AGSO

GUIDE TO *ROCSTOR* - AGSO'S ROCK STORE DATABASE

BY

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RECORD 1996/7

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AUSTRALIAN GEOLOGICAL SURVEY ORGANISATION

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AUSTRALIAN GEOLOGICAL SURVEY ORGANISATION

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ABSTRACT

AGSO's Rock Store Database, or 'ROCSTOR' for short, is a new corporate database to assist with the organisation and management of AGSO's Fyshwick Rock Store facility. It is designed to efficiently catalogue and locate the contents of the Rock Store and to assist with loans of material, both to AGSO staff and *bona fide* external clients. It has a link to the OZROX Field Geology Database for the details of sample location, geology, lithology, *etc.* ROCSTOR is the first AGSO database to be implemented as a proper client/server database application, with graphical screen windows that take full advantage of the Microsoft Windows environment (and, if necessary, other GUI environments as well).

This Record provides a full description of the database and is also a guide to users. All screen windows, their fields and operating procedures are described in some detail, and a full schema for the database is given as an appendix.

1 - INTRODUCTION

For over 30 years the Australian Geological Survey Organisation (and previously the Bureau of Mineral Resources) has maintained a 'Rock Store' at its Fyshwick Stores Compound for keeping rock samples collected during field work. For the most part, these are hand specimens, or larger, collected from outcrop for the purposes of petrographic description, whole-rock geochemistry, mineralogy, age determination, *etc.*, but they also include sediment samples and some drill cores. Palaeontological specimens and cores and cuttings from petroleum exploration wells are kept elsewhere.

As material accumulated over time, the organisation of the Rock Store and the resources allocated to managing it were far from ideal. However, the Rock Store recently underwent a re-evaluation, and is now recognised by management as a potentially valuable asset. In order to take proper advantage of this asset, though, a lot must be done to improve its organisation and management. With this in mind a corporate Rock Store Database, ROCSTOR, has been designed and implemented by the National Geoscience Database Development Project, which is part of AGSO's National Geoscience Information System Program. By the time AGSO and the Rock Store are scheduled to move to a new building in 1998, this facility should be well catalogued and organised, with links in place to other AGSO geoscience databases.

This record describes the infrastructure of the Rock Store Database - which forms part of AGSO's Geological Database System (Figure 1) as 'ROCSTOR'. The structure of the databases is outlined, its library-like loans system and all windows that go to make up the new graphical user interface system are described. The definition of most fields are given in detail, and a full schema is listed as an appendix.

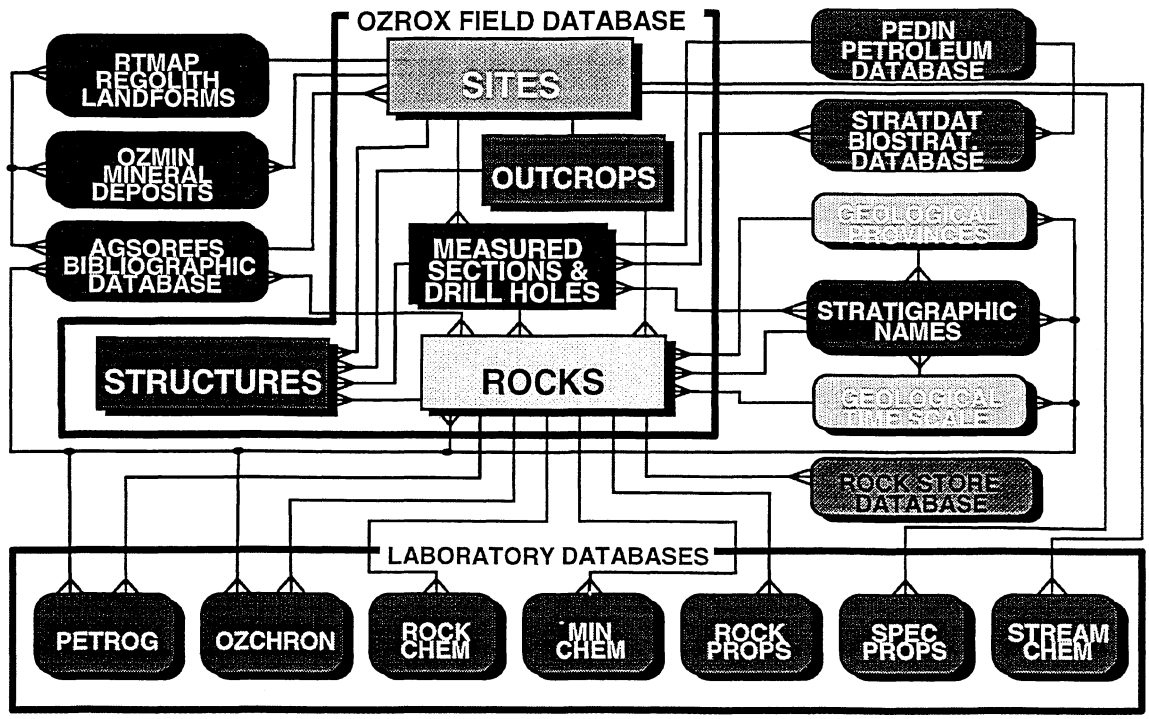

Figure 1: Simplified diagram of AGSO's Geological Database System from Ryburn, *et al.*, 1995

SOFTWARE REQUIREMENTS

The ROCSTOR Database application was built with Oracle's DEVELOPER/2000 Tools for Micrsoft® Windows version 3.1x. It is a true client/server application acting as a client for the ROCSTOR Database which currently runs on the Oracle 7 relational database management system (RDBMS) under UNIX 5.4 on AGSO's DG AViiON 6240 computer. The ROCSTOR application requires the following system configuration:

- Microsoft Windows 3.1 or later.
- Oracle Forms (Runform) version 4.5 or later.
- Oracle SQL*Net 1.0 or later.
- TCP/IP Stack Software which is supported by Oracle SQL*Net (*eg* Novell's LAN Workplace software).

Oracle Forms and SQL*Net are also available for Apple Macintosh System 7 and Motif and X-Windows for UNIX. The ROCSTOR application may become available for these operating systems in the future, but these interfaces do not support the complete range of features used by the ROCSTOR Database application.

HARDWARE REQUIREMENTS

To run Oracle Forms and Oracle SQL*Net you require an IBM-PC or compatible running Microsoft Windows 3.1x with at least 8MB of RAM and 28MB of disk space; the ROCSTOR forms require an additional 1MB of disk space. The PC must be connected to the AGSO Novell network via Ethernet.

For *acceptable* performance, it is recommended that the PC have at least:

- Pentium processor
- 8MB RAM (16MB is highly recommended)
- 30MB disk space
- the Ethernet connection should be a minimum 2Mb/s link.

STRUCTURE OF THE ROCSTOR DATABASE

The ROCSTOR Database consists of three main data tables - BOXES, SAMPLES and LOANS. All other tables indicated in Figure 2 below are lookup tables used to validate the classifications and nomenclature used in these main tables.

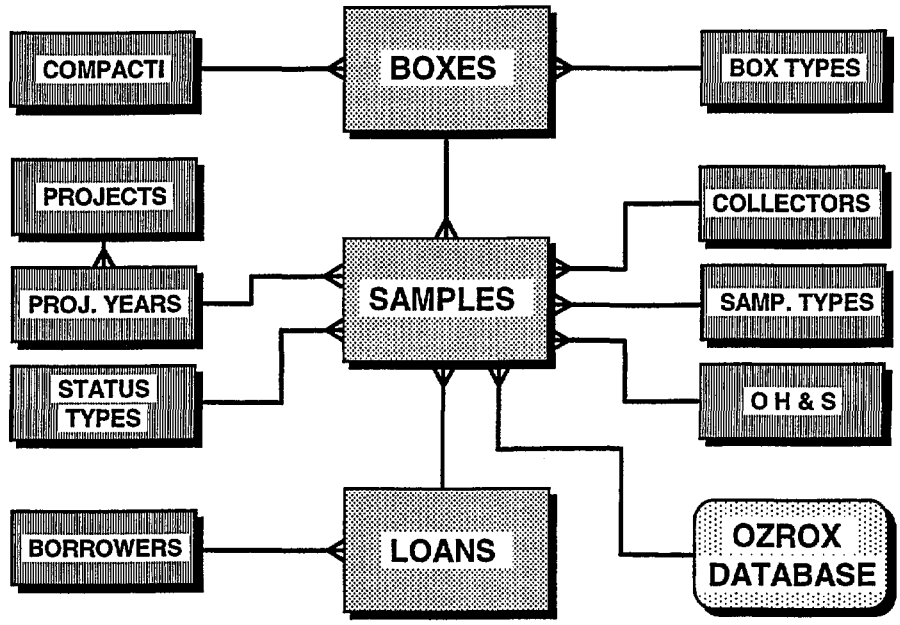

Figure 2: The Structure of the Rock Store Database showing the main data tables in light grey, lookup tables in darker grey and the OZROX database as a rounded box. The 'many' end of one-to-many linkages are indicated by the 'crows feet'.

The hub of the Rock Store Database is the SAMPLES table, which is the only indication of the physical existence of samples in the AGSO Rock Store. This table is logically linked via the Box Number to the BOXES table, which indicates the physical location of the sample in the store, and via the Rock Store Number and Box Number to the LOANS table which records the borrowings of the sample. The SAMPLES table is logically linked to the ROCKS table in the OZROX database via the Rock Number. Full definitions of all tables, indexes and views used by the ROCSTOR Database are given in Appendix B. The OZROX Database is described in detail in Ryburn *et al.* (1995).

SECURITY & ACCESS

Three Oracle database roles have been set up for the ROCSTOR Database. These are:

- ROCSTOR_ADMIN - has *ALL* privileges on all ROCSTOR tables.
- ROCSTOR_ENTRY - has *ALL* privileges on BOXES, SAMPLES, LOANS, PROJYEARS, BORROWERS and COLLECTORS tables, *SELECT* and *UPDATE* privileges on the MAXNOS table and *SELECT* privileges on the remaining authority tables.
- ROCSTOR_USER - has *SELECT* privileges on all ROCSTOR tables. At present all AGSO staff have access to this role (via the INTERNAL role).

The application determines the privileges of the user at start-up and sets access to the tables accordingly.

ORACLE FORMS 4.5 INTERFACE

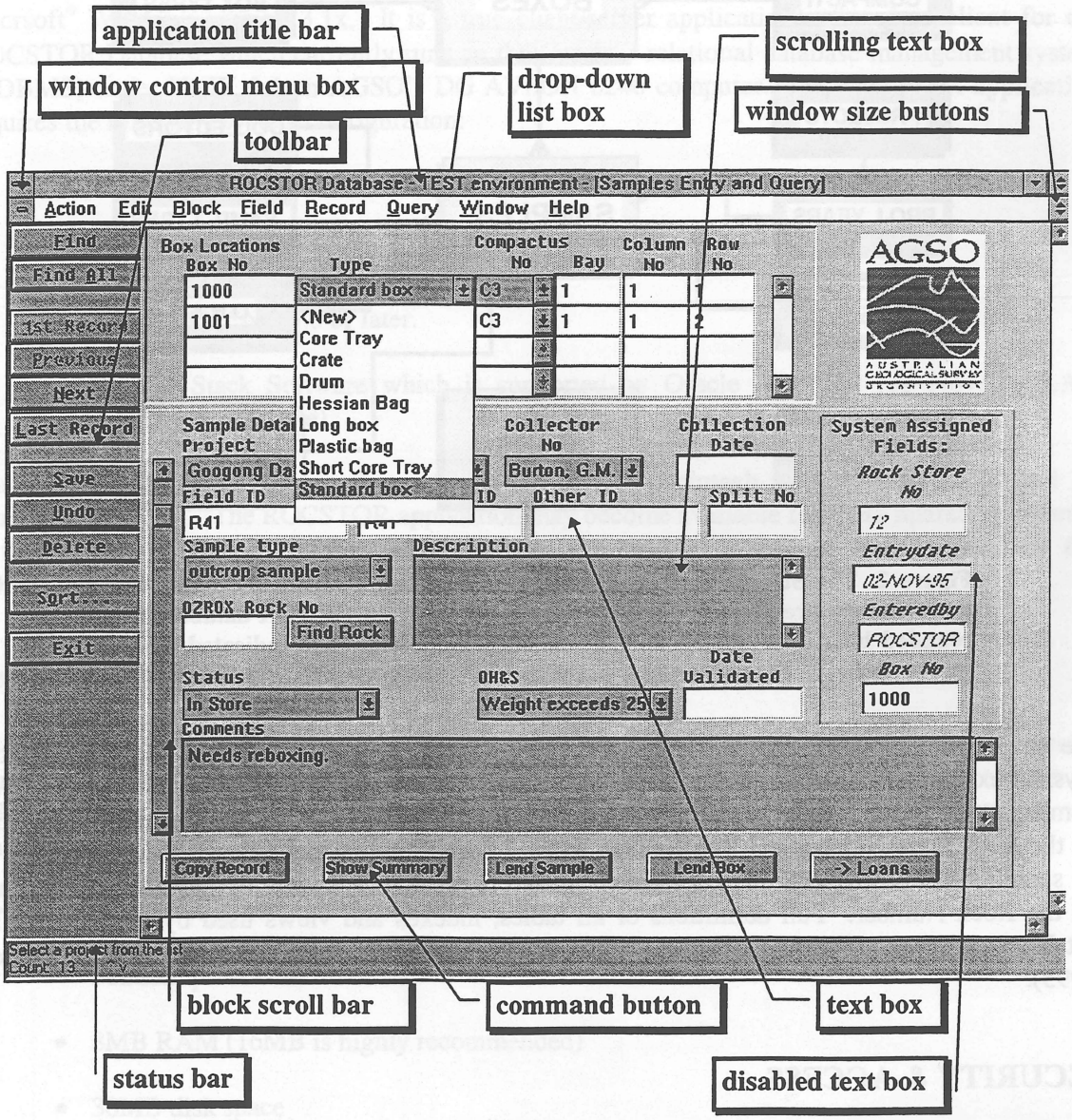

Figure 3: Oracle Forms 4.5 Interface Features

ROCSTOR is the first AGSO database to be developed using Oracle Forms 4.5 and for this reason the Windows interface is covered in some detail. Oracle Forms 4.5 for Windows makes many of the features of the normal Microsoft Windows interface available. An example of the Forms 4.5 interface showing the features is illustrated in Figure 3. Most of these features are "normal" Windows interface features and behave as expected. The behaviour of these features in the AGSO ROCSTOR Database application is as follows:

Application title bar The title bar displays the name of the database to which you are connected and the Oracle environment in which it is located. In the example in Figure 3, this is "ROCSTOR Database - TEST environment". Within the application window may be one or more windows each displaying data from different tables in the ROCSTOR Database. When the current window is maximised, the name of that window is also displayed in the title bar, in the example, "[Samples Entry and Query]".

Window Control Menu Box Double-clicking on this button enables you to close the current window, and is equivalent to choosing the Exit button on the toolbar. Clicking once on the button activates a "standard" Windows control menu which enables you to resize, move or close the window or activate the next window (if there is one). To activate the button menu using the keyboard, press *Alt+<Down-arrow>*.

Toolbar At the left side of the application window is a Toolbar containing command buttons which activate various Oracle features. The buttons are consistent across all windows within an application and wherever possible, across database applications. The buttons are enabled or disabled ("greyed-out") depending on the state of the window, current record and current field.

Drop-down List Box You can select a value from a list by: typing the first few letters of the item so that the window can automatically complete the value; pressing the Enter key repeatedly until the desired value appears in the field; or by accessing the list directly by pressing the down-arrow key (or clicking on the down-arrow icon on the adjacent button with the mouse), then selecting the item from the list.

ROCSTOR will include the "<New>" value in the list when you have privileges to insert new values into the table from which the list is derived. When you select "<New>" the appropriate window will appear.

Scrolling Text Box A text item that is too long to fit in a field in the window can be "wrapped" into a multi-line field. If the item is still too long to fit, then the field is given a scroll bar on the right-hand side so that you may view the remainder of the item by scrolling the field with the mouse and scroll bar. Alternately, you may invoke an editor to display the item by pressing the Edit key (*Ctrl+e*). Note that currently you can only exit from a scrolling text field by using the mouse to position the cursor to another field.

Window Size Buttons When the window is not maximised, there are two buttons active, the one on the left minimises (iconises) the window and the one on the right maximises the window within the application window. Alternatively, choose the Minimize and Maximize options from the window control menu. To restore an iconised window, double click on the icon.

When the window is maximised, there is only one button visible, the ***Restore*** button. Clicking on this button enables you to restore the window to its previous ("normal") size, and is the same as to choosing the ***Restore*** option from the window control menu. To activate the window control menu, click once on the window control menu button. To activate the button menu without the mouse, press *Alt+<Down-arrow>*.

Status Bar ROCSTOR displays advisory messages in the status bar, along with a record count and other options such as "<List>" when a list of values is available for an item.

Block Scroll Bar When more records have been retrieved from the database than can be displayed, a block scroll bar is enabled to allow you to scroll through the retrieved records. It is not an indicator of how much of a search has been retrieved, since it works only on the records currently retrieved and held locally (on your PC) and not to the set of records satisfying the current search criteria. Further complications arise because Oracle holds records locally in a buffer. It is these buffered records that the scoll bar applies to. For example, if the buffer size has been set to 10 records, and a search returns 25 records, then the scroll bar initially works for the first 10 records only: the scroll bar ranges from record 1 to record 10. Once you display record 11, the scroll bar ranges from record 1 to 20; i.e. moving from record 10 to record 11 will cause the scroll bar slider to move from 100% (record 10 of 10 records buffered) to 55% (record 11 of 20 records buffered). Similarly, when you first display record 21 the scroll bar will range

from record 1 to 25 and the slider will move from 100% to 82%. The buffer size is set at application design time to 50 records.

Command Button Command buttons are provided to allow you to quickly perform certain operations on the data quickly. They are frequently used to invoke other windows, or complex procedures. Command buttons may be enabled or disabled, and the labels on the buttons may also change, depending on the current state of the window and the data displayed.

Disabled Text Box When an item is to be available for querying, but not for data entry, the field is normally disabled in the window except in query mode. As a visual clue to the state of a field, the text item is usually "greyed out".

TOOLBAR BUTTONS

The Toolbar consists of sets of command buttons which are enabled and disabled from time to time, depending on the state of the current window and the data displayed.

The "standard" toolbar provided with all ROCSTOR windows includes the following command buttons which function as described:

Find / Same "***Find***" puts the window into "Enter Query" mode. This allows you to input criteria to specify which records are to be retrieved. "***Same***" appears on the button when the window is in "Enter Query" mode, and copies the most recently applied criteria to the window so that it may be altered as required before retrieving records. See the "Users' Guide to AGSO's Oracle Database System" (Lenz, et al., 1993) for further information about specifying criteria for retrieving records. Note that not specifying any criteria is equivalent to choosing the "***Find All***" command button: see the warning about this function in the next section.

Find All / Execute "***Find All***" performs an "open query" - it will retrieve all records in the table applicable to the current block. Beware of using this command, as it may take a long time to execute, especially if a sort order has been specified for the block; all the records must be retrieved and then sorted into the specified order before any records are returned; in a table with a lot of records, this process may take several minutes to several hours. "***Execute***" appears on the button when the window is in "Enter Query" mode and performs the retrieval as specified by the criteria. To determine how many records are to be retrieved choose the ***Count Query*** option from the ***Query*** menu whilst in "Enter Query" mode.

1st Record Positions the cursor to the first field in the first record retrieved. Note that if a sorting order is not specified (see below), the order of records in the block may change from one retrieval to another during the course of a session.

Previous Record Positions the cursor to the same field in the previous record. It is equivalent to pressing the *<Up arrow>* key in most instances.

Next / New Positions the cursor to the same field in the next record. It is equivalent to pressing the *<Down arrow>* key in most instances. Once you reach the last record in the retrieved set of records, the button is labelled as "***New***" and moves the cursor to a new record.

Last Record Positions the cursor to the first field in the last record satisfying the current retrieval criteria. In a table with a lot of records, this function may take a considerable length of time, because the entire table may need to be scanned. To determine how many records are to be retrieved choose the ***Count Query*** option from the ***Query*** menu whilst in "Enter Query" mode.

Note that if a sorting order is not specified (see below), the order of records in the block may change from one retrieval to another during the course of a session.

Save Saves all pending alterations, deletions and additions in all active windows to the database.

Undo "Undoes" all pending alterations, deletions and additions in all active windows. In effect, all changes are ignored and you must retrieve the records again.

Delete Removes the current record from the retrieved set of records, and marks the record as deleted. Further retrievals will not see the record, but the record may be "undeleted" by "Undoing" the deletion (and all other modifications and additions).

Sort Activates the Sort Order dialogue (Figure 4) so that you may specify the order in which records are to be retrieved for the current block. You may specify which fields to order retrievals on and whether the retrieval is to be in ascending (the default) or descending order. The newly specified ordering takes effect with the next retrieval. Note that unsorted retrievals are fastest, since Oracle can return records as they are found, rather than finding all records satisfying the retrieval criteria, then sorting them into order

Exit / Cancel "***Exit***" closes all active windows and exits the ROCSTOR Database application. If there are pending alterations, deletions and additions in any active window, you will be prompted to save or ignore the changes, or cancel and return to ROCSTOR. If you are in "Enter Query" mode, the button will be labelled "***Cancel***" and its function cancels "Enter Query" mode, returning to "Entry" mode.

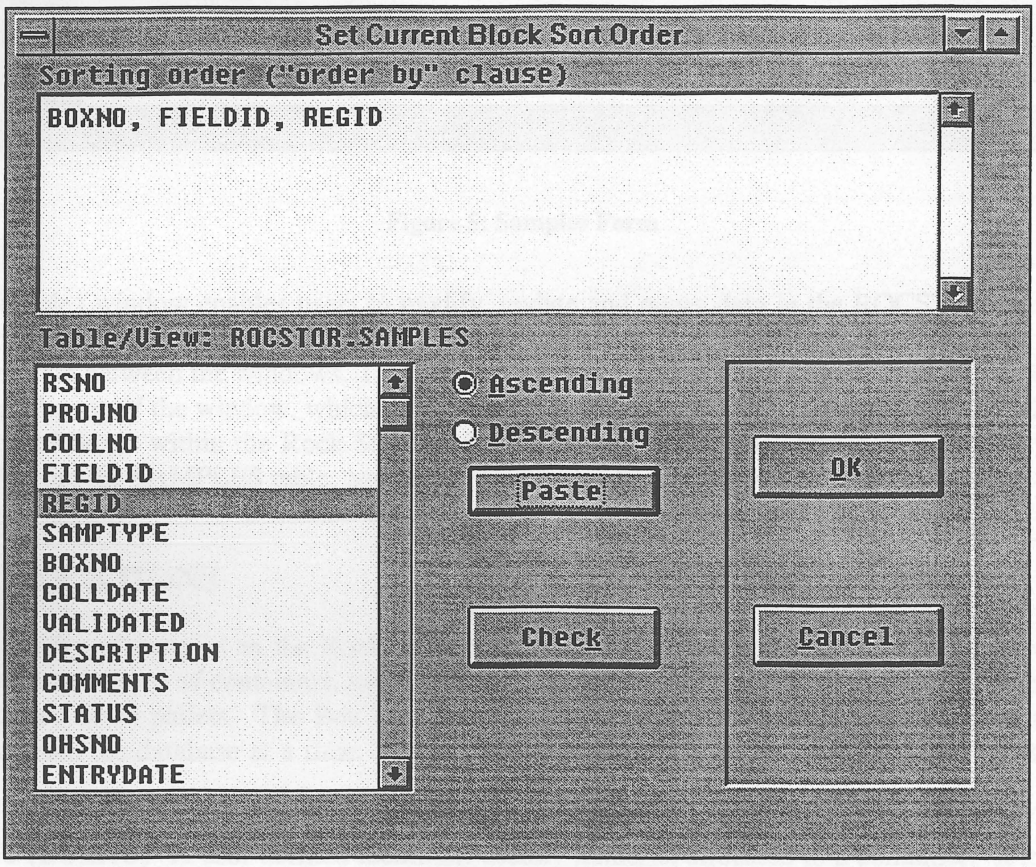

Figure 4: Sort Order dialogue

Setting a Block's Sort Order

To set the current block's sort order, choose the ***Sort*** command button on the toolbar. The Sort Order dialogue appears. At the top of the dialogue, is the ***Sorting order*** text box showing the current sorting order for the block. (This is the "*order by*" clause of an SQL statement.) You may modify the sorting order by editing the text box to suit your requirements. You may check the syntax of the sorting order by choosing the ***Check*** button which will advise you of any syntax errors. Note that you may order by an expression (*eg* UPPER(DESCRIPTION), or YEAR(COLLDATE)) as well as columns. Consult the Oracle SQL Language Reference Manual for further information about expressions.

You may also build the ***Sorting order*** text by selecting the relevant columns from the ***Table/View*** list box below the text box. This is a list of all columns in the table. Highlight the field to be added to the text box, set the ***Ascending*** or ***Descending*** radio button as required (the default is Ascending) and choose the ***Paste*** button to copy the column into the text box. Repeat this procedure until you have included all the columns that specify the sorting order.

Once you have completed specifying the sorting order choose the ***OK*** button. The syntax of the sorting order will be checked and applied to the current block. The ordering of the current block will not be affected until you perform a retrieval.

2 - SAMPLES WINDOW

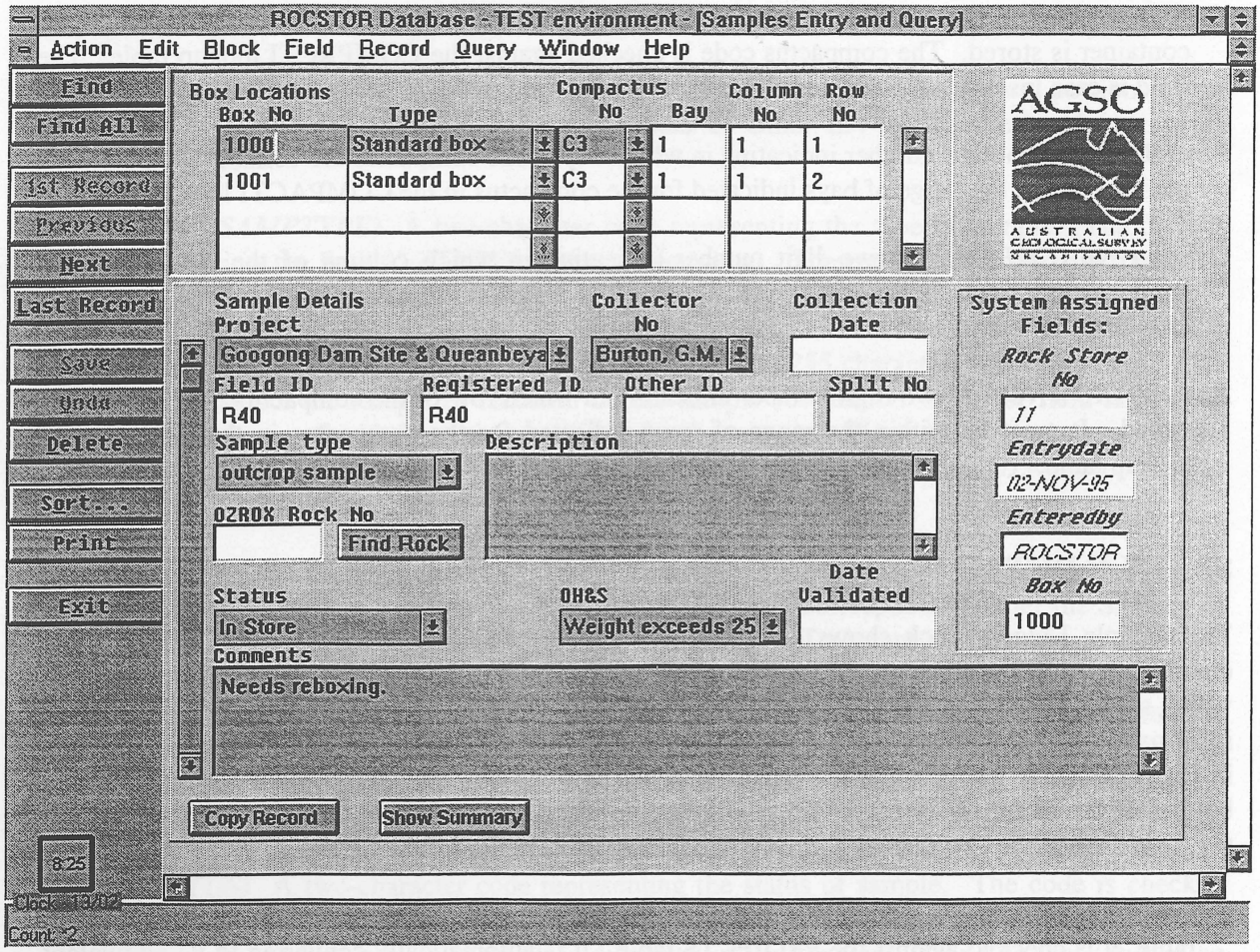

Figure 5: Samples Form

The Samples window enables users to modify, update and query data in the ROCSTOR Database. The user is able to access the Field Data and Loans directly from the Samples window and to transfer data between the windows. The Samples window consists of two blocks, the Box Locations block at the top of the window, which displays records from the BOXES table, showing the physical location of boxes within the Rock Store, and the Sample Details block which displays the related records from the SAMPLES table, and shows the details of each sample.

BOX LOCATIONS

The majority of samples in the Rock Store are contained in boxes. Some samples, however are stored in other types of containers, such as drums, cannisters, and bags, on shelves in the compactus or in crates or on pallets. The Box Locations block is a multi-record block displaying up to four records from the database at a time. It displays the following fields from the ROCSTOR.BOXES table:

Box No (BOXNO) A user defined identifier, usually numeric, allocated to a container. It must be unique, and checks are made to ensure this.

Box Type (BOXTYPE) A two-character code representing the type of container. The code is checked against the BOXTYPES lookup table. The code is automatically translated to its equivalent description by the List Item field which is displayed in the window.

Compactus No (COMPACTUS) The four-character code representing the compactus in which the container is stored. The compactus code is checked against the COMPACTI lookup table. The field is case insensitive (*ie* it doesn't matter if it is entered in upper or lower case).

Bay (BAY) A two-digit number indicating in which bay of the compactus the container is stored. It must be within the range of bays indicated for the compactus in the COMPACTI lookup table.

Column No (COLNO) A two-digit number indicating in which column of the compactus the container is stored. It must be within the range of columns indicated for the compactus in the COMPACTI lookup table.

Row No (ROWNO) A two-digit number indicating in which row of the compactus the container is stored. It must be within the range of rows indicated for the compactus in the COMPACTI lookup table.

SAMPLE DETAILS

The Sample Details block shows details of the samples contained in the currently highlighted container in the Boxes block. There are two formats for this block, the one shown in Figure 5, which shows all data for one sample at a time (the "Details"), and the multi-record view of the same information (the "Summary") which shows up to ten records at a time, in a grid layout as illustrated in Figure 6. It is not possible to see all fields at the one time, so a scroll bar is provided at the bottom of the summary display. There is a button at the bottom left of the Samples block which toggles between the two display formats. The block displays the following fields:

Project (PROJECT) A mandatory four-digit number representing a project in the PROJECTS table. It is checked against the PROJECTS table. It is automatically converted to its equivalent description by the List Item field which is displayed in the window.

Collector (COLLNO) A mandatory four-digit number representing a collector in the COLLECTORS table. It is checked against the COLLECTORS table. It is automatically converted to its equivalent description by the List Item field which is displayed in the window.

Collection Date (COLLDATE) An optional date indicating the date the sample was collected formatted as "DD-MON-YYYY" (eg 13-DEC-1995). A valid date must be entered: if only the year is known, enter the day and month as 01-JAN; if only the month and year is known enter the day as 01. Entry in this fashion will facilitate chronological ordering and searches.

Field ID (FIELDID) A mandatory identifier of up to 16 characters given to the sample in the field. Usually it is the same as the Registered ID, and if the sample is also in the OZROX Field Geology Database, it will usually correspond to the SAMPLEID field in the ROCKS table. This identifier must be unique for a given project-collector combination. If there are several portions of the same sample (all with the same Field ID) then use the Split No field to differentiate between the various portions.

Registered ID (REGID) An optional AGSO registered identifier of up to 16 characters given to the sample. If there are several portions of the same sample (all with the same ***Registered ID***) then use the Split No field to differentiate between the various portions. Usually this identifier will correspond to the **Field ID.**

Other ID (OTHERID) An optional identifier of up to 16 characters given to the sample, which corresponds to neither that given the sample in the field, nor a registered ID, but is recorded because it may the way a sample has been cited in a publication and hence can be located. If there are several portions of the same sample (all with the same Other ID) then use the Split No field to differentiate between the various portions.

Split No (SPLITNO) An optional number given to a sample when there are several portions of the same sample (all with the same Registered, Field or Other ID) to differentiate between the various portions.

Sample Type (SAMPTYPE) A two-character code representing the type of sample. The code is checked against the SAMPLETYPES lookup table (view). The code is automatically translated to its equivalent description by the List Item field which is displayed in the window.

Description (DESCRIPTION) An optional text field of up to 255 characters recording descriptive information about the sample as recorded on the sample submission sheets or field note book where there is no other information available for the sample. There is no need to record the information if the sample data has been recorded elsewhere (eg in the OZROX or MARS databases).

OZROX Rock No (ROCKNO) An optional number indicating the ROCKNO assigned to the sample by the OZROX database. If there is a Registered ID it must correspond to either the SITEID or SAMPLEID of the corresponding ROCKNO in OZROX. To locate the Sample in OZROX, press the "***Find Rock***" button; the Field Data window will be opened and search made in OZROX for a rock with a SITEID and/or SAMPLEID of the given Registered ID. If found, the corresponding ROCKNO can be transferred back to the Samples window. Once there is a value in the OZROX No field, the label on the associated command button becomes "***Show Rock***" and activates and automatically retrieves the indicated rock number.

Status (STATUS) A two-character code representing the status of sample. The code is checked against the STATUSTYPES lookup table. It is automatically converted to its equivalent description by the List Item field which is displayed in the window. Changing the status of an existing sample to "Borrowed" invokes the Loans window, so that you may enter details about the loan.

OH&S (OHS) A two-character code representing an Occupational Health & Safety warning about the sample. The code is checked against the OHS lookup table. It is automatically translated to its equivalent description by the List Item field which is displayed in the window.

Date Validated (VALIDATED) The date the sample details were validated. Allowance has been made for intermediate entry of data by OZROX or MARS database users. When this functionality is finally implemented, this field will record the date the details where reconciled with the physical contents of storage boxes. The field may only be set by users granted ROCSTOR_ENTRY privileges.

Comments (COMMENTS) An optional text field of up to 255 characters to record comments pertinent to the storage of the sample.

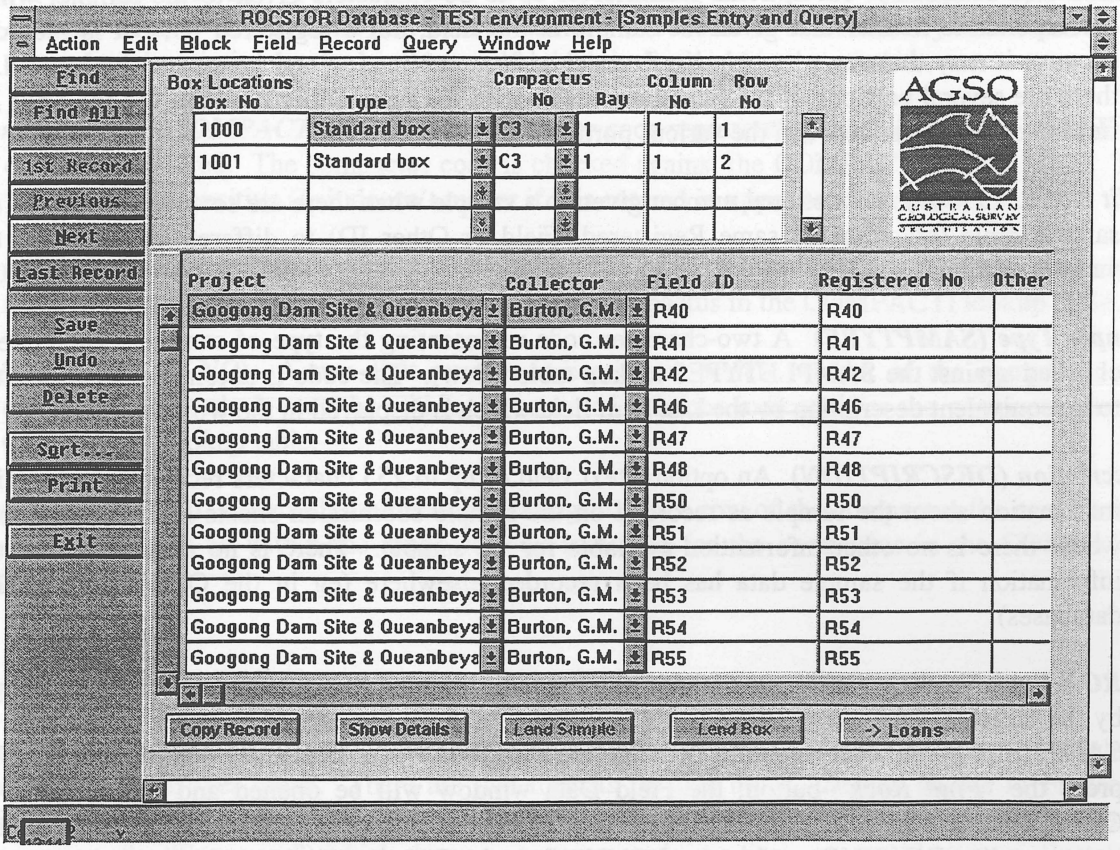

Figure 6: Samples Window showing Sample "Summary"

Rock Store No (RSNO) This is a seven-digit number assigned to the sample upon entry into the SAMPLES table. You may query on this field, but not modify it.

Entry Date (ENTRYDATE) This is the date indicating when a sample is entered into the SAMPLES table. You may query on this field, but not modify it.

Entered By (ENTEREDBY) This is the Oracle user ID of the user who entered the sample into the SAMPLES table. You may query on this field, but not modify it.

Box No (BOXNO) This is the number of the container in which the sample is stored. Usually it is copied from the current Box Details record during entry of new sample records. It is available for modification by users granted ROCSTOR_ENTRY privileges when a sample is physically moved from one container to another. The relevant BOXES record must exist before assigning the sample to a different container. Other users may query on this field, but not modify it.

At the bottom of the Samples window are several command buttons which are enabled or disabled depending on the state of the window and the status of the currently displayed sample. They function as follows:

Copy Sample Enables you to enter several samples with consecutive ***Field ID*** (and ***Registered ID*** and/or ***Other ID***). The button activates the Copy Records dialogue discussed on page 13.

Show Summary / Show Details Toggles the display of the sample records between "detailed" format (as in Figure 5 on page 9) and "summary" format (as in Figure 6).

One additional button appears in the toolbar only when the Samples window is active:

Print Activates the Create a Report dialogue, allowing you to create a report of data displayed in the window. See the section on page 29 for more details.

The following command buttons are only visible when the Loans Window is open. To open the Loans window from the Samples window, change the ***status*** *of the current sample to "Borrowed".*

Lend Sample Activates the Loans window, and initialises it with details for the current sample in the Samples window. Once you have completed the Loan details and saved the record, the sample ***Status*** is set to "Borrowed".

Lend Box Activates the Loans window, and initialises it with details for the current sample in the Samples window. Once you have completed the Loan details and saved the record, similar loan records are created for each sample in the current container and the ***Status*** of each sample is set to "Borrowed".

Loans -> Activates the Loans window.

Entering Consecutive Samples

Oracle offers two functions to assist you to enter essentially similar information by copying it from the preceding record. These functions are only available when the current record is a new record, *and has not been inserted into the database*. The first of these is ***Duplicate*** on the ***Field*** menu and has a shortcut key of *F3*. Selection of this function copies the value in the current field on the immediately preceding record to the current record. The second of these is ***Duplicate*** on the ***Record*** menu and has a shortcut key of F4. This function copies *all* fields from the immediately preceding record to the current record, including those fields which you do not normally have access to, such as Rock Store Number. This feature can cause confusion, since although you can alter the Field ID, *etc.*, you cannot alter the disabled fields. However, because the record is a new record, the system supplied data is correctly inserted into the relevant fields.

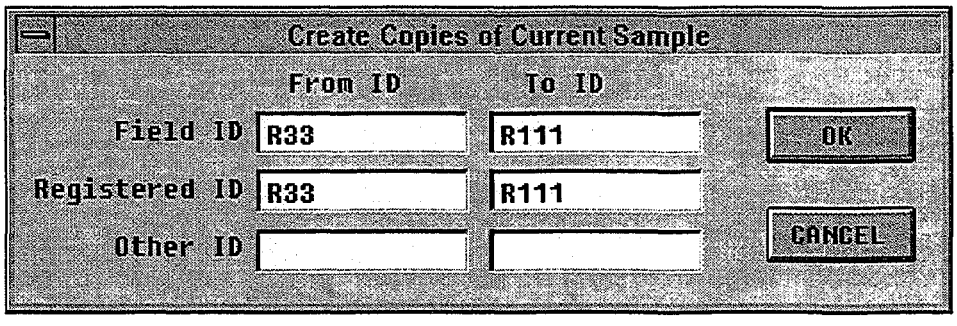

Figure 7: Copy Records dialogue

The Samples window offers an additional method for adding similar data for consecutive samples to the database. This method is via the Copy Records dialogue which is activated by choosing the ***Copy Record*** command button at the bottom of the window. The dialogue is shown in Figure 7.

This dialogue enables you to enter the range of Field IDs, Registered IDs, and Other IDs for which sample records are to be created. These records will be created by copying all the updateable fields of the current sample record in the Samples Window and incrementing each of the given IDs,

where possible, by one for each sample over the range of IDs indicated. If there are "gaps" in the numbering sequence, you may delete the superfluous sample records before saving the newly created records.

The starting values (the ***From ID***) are copied from the current sample; therefore you must enter the relevant values in these fields before choosing the ***Copy Record*** command button. In the Copy Records dialogue, enter the final value (the ***To ID***) of each of the IDs to be created. When you have entered all the IDs to be incremented, choose the ***OK*** button. There must be the same number of samples in the range for each of the different IDs and the IDs must have a numeric part that can be incremented; if either of these criteria is not satisfied a message box will appear to advise you. If you leave a ***To ID*** blank, then that ID will be treated as constant like any other field in the record: the value in the field in the current record will be copied *unaltered* to each new record.

3 - LOANS WINDOW

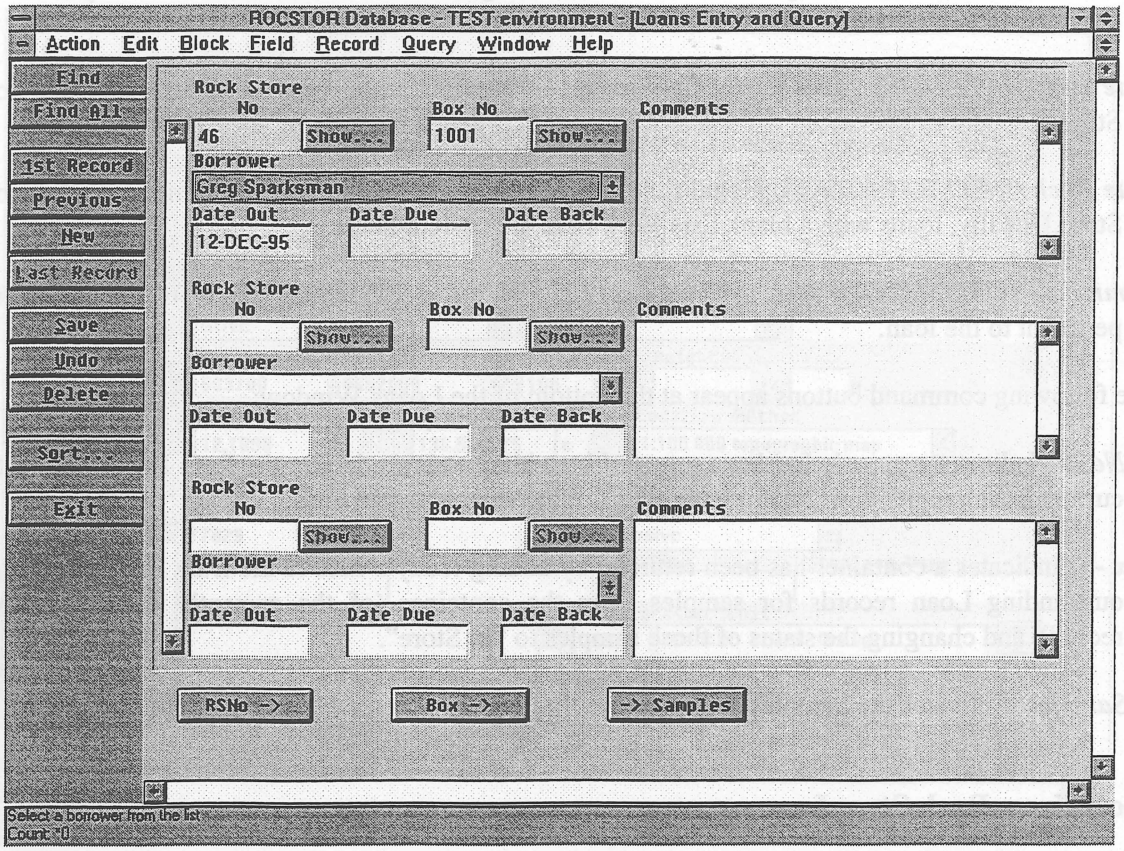

Figure 8: Loans Window

The Loans window enables you to view and maintain information about the status of loans of material from the Rock Store. The window displays three records at a time; you can scroll through the set of retrieved records by use of the scroll bar to the left of the record display. Each record displays the following information:

Rock Store Number (RSNO) This is the unique identifier assigned to a sample when it is first entered into the ROCSTOR Database. If you do not know the number you can activate the Samples Window by choosing the ***Find*** command button beside the Rock Store Number field, and perform a retrieval in the Samples Window to locate the sample in question. If the Rock Store Number field is not blank then the label on the adjacent command button is ***Show*** and choosing it will activate the Samples Window and automatically retrieve the relevant sample.

Box Number (BOXNO) This is the identifier assigned to a sample container by the Rock Store personnel. If you do not know the number your can activate the Samples Window by choosing the ***Find*** command button beside the Box Number field, and perform a retrieval in the Samples Window to locate the container in question. If the Box Number field is not blank then the label on the adjacent command button is ***Show*** and choosing it will activate the Samples Window and automatically retrieve the relevant container.

Borrower (BORROWER) A mandatory four-digit number representing a borrower in the BORROWERS table. The number is checked against the BORROWERS table. It is

automatically translated to its equivalent description by the List Item field which represents it in the window.

Date Out (DATEOUT) An optional field for recording the date a loan is made. The system will automatically add today's date to the field.

Date Due (DATEDUE) An optional field for recording the date a loan is due back into the Rock Store.

Date Back (DATEBACK) An optional field for recording the date a loan is returned into the Rock Store. Ideally, loans with a blank Due Back field are current loans.

Comments (COMMENTS) An optional text field of up to 255 characters to record comments pertinent to the loan.

The following command buttons appear at the bottom of the Loans Window:

RSNo -> Indicates a sample has been returned by adding today's date to the Date Back field of the current Loan record, and changing the status of the sample to "In Store".

Box -> Indicates a container has been returned by adding today's date to the Date Back field of all outstanding Loan records for samples from the container (of the currently displayed Loan record), and changing the status of those samples to "In Store".

-> Samples Activates the Samples Window.

Recording a Rock Store Loan

If lending a single sample, you must record the Rock Store Number of the sample being loaned. The easiest way to do this is to first record the ***Borrower***, then choose the ***Find*** button adjacent to the Rock Store Number field to invoke the Samples Window. Perform a retrieval to locate the sample being loaned, and choose the ***Lend Sample*** command button in the Samples Window.

If lending an entire container, you must record the Rock Store Number of the sample being loaned. The easiest way to do this is to first record the ***Borrower*** and the ID of the container being loaned then choose the ***Show*** button adjacent to the ***Box No*** field. In the Samples window, choose the ***Lend Box*** button to record the loan. If you do not know the ID of the container being loaned, choose either of the ***Find*** buttons (adjacent to the Rock Store Number field or the Box Number field) to invoke the Samples Window. Perform a retrieval to locate the container or a sample from the container being loaned, and then choose the ***Lend Box*** command button in the Samples window.

4 - FIELD DATA WINDOW

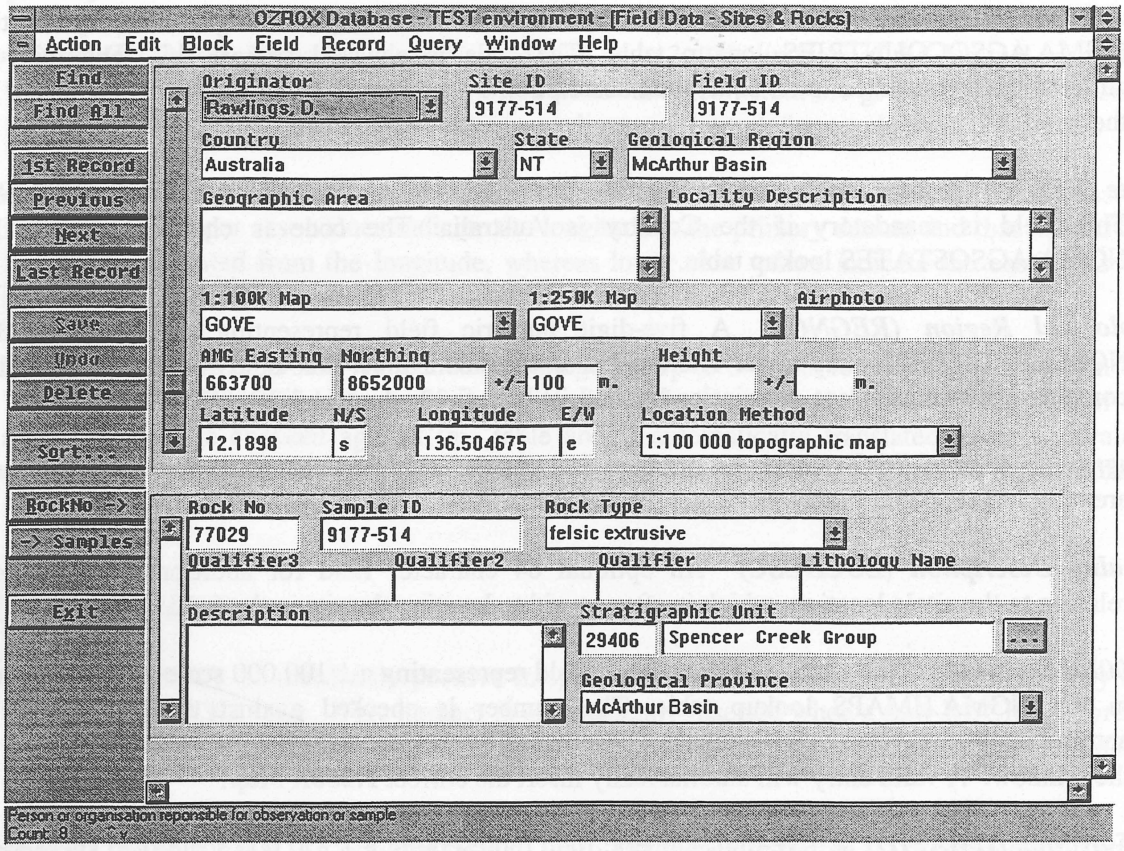

Figure 9: Field Data Window

The Field Data Window displays information in the SITES and ROCKS tables from the OZROX database. Not all columns in these tables are displayed, so the window is not intended to be used for data entry; it may be used, if absolutely necessary to update data. The window consists of two blocks, the Sites block which has a one-to-many relationship to the Rock details block. A complete description of the OZROX Database may be found in Ryburn *et al.* (1995). The window displays the following information:

SITES BLOCK

Originator (ORIGNO) A mandatory five-digit numeric field representing a originator in the NGMA.ORIGINATORS table. The number is checked against the ORIGINATORS lookup table and is automatically converted to its equivalent description by the List Item field which is displayed in the window. This field may correspond to the ***Collector*** field in the ROCSTOR Samples window.

Site ID (SITEID) A mandatory field of up to 16 characters for the user-supplied number or ID for the site. For more recent projects, this represents the AGSO registered number, but any combination of numbers and letters which is unique to the originator is used. This field may correspond to the ***Registered ID*** and/or ***Field ID*** of the ROCSTOR Samples window.

Field ID (FIELDID) An optional field of up to 16 characters for an alternative site number or ID. These field numbers need not be unique. This field may correspond to the ***Registered ID*** and/or ***Field ID*** of the ROCSTOR Samples window.

Country (COUNTRYID) A mandatory three-character field representing a country in the NGMA.AGSOCOUNTