	
	:ENERGY MANAGEMENT	
	: 2247518	

COMMENTS:
LOCATION, ADDRESSES, NAMES OF PROPRIETORS AND STORAGE CAPACITIES FOR SERVICE STATIONS, BULK DEPOTS AND SEABOARD TERMINALS

DATABASE ACCESSIBILITY/AVAILABILITY:
FOR INTERNAL USE ONLY - ACCESSED THROUGH D. GARLIPP

INDEXED BY:

OUTPUT PRODUCTS:

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 84 ENTRY DATE :17/03/88

DATABASE NAME :LIQUID FUEL STORAGE DATA
ACRONYM :

KEYWORDS :ENERGY :STATISTICS
:DIRECTORIES :LIQUID FUEL
:FUEL STORAGE :PETROLEUM PRODUCTS
:PETROLEUM INDUSTRY :
: :

BROADSUBJECT :1130 :1440 : 0

DATABASE TYPE :S (S-SOURCE/R-REFERENCE)
DATABASE STATUS :A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)

AREA :QLD
PERIOD FROM :CUR TO :
SYSTEM TYPE :C (M-MANUAL/C-COMPUTERISED/B-BOTH)
MANUAL TYPE :
COMPUTER TYPE :CITEC MAPPER SYSTEM
DATA VOLUME : 2200 SERVICE STATIONS ETC

CONTACT :D. GARLIPP
:ENERGY MANAGEMENT
: 2247518

COMMENTS:

DATABASE ACCESSIBILITY/AVAILABILITY:
RESTRICTED AVAILABILITY FOR PUBLIC - ACCESS THROUGH D. GARLIPP,
MICHELLE SPRENGER.
STORAGE CAPACITIES AND OFFTAKES ARE CONFIDENTIAL

INDEXED BY:

OUTPUT PRODUCTS:

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO.	: 85	ENTRY DATE :17/03/88

DATABASE NAME	:LIQUID FUEL USAGE	
ACRONYM	:	
KEYWORDS	:ENERGY	:STATISTICS
	:PETROLEUM CONSUMPTION	:LIQIUD FUELS
	:PETROLEUM PRODUCTS	:
	:	:
	:	:
BROADSUBJECT	:1130 :1440 : 0	
DATABASE TYPE	:S (S-SOURCE/R-REFERENCE)	
DATABASE STATUS	:A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)	
AREA	:QLD	
PERIOD FROM	:1983 TO :+	
SYSTEM TYPE	:C (M-MANUAL/C-COMPUTERISED/B-BOTH)	
MANUAL TYPE	:	
COMPUTER TYPE	:CITEC MAPPER SYSTEM RID "D"	
DATA VOLUME	: 40 ESSENTIAL USER INDUSTRIES	
CONTACT	:D. GARLIPP	
	:ENERGY MANAGEMENT	
	: 2247518	

COMMENTS:

DATABASE ACCESSIBILITY/AVAILABILITY:
RESTRICTED AVAILABILITY TO PUBLIC - ACCESS THROUGH D. GARLIPP

INDEXED BY:

OUTPUT PRODUCTS:

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO.	: 86	ENTRY DATE :17/03/88

DATABASE NAME	:LIQUID FUELS FILES	
ACRONYM	:	
KEYWORDS	:ENERGY	:LIQUID FUEL
	:PETROLEM PRODUCTS	:PETROLEUM INDUSTRY
	:INDUSTRIAL SAFETY	:MANUALS
	:	:
	:	:
BROADSUBJECT	:1130 :1440 :1540	
DATABASE TYPE	:S (S-SOURCE/R-REFERENCE)	
DATABASE STATUS	:A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)	
AREA	:QLD	
PERIOD FROM	:1982 TO :	
SYSTEM TYPE	:M (M-MANUAL/C-COMPUTERISED/B-BOTH)	
MANUAL TYPE	:FILES	
COMPUTER TYPE	:	
DATA VOLUME	: 44 FILES	
CONTACT	:D. GARDLIPP	
	:ENERGY MANAGEMENT	
	: 2247518	

COMMENTS:
LIQUID FUEL FILES ARE TO BE KEPT SEPARATE FROM THE RECORDS SECTION TO
PERMIT
ACCESSIBILITY ON WEEKENDS AND AFTER HOURS IN CASE OF AN EMERGENCY

DATABASE ACCESSIBILITY/AVAILABILITY:
THROUGH D. GARLIPP

INDEXED BY:
FILE NOS.

OUTPUT PRODUCTS:

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 39 ENTRY DATE :17/03/88

DATABASE NAME :MICROFILM INDEX
ACRONYM :

KEYWORDS :MINERAL EXPLORATION :COAL EXPLORATION
:PETROLEUM EXPLORATION :REPORTS
:INDEXES :
: :
: :

BROADSUBJECT :1344 : 0 : 0

DATABASE TYPE :R (S-SOURCE/R-REFERENCE)
DATABASE STATUS :A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)

AREA :QLD
PERIOD FROM : TO :1984
SYSTEM TYPE :C (M-MANUAL/C-COMPUTERISED/B-BOTH)
MANUAL TYPE :
COMPUTER TYPE :
DATA VOLUME : 10000 ITEMS

CONTACT :P MURPHY
:COMPUTER SERVICES
: 2247088

COMMENTS:
ADMINISTRATION OF FILM ARCHIVES

DATABASE ACCESSIBILITY/AVAILABILITY:
INTERNAL USE

INDEXED BY:

OUTPUT PRODUCTS:
REPORT LISTINGS

DOCUMENTATION:
GSQ RECORD 1984/21

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 161 ENTRY DATE :21/03/88

DATABASE NAME :OIL CORE AND CUTTINGS DETAILED INFORMATION
ACRONYM :PIC

KEYWORDS :DRILLING :OIL WELLS
:DRILL CORE :DRILL CUTTINGS
:PETROLEUM EXPLORATION :INDEXES
: :
: :

BROADSUBJECT :1445 :1090 : 0

DATABASE TYPE :S (S-SOURCE/R-REFERENCE)
DATABASE STATUS :A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)

AREA :QLD
PERIOD FROM :1900 TO :+
SYSTEM TYPE :B (M-MANUAL/C-COMPUTERISED/B-BOTH)
MANUAL TYPE :CARD INDEX
COMPUTER TYPE :MAGNETIC DISK/TAPE, SPECIAL PURPOSE DBMS, PDP 11/7
DATA VOLUME : 1500 CARDS

CONTACT :PAUL DONOVAN
:DRILLING AND FIELD SERVICES
: 2636833

COMMENTS:
ALL DETAILS (EXCEPT STRAT INFO) ON PETROLEUM/OIL BORE HOLES/WELLS.
SOME OF THIS INFO WENT INTO NERDDP ** QERDB **

DATABASE ACCESSIBILITY/AVAILABILITY:
INTERNAL, EXTERNAL ON REQUEST

INDEXED BY:
BORE HOLE NAME/NUMBER, COMPANY NAME

OUTPUT PRODUCTS:
CUSTOMISED INFO ON SEARCH

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 140 ENTRY DATE :21/03/88

DATABASE NAME	:PETROLEUM APPRAISAL AND DVLPMT WELL INDEX	
ACRONYM	:	
KEYWORDS	:PETROLEUM EXPLORATION	:DRILLING
	:OIL WELLS	:EXPLORATORY WELLS
	:	:
	:	:
	:	:
BROADSUBJECT	:1445 : 0 : 0	
DATABASE TYPE	:S (S-SOURCE/R-REFERENCE)	
DATABASE STATUS	:A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)	
AREA	:QLD	
PERIOD FROM	:1900 TO :+	
SYSTEM TYPE	:M (M-MANUAL/C-COMPUTERISED/B-BOTH)	
MANUAL TYPE	:CARD INDEX	
COMPUTER TYPE	:	
DATA VOLUME	: 600 WELLS	
CONTACT	:M. RANDAL	
	:PETROLEUM RESOURCES ASSESSMENT AND DEVELOPMENT	
	: 2247934	

COMMENTS:
LOCATION, OPERATOR, SPUD AND COMPLETION DATES, FORMATION TOPS, RESULTS, ELEVATION

DATABASE ACCESSIBILITY/AVAILABILITY:
STAFF USE ONLY

INDEXED BY:
ALPHABETICALLY BY OIL OR GAS FIELD

OUTPUT PRODUCTS:
RESTRICTED LISTINGS, SOME INFORMATION AVAILABLE IN REPORTS

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 139 ENTRY DATE :21/03/88

DATABASE NAME :PETROLEUM EXPLORATION WELL INDEX
ACRONYM :

KEYWORDS :PETROLEUM EXPORATION :DRILLING
:OIL WELLS :EXPLORATORY WELLS
:STRATIGRAPHY :
: :
: :

BROADSUBJECT :1445 : 0 : 0

DATABASE TYPE :S (S-SOURCE/R-REFERENCE)
DATABASE STATUS :A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)

AREA :QLD
PERIOD FROM :1900 TO :+
SYSTEM TYPE :M (M-MANUAL/C-COMPUTERISED/B-BOTH)
MANUAL TYPE :CARD INDEX
COMPUTER TYPE :
DATA VOLUME : 1173 WELLS

CONTACT :V.SUCHOCKI
:PETROLEUM RESOURCES ASSESSMENT AND DEVELOPMENT
: 2247438

COMMENTS:
SPUD AND COMPLETION DATES, TARGET FORMATION, RESULTS, STATUS, ELEVATION, FORMATION TOPS

DATABASE ACCESSIBILITY/AVAILABILITY:
INTERNAL STAFF USE ONLY

INDEXED BY:
ALPHABETICALLY BY OPERATOR

OUTPUT PRODUCTS:
LISTS, MAPS, REPORTS

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 135 ENTRY DATE :21/03/88

DATABASE NAME :PETROLEUM EXPLORATION WELL MAPS
ACRONYM :

KEYWORDS :MAPS :EXPLORATORY WELLS
:PETROLEUM EXPLORATION :DRILLING
: :
: :
: :

BROADSUBJECT :1445 : 0 : 0

DATABASE TYPE :S (S-SOURCE/R-REFERENCE)
DATABASE STATUS :A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)

AREA :QLD
PERIOD FROM :1900 TO :+
SYSTEM TYPE :M (M-MANUAL/C-COMPUTERISED/B-BOTH)
MANUAL TYPE :MAPS
COMPUTER TYPE :
DATA VOLUME : 31 MAP SHEETS

CONTACT :V. SUCHOCKI
:PETROLEUM RESOURCES ASSESSMENT AND DEVELOPMENT
: 2247438

COMMENTS:
LOCATION OF PETROLEUM EXPLORATION WELLS STATERS OF WELL

DATABASE ACCESSIBILITY/AVAILABILITY:
AVAILABLE ON REQUEST

INDEXED BY:
ORGANISED BY MAP SHEET AREA

OUTPUT PRODUCTS:
REPRODUCTIONS OF MAP SHEETS

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 138 ENTRY DATE :21/03/88

DATABASE NAME	:PETROLEUM WELL REGISTER	
ACRONYM	:	
KEYWORDS	:PETROLEUM EXPLORATION	:DRILLING
	:OIL WELLS	:
	:	:
	:	:
	:	:
BROADSUBJECT	:1445 : 0 : 0	
DATABASE TYPE	:S (S-SOURCE/R-REFERENCE)	
DATABASE STATUS	:A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)	
AREA	:QLD	
PERIOD FROM	:1880 TO :+	
SYSTEM TYPE	:C (M-MANUAL/C-COMPUTERISED/B-BOTH)	
MANUAL TYPE	:	
COMPUTER TYPE	:MAGNETIC DISK, DBASE III+, IBM PC	
DATA VOLUME	: 1909 WELLS	
CONTACT	:V. SUCHOCKI	
	:PETROLEUM RESOURCES ASSESSMENT AND DEVELOPMENT	
	: 2247438	

COMMENTS:
COMPANY (OPERATOR), WELL NAME, A TO P, 1:250 000 SHEET, 1:100 000 SHEET, SPUD DATE, RIG RELEASE DATE, PROPOSAL CR NO, WCR NO, BASINS INTERSECTED, COMPLETION REPORT STATUS, WELL STATUS, WELL TYPE, WELL FILE NO, SEPIAS, TAPES

DATABASE ACCESSIBILITY/AVAILABILITY:
TO PUBLIC ON REQUEST

INDEXED BY:
WELL NAME, A TO P, OPERATOR

OUTPUT PRODUCTS:
HARD COPY PRINTOUTS

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 104 ENTRY DATE :18/03/88

DATABASE NAME :QLD ENERGY RESOURCES DATA BASE
ACRONYM :QERDB

KEYWORDS :DRILLING :STRATIGRAPHIC DRILLING
:OIL WELLS :WELLS
:MAPS :INDEXES
:PETROLEUM EXPLORATION :
: :

BROADSUBJECT :1500 :1445 :1590

DATABASE TYPE :S (S-SOURCE/R-REFERENCE)
DATABASE STATUS :A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)

AREA :QLD
PERIOD FROM :1900 TO :+
SYSTEM TYPE :C (M-MANUAL/C-COMPUTERISED/B-BOTH)
MANUAL TYPE :
COMPUTER TYPE :MAGNETIC DISK (MAPPER) CITEC SPERRY
DATA VOLUME : 1600 WELLS AND BORES

CONTACT :T.NOON / B.JOHN
:BASIN STUDIES
: 2247456

COMMENTS:

DATABASE ACCESSIBILITY/AVAILABILITY:
CURRENTLY LIMITED TO COMPUTER SERVICES PERSONNEL . DATA ON DATABASE PUBLICALLY ACCESSIBLE. LISTING HELD IN PUBLIC READING ROOM.

INDEXED BY:
WELL NAME, GEOGRAPHIC PARAMETERS, SEDIMENTARY BASINS ETC

OUTPUT PRODUCTS:
LISTS, MAPS AND REPORTS, COM FICHE, MAG TAPE, DATA BASE ACCESS.

DOCUMENTATION:
GSQ RECORD 1983/67
GSQ RECORD 1985/56
QLD GOVT MINING JOURNAL, 77, 37-45.
GSQ RECORD 1987/5
GSQ RECORD 1987/56

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 38 ENTRY DATE :17/03/88

DATABASE NAME	:QLD GOVERNMENT MINING JOURNAL INDEX	
ACRONYM	:	
KEYWORDS	:INDEXES	:MINERAL EXPLORATION
	:PETROLEUM EXPLORATION	:MINING
	:COAL INDUSTRY	:GOVERNMENT POLICY
	:MINERAL STATISTICS	:PETROLEUM STATISTICS
	:STRATIGRAPHY	:GEOLOGY
BROADSUBJECT	:1500 :1110 : 0	
DATABASE TYPE	:R (S-SOURCE/R-REFERENCE)	
DATABASE STATUS	:I (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)	
AREA	:QLD	
PERIOD FROM	:1900 TO :?	
SYSTEM TYPE	:C (M-MANUAL/C-COMPUTERISED/B-BOTH)	
MANUAL TYPE	:	
COMPUTER TYPE	:UNIVAC 1100/82, MAGNETIC DISK, APPLICATION PROGRAM	
DATA VOLUME	: 0	
CONTACT	:J.W. LAYCOCK	
	:COMPUTER SERVICES	
	: 2247089	

COMMENTS:

DATABASE ACCESSIBILITY/AVAILABILITY:
ON REQUEST

INDEXED BY:
AUTHOR, AREA, SUBJECT

OUTPUT PRODUCTS:
PRINTOUTS

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 77 ENTRY DATE :17/03/88

DATABASE NAME	:QUEST SCHEDULES AND MAPS	
ACRONYM	:	
KEYWORDS	:EXPLORATION LICENCES	:MINERAL EXPLORATION
	:MAPS	:COAL EXPLORATION
	:PETROLEUM EXPLORATION	:
	:	:
	:	:
BROADSUBJECT	:1344 :1350 :1055	
DATABASE TYPE	:S (S-SOURCE/R-REFERENCE)	
DATABASE STATUS	:A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)	
AREA	:QLD	
PERIOD FROM	:1960 TO :+	
SYSTEM TYPE	: (M-MANUAL/C-COMPUTERISED/B-BOTH)	
MANUAL TYPE	:MICROFILM AND HARD COPY	
COMPUTER TYPE	:	
DATA VOLUME	: 2000 RECORDS	
CONTACT	:SUP.CARTO.EXPL.TITLE	
	:CARTOGRAPHIC SERVICES	
	: 2247469	

COMMENTS:
MAPS 1960 - PRESENT
SCHEDULES 1967 - PRESENT

DATABASE ACCESSIBILITY/AVAILABILITY:
PUBLIC ACCESS THROUGH PUBLIC COUNTER

INDEXED BY:
MONTH/YEAR

OUTPUT PRODUCTS:
PRINTS

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 11 ENTRY DATE :17/03/88

DATABASE NAME :ROYALTY STATISTICS
ACRONYM :

KEYWORDS :ROYALTIES :TAXATION
:MINERAL INDUSTRY :MINERAL STATISTICS
:STATISTICS :COAL STATISTICS
:PETROLEUM STATISTICS :INDUSTRIAL MINERALS
:GOLD :BASE METALS

BROADSUBJECT :1330 :1350 :1370

DATABASE TYPE :S (S-SOURCE/R-REFERENCE)
DATABASE STATUS :A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)

AREA :QLD
PERIOD FROM :CUR TO :
SYSTEM TYPE :M (M-MANUAL/C-COMPUTERISED/B-BOTH)
MANUAL TYPE :REPORTS
COMPUTER TYPE :
DATA VOLUME : 50 REPORTS

CONTACT :ROYALTY STAFF
:ROYALTIES
: 2242281

COMMENTS:

DATABASE ACCESSIBILITY/AVAILABILITY:
CONFIDENTIAL - NO ACCESS TO PUBLIC

INDEXED BY:

OUTPUT PRODUCTS:

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 119 ENTRY DATE :21/03/88

DATABASE NAME :SEISMIC REFLECTION SURVEY LINE DATA
ACRONYM :LINDAT

KEYWORDS :GEOPHYSICAL SURVEYS :SEISMIC REFLECTION SURVEYS
:DOCUMENTATION :SEISMIC PROFILES
: :
: :
: :

BROADSUBJECT :1230 :1344 :1445

DATABASE TYPE :R (S-SOURCE/R-REFERENCE)
DATABASE STATUS :A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)

AREA :QLD
PERIOD FROM : TO :
SYSTEM TYPE :C (M-MANUAL/C-COMPUTERISED/B-BOTH)
MANUAL TYPE :
COMPUTER TYPE :HARD DISK, DBASE III+, NEC APC4
DATA VOLUME : 20000 SEISMIC SECTIONS

CONTACT :P.JONES / V.SUCHOCKI
:PETROLEUM RESOURCES ASSESSMENT AND DEVELOPMENT
: 2247345

COMMENTS:
SEISMIC SECTIONS AND SHOT POINT MAPS OF SEISMIC SURVEYS SHOT IN
QUEENSLAND

DATABASE ACCESSIBILITY/AVAILABILITY:
INTERNAL USE ONLY

INDEXED BY:
SURVEY NAME, LINE PREFIX, COMPANY, A TO P

OUTPUT PRODUCTS:

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 173 ENTRY DATE :16/09/88

DATABASE NAME	:SEISMIC REFLECTION SURVEY LOCATIONS	
ACRONYM	:SURVMAP	
KEYWORDS	:GEOPHYSICAL SURVEYS	:SEISMIC REFLECTION SURVEYS
	:MAP INDEX	:
	:	:
	:	:
	:	:
BROADSUBJECT	:1230 :1344 :1445	
DATABASE TYPE	:R (S-SOURCE/R-REFERENCE)	
DATABASE STATUS	:A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)	
AREA	:QLD	
PERIOD FROM	: TO :	
SYSTEM TYPE	:C (M-MANUAL/C-COMPUTERISED/B-BOTH)	
MANUAL TYPE	:	
COMPUTER TYPE	:HARD DISK,DBASE III+,NEC APC4	
DATA VOLUME	: 700 SURVEYS	
CONTACT	:P.JONES/V.SUCHOCKI	
	:PETROLEUM RESOURCES ASSESSMENT AND DEVELOPMENT	
	: 2247438	

COMMENTS:
CORRELATE SEISMIC REFLECTION SURVEYS TO 1 : 100 000 MAP REFERENCES.

DATABASE ACCESSIBILITY/AVAILABILITY:
INTERNAL OR BY REQUEST FROM PUBLIC

INDEXED BY:
SURVEY NAME

OUTPUT PRODUCTS:

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 174 ENTRY DATE :16/09/88

DATABASE NAME	:SEISMIC SHOTPOINT LOCATION DATA	
ACRONYM	:SPLOC	
KEYWORDS	:GEOPHYSICAL SURVEY	:SEISMIC REFLECTION SURVEYS
	:MAP INDEX	:
	:	:
	:	:
	:	:
BROADSUBJECT	:1230 :1344 :1445	
DATABASE TYPE	:R (S-SOURCE/R-REFERENCE)	
DATABASE STATUS	:U (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)	
AREA	:QLD	
PERIOD FROM	: TO :	
SYSTEM TYPE	:C (M-MANUAL/C-COMPUTERISED/B-BOTH)	
MANUAL TYPE	:	
COMPUTER TYPE	:	
DATA VOLUME	: 700	
CONTACT	:R.HUBER/O.DIXON	
	:GEOPHYSICAL SERVICES	
	: 2247409	

COMMENTS:
DIGITAL STORAGE OF SHOTPOINT LOCATION DATA.

DATABASE ACCESSIBILITY/AVAILABILITY:

INDEXED BY:

OUTPUT PRODUCTS:

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 103 ENTRY DATE :18/03/88

DATABASE NAME	:SOUTHERN EROMANGA BASIN - VSHALE MAPS	
ACRONYM	:	
KEYWORDS	:EROMANGA BASIN	:MAPS
	:STRATIGRAPHIC DRILLING	:OIL WELLS
	:	:
	:	:
	:	:
BROADSUBJECT	:1445 : 0 : 0	
DATABASE TYPE	:S (S-SOURCE/R-REFERENCE)	
DATABASE STATUS	:U (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)	
AREA	:SOUTHWEST QLD	
PERIOD FROM	: TO :300686	
SYSTEM TYPE	:M (M-MANUAL/C-COMPUTERISED/B-BOTH)	
MANUAL TYPE	:MAPS	
COMPUTER TYPE	:	
DATA VOLUME	: 2 1:100 000 MAPS	
CONTACT	:T. BRAIN, TONY NOON	
	:BASIN STUDIES	
	: 2247474	

COMMENTS:
VSHALE MAPS FOR WESTBOURNE AND BIRKHEAD FORMATIONS.
GENERATED AS PART OF NERDDP 914 PROJECT.
BASED ON APPROX. 250 PETROLEUM AND STRATIGRAPHIC WELLS

DATABASE ACCESSIBILITY/AVAILABILITY:
INTERNAL/EXTERNAL (OPEN FILE)

INDEXED BY:

OUTPUT PRODUCTS:
FUTURE GSQ RECORD

DOCUMENTATION:
FUTURE GSQ RECORD

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 96 ENTRY DATE :18/03/88

DATABASE NAME :SOUTHERN EROMANGA BASIN MACERAL DATA BASE
ACRONYM :MACERAL

KEYWORDS :EROMANGA BASIN :OIL WELLS
:STRATIGRAPHIC :DRILLING
:COAL CONTITUENTS :COAL PETROLOGY
: :
: :

BROADSUBJECT :1090 :1055 :1450

DATABASE TYPE :S (S-SOURCE/R-REFERENCE)
DATABASE STATUS :A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)

AREA :STH EROMANGA BASIN
PERIOD FROM : 1970 TO :+
SYSTEM TYPE :C (M-MANUAL/C-COMPUTERISED/B-BOTH)
MANUAL TYPE :
COMPUTER TYPE :HARD DISK, DBASEIII+, IBMPC COMPATIBLE
DATA VOLUME : 1138 RECORDS

CONTACT :T. NOON, L. WILLIAMS
:BASIN STUDIES
: 2247456

COMMENTS:
GENERATED AS PART OF NERDDP PROJECT 914

DATABASE ACCESSIBILITY/AVAILABILITY:
INTERNAL/EXTERNAL REFER TO DATA RECORDS. COULD BE SUPPLIED ON FLOPPY DISK

INDEXED BY:
WELL/BORE LOCATION NUMBER (CROSS INDEXED TO BORE/WELL NAME)

OUTPUT PRODUCTS:
GRAPHICAL SUMMARIES IN DATA RECORDS, PRINTOUTS

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 91 ENTRY DATE :18/03/88

DATABASE NAME :SOUTHERN EROMANGA BASIN ORGANIC MATTER DB.
ACRONYM :ORGMAT

KEYWORDS :EROMANGA BASIN :STRATIGRAPHIC DRILLING
:OIL WELLS :KEROGEN
:ORGANIC MATERIAL :
: :
: :

BROADSUBJECT :1090 :1445 :1190

DATABASE TYPE :S (S-SOURCE/R-REFERENCE)
DATABASE STATUS :U (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)

AREA :STH EROMANGA BASIN
PERIOD FROM :1970 TO :+
SYSTEM TYPE :C (M-MANUAL/C-COMPUTERISED/B-BOTH)
MANUAL TYPE :
COMPUTER TYPE :HARD DISK, DBASEIII+, IBM PC COMPATIBLE
DATA VOLUME : 771 RECORDS

CONTACT :T. NOON, L. WILLIAMS
:BASIN STUDIES
: 2247456

COMMENTS:
GENERATED AS PART OF NERDDP PROJECT 914.
KEROGEN ABUNDANCE FOR CORES FROM PETROLEUM WELLS AND STRATIGRAPHIC BORES

DATABASE ACCESSIBILITY/AVAILABILITY:
SUBPROGRAM USE ONLY DURING DEVELOPMENT. DATA COULD BE SOLD ON FLOPPIES WHEN COMPLETED

INDEXED BY:
WELL/BORE LOCATION NUMBER
CROSS INDEXED TO WELL BORE NAME

OUTPUT PRODUCTS:
TABULATED IN DATA RECORDS, PRINTOUTS.

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO.	: 95	ENTRY DATE :18/03/88

DATABASE NAME	:SOUTHERN EROMANGA BASIN SEISMIC SURVEY DB.	
ACRONYM	:	
KEYWORDS	:EROMANGA BASIN	:SEISMIC SURVEYS
	:INDEXES	:
	:	:
	:	:
	:	:
BROADSUBJECT	:1445 :1230 :1600	
DATABASE TYPE	:S (S-SOURCE/R-REFERENCE)	
DATABASE STATUS	:I (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)	
AREA	:(QLD) STH EROMANGA B	
PERIOD FROM	:1981 TO :1986	
SYSTEM TYPE	:C (M-MANUAL/C-COMPUTERISED/B-BOTH)	
MANUAL TYPE	:	
COMPUTER TYPE	:HARD DISK, DBASEIII+, IBMPC COMPATIBLE	
DATA VOLUME	: 98 SURVEYS	
CONTACT	:T. NOON	
	:BASIN STUDIES	
	: 2247456	

COMMENTS:
LOCATIONS, LINE KMS, AND MAP SHEET COVERAGE FOR SEISMIC SURVEYS IN
SOUTHERN
EROMANGA BASIN.
MAINLY USED FOR DATA ADMINISTRATION DURING COMPILATION OF SEISMIC LINE
LOCATION MAPS.
GENERATED AS PART OF NERDDP PROJECT 914

DATABASE ACCESSIBILITY/AVAILABILITY:
INTERNAL/PUBLIC REFER TO GSQ RECORD 1984/47

INDEXED BY:
SEISMIC SURVEY NAME, MAPSHEET

OUTPUT PRODUCTS:
PRINTOUT IN GSQ RECORD 1986/47

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 99 ENTRY DATE :18/03/88

DATABASE NAME :SOUTHERN EROMANGA BASIN STRCTL ELMTS MAPS
ACRONYM :

KEYWORDS :EROMANGA BASIN :MAPS
:TECTONIC MAPS :STRUCTURAL GEOLOGY
: :
: :
: :

BROADSUBJECT :1600 : 0 : 0

DATABASE TYPE :S (S-SOURCE/R-REFERENCE)
DATABASE STATUS :I (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)

AREA :STH EROMANGA BASIN
PERIOD FROM :CUR TO :JUN86
SYSTEM TYPE :C (M-MANUAL/C-COMPUTERISED/B-BOTH)
MANUAL TYPE :
COMPUTER TYPE :DISK
DATA VOLUME : 0

CONTACT :K.HOFFMAN,L.WILLIAMS
:BASIN STUDIES
: 2247474

COMMENTS:
GENERATED AS PART OF NERDDP PROJECT 914.
STRUCTURAL ELEMENTS PRESENT AT THE "C" AND "P" HORIZON LEVELS.

DATABASE ACCESSIBILITY/AVAILABILITY:
INTERNAL/EXTERNAL (OPEN FILE)

INDEXED BY:
C AND P HORIZONS

OUTPUT PRODUCTS:
GSQ RECORD 1987/35; DYELINE COPIES AVAILABLE

DOCUMENTATION:
GSQ RECORD 1987/35

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 98 ENTRY DATE :18/03/88

DATABASE NAME	:SOUTHERN EROMANGA BASIN WELL LOCATION MAPS	
ACRONYM	:	
KEYWORDS	:OIL WELLS	:STRATIGRAPHIC DRILLING
	:MAPS	:INDEXES
	:EROMANGA BASIN	:
	:	:
	:	:
BROADSUBJECT	:1090 :1590 :1440	
DATABASE TYPE	:S (S-SOURCE/R-REFERENCE)	
DATABASE STATUS	:I (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)	
AREA	:SOUTHWEST QLD	
PERIOD FROM	:CUR TO :300686	
SYSTEM TYPE	:C (M-MANUAL/C-COMPUTERISED/B-BOTH)	
MANUAL TYPE	:	
COMPUTER TYPE	:DISK, PRIME/GDS	
DATA VOLUME	: 21 MAPS	
CONTACT	:K.HOFFMANN / T.NOON	
	:BASIN STUDIES	
	: 2247474	

COMMENTS:
GENERATED AS PART OF NERDDP 914 PROJECT. 244 WELLS PLOTTED ON 20 MAP SHEETS (1:250 000) AND ONE MAP (1:1 MIL)

DATABASE ACCESSIBILITY/AVAILABILITY:
INTERNAL/EXTERNAL (OPEN FILE)

INDEXED BY:
ALPHABETICALLY BY 1:250,000 SHEET. SINGLE 1:1,000,000

OUTPUT PRODUCTS:
GSQ RECORD 1986/50; DYELINE COPIES AVAILABLE

DOCUMENTATION:
GSQ RECORD 1986/50

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 100 ENTRY DATE :18/03/88

DATABASE NAME :SOUTHERN EROMANGA BSN KEROGEN FACIES MAPS
ACRONYM :

KEYWORDS :EROMANGA BASIN :KEROGEN
:MAPS :OIL WELLS
:STRTIGRAPHIC DRILLING :GEOCHEMICAL MAPS
: :
: :

BROADSUBJECT :1445 :1190 :1090

DATABASE TYPE :S (S-SOURCE/R-REFERENCE)
DATABASE STATUS :U (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)

AREA :SOUTHWEST QLD
PERIOD FROM :CUR TO :300987
SYSTEM TYPE :C (M-MANUAL/C-COMPUTERISED/B-BOTH)
MANUAL TYPE :
COMPUTER TYPE :DISK, PRIME
DATA VOLUME : 6 1:100 000 MAPS

CONTACT :PETER HAWKINS
:BASIN STUDIES
: 2247474

COMMENTS:
GENERATED AS PART OF NERDDP 914 PROJECT.
BASED ON APPROX. 180 WELLS

DATABASE ACCESSIBILITY/AVAILABILITY:
INTERNAL AND EXTERNAL USE

INDEXED BY:
BASAL JURASSIC, BIRKHEAD FM, WESTBOURNE FM, SINGLE 1:100 000

OUTPUT PRODUCTS:
FUTURE GSQ RECORD

DOCUMENTATION:
FUTURE GSQ RECORD

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 97 ENTRY DATE :18/03/88

DATABASE NAME :SOUTHERN EROMANGA PYROLYSIS DATA BASE
ACRONYM :

KEYWORDS :EROMANGA BASIN :OIL WELLS
:STRATIGRAPHIC DRILLING :PYROLYSIS
: :
: :
: :

BROADSUBJECT :1090 :1440 : 0

DATABASE TYPE :S (S-SOURCE/R-REFERENCE)
DATABASE STATUS :A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)

AREA :STH EROMANGA BASIN
PERIOD FROM :1970 TO :+
SYSTEM TYPE :C (M-MANUAL/C-COMPUTERISED/B-BOTH)
MANUAL TYPE :
COMPUTER TYPE :HARD DISK, DBASEIII+, IBMPC COMPATIBLE
DATA VOLUME : 2796 RECORDS

CONTACT :NOON/ALMOND/HAWKINS
:BASIN STUDIES
: 2247456

COMMENTS:
TOC AND ROCK EVAL PYROLYSIS DATA FOR PETROLEUM WELLS AND STRATIGRAPHIC BORES.
GENERATED AS PART NERDDP PROJECT 914

DATABASE ACCESSIBILITY/AVAILABILITY:

INDEXED BY:
WELL/BORE LOCATION NUMBER (CROSS INDEXED TO WELL/BORE NAME)

OUTPUT PRODUCTS:
DATA RECORDS WITH GRAPHICAL SUMMARIES

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 102 ENTRY DATE :18/03/88

DATABASE NAME :STHN EROMANGA BSN BASEMENT LITHOLOGY MAP
ACRONYM :

KEYWORDS :EROMANGA BASIN :SUBSURFACE MAPS
:MAPS :TECTONIC MAPS
: :
: :
: :

BROADSUBJECT :1600 : 0 : 0

DATABASE TYPE :S (S-SOURCE/R-REFERENCE)
DATABASE STATUS :U (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)

AREA :SOUTHWEST QLD
PERIOD FROM : TO :
SYSTEM TYPE :M (M-MANUAL/C-COMPUTERISED/B-BOTH)
MANUAL TYPE :MAP
COMPUTER TYPE :
DATA VOLUME : 1 X 1:1,000,000 MAP

CONTACT :HAWKINS, HOFFMANN
:BASIN STUDIES
: 2247474

COMMENTS:
GENERATED AS PART OF NERDDP 914

DATABASE ACCESSIBILITY/AVAILABILITY:
INTERNAL/EXTERNAL/OPEN FILE

INDEXED BY:

OUTPUT PRODUCTS:
GSQ RECORD IN PREP.

DOCUMENTATION:
GSQ RECORD, IN PREP.

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 101 ENTRY DATE :18/03/88

DATABASE NAME :STHN EROMANGA BSN SEISMIC LINE LOCATION MP
ACRONYM :

KEYWORDS :EROMANGA BASIN :SEISMIC SURVEYS
:OIL WELLS :INDEXES
:MAPS :STRATIGRAPHIC DRILLING
: :
: :

BROADSUBJECT :1445 :1230 :1090

DATABASE TYPE :S (S-SOURCE/R-REFERENCE)
DATABASE STATUS :I (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)

AREA :SOUTHWEST QLD
PERIOD FROM :1981 TO :1985
SYSTEM TYPE :M (M-MANUAL/C-COMPUTERISED/B-BOTH)
MANUAL TYPE :SEPIA
COMPUTER TYPE :
DATA VOLUME : 20 MAP SHEETS

CONTACT :K. HOFFMANN, T. NOON
:BASIN STUDIES
: 2247474

COMMENTS:
GENERATED AS PART OF NERDDP 914 PROJECT

DATABASE ACCESSIBILITY/AVAILABILITY:
INTERNAL/EXTERNAL (OPEN FILE)

INDEXED BY:
ALPHABETICALLY BY 1:250 000

OUTPUT PRODUCTS:
GSQ RECORD 1986/47; DYELINE COPY AVAILABLE ON REQUEST

DOCUMENTATION:
GSQ RECORD 1986/47

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 92 ENTRY DATE :18/03/88

DATABASE NAME	:STRATIGRAPHIC BORE FILES	
ACRONYM	:	
KEYWORDS	:DRILLING	:STRTIGRAPHIC DRILLING
	:GEOLOGICAL LOGS	:DRILL CORE ANALYSES
	:	:
	:	:
	:	:
BROADSUBJECT	:1590 :1090 : 0	
DATABASE TYPE	:S (S-SOURCE/R-REFERENCE)	
DATABASE STATUS	:A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)	
AREA	:QLD	
PERIOD FROM	:1963 TO :+	
SYSTEM TYPE	:M (M-MANUAL/C-COMPUTERISED/B-BOTH)	
MANUAL TYPE	:FILES	
COMPUTER TYPE	:	
DATA VOLUME	: 180 FILES	
CONTACT	:T.NOON / B.JOHN	
	:BASIN STUDIES	
	: 2247456	

COMMENTS:
COLLECTION OF DATA RELATING TO DEPARTMENTAL STRATIGRAPHIC BORES EG.
LITHOLOGIC
LOGS, ANALYTICAL RESULTS, DRILLERS TOW SHEETS

DATABASE ACCESSIBILITY/AVAILABILITY:
INTERNAL / EXTERNAL; FILES TO BE VIEWED WITHIN CONFINES OF BASIN
STUDIES

INDEXED BY:
BORE NAME

OUTPUT PRODUCTS:
PHOTOCOPIES, VERBAL REPLIES

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 94 ENTRY DATE :18/03/88

DATABASE NAME	:STRATIGRAPHIC BORE LOCATON MAPS	
ACRONYM	:	
KEYWORDS	:MAPS	:STRATIGRAPHIC DRILLING
	:INDEXES	:DRILLING
	:	:
	:	:
	:	:
BROADSUBJECT	:1590 :1090 : 0	
DATABASE TYPE	:S (S-SOURCE/R-REFERENCE)	
DATABASE STATUS	:A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)	
AREA	:QLD	
PERIOD FROM	:1963 TO :+	
SYSTEM TYPE	:M (M-MANUAL/C-COMPUTERISED/B-BOTH)	
MANUAL TYPE	:MAPS ON BACKING BOARD	
COMPUTER TYPE	:	
DATA VOLUME	: 48 MAPS	
CONTACT	:B.S. PERSONNEL	
	:BASIN STUDIES	
	: 2247456	

COMMENTS:
1:250 000 GEOLOGICAL SERIES MAPS WITH STRATIGRAPHIC BORE LOCATIONS MARKED

DATABASE ACCESSIBILITY/AVAILABILITY:
INTERNAL/EXTERNAL (WITHIN CONFINES OF BASIN STUDIES SUBPROGRAM)

INDEXED BY:
ALPHABETICALLY BY MAPSHEET NAME

OUTPUT PRODUCTS:

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 93 ENTRY DATE :18/03/88

DATABASE NAME :STRATIGRAPHIC BORE LOGS
ACRONYM :

KEYWORDS :DRILLING :STRATIGRAPHIC DRILLING
:CORE LOGS :COMPOSITE LOGS
: :
: :
: :

BROADSUBJECT :1590 :1090 : 0

DATABASE TYPE :S (S-SOURCE/R-REFERENCE)
DATABASE STATUS :A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)

AREA :QLD
PERIOD FROM :1963 TO :
SYSTEM TYPE :M (M-MANUAL/C-COMPUTERISED/B-BOTH)
MANUAL TYPE :SEPIA FILM
COMPUTER TYPE :
DATA VOLUME : 198 SEPIAS

CONTACT :T. NOON OR PERSONNEL
:BASIN STUDIES
: 2247456

COMMENTS:
COMPOSITE BORE LOGS FOR DEPARTMENTAL STRATIGRAPHIC BORES, AS WELL AS
SELECTED

WATER BORES AND COAL BORES.

MOST COPIES OF LOGS ARE ONE OFF ORIGINALS. EXTREME CARE MUST BE TAKEN
WHEN
BORROWED FOR COPYING - DUPLICATES ARE BEING MADE PROGRESSIVELY.

DATABASE ACCESSIBILITY/AVAILABILITY:
INTERNAL/EXTERNAL (THROUGH INFORMATION SERVICES)

INDEXED BY:
ALPHABETICALLY BY BORE NAME

OUTPUT PRODUCTS:
DYELINE COPIES

DOCUMENTATION:

QUEENSLAND DEPARTMENT OF MINES
DATABASE INVENTORY REPORTS
FULL REFERENCE LIST

REFERENCE NO. : 132 ENTRY DATE :21/03/88

DATABASE NAME	:WATER BORE DATA SYSTEM	
ACRONYM	:	
KEYWORDS	:GROUNDWATER	:HYDROGEOLOGICAL DATA
	:WATER CHEMISTRY	:WATER WELLS
	:DRILLING	:STRATIGRAPHY
	:DRILL HOLES	:
	:	:
BROADSUBJECT	:1240 :1650 : 0	
DATABASE TYPE	:S (S-SOURCE/R-REFERENCE)	
DATABASE STATUS	:A (A-ACTIVE/I-INACTIVE/U-UNDER DEVELOPMENT/C-CLOSED)	
AREA	:QLD	
PERIOD FROM	:1890 TO :+	
SYSTEM TYPE	:C (M-MANUAL/C-COMPUTERISED/B-BOTH)	
MANUAL TYPE	:	
COMPUTER TYPE	:MAGNETIC DISK, SPECIAL PURPOSE DBMS, UNIVAC 1100/82	
DATA VOLUME	: 14500 BORES	
CONTACT	:T.NOON / P.MULLER	
	:BASIN STUDIES	
	: 2247456	

COMMENTS:
SUPERCEDES WATRMAS DATABASE WHICH NO LONGER EXITS IN ANY USABLE FORM

DATABASE ACCESSIBILITY/AVAILABILITY:
INTERNAL USE ONLY, DATA AVAILABLE TO PUBLIC ON REQUEST

INDEXED BY:
UNIQUE REFERENCE NO ASSIGNED TO EACH BORE, QWRC REGISTERED NUMBER, 1:1000 000/ 1:250 000/ 1:100 000 / 1:50 000 SHEET AREA

OUTPUT PRODUCTS:
COMPREHENSIVE BORE LISTING, LISTINGS AND TABLES OF WATER CHEMISTRY DATA, AND OTHER PRODUCTS AS DESCRIBED IN GSQ RECORD 1987/34

DOCUMENTATION:
GSQ RECORD 1985/47 - SYSTEMS DESCRIPTION
GSQ RECORD 1987/34 - PROGRAMS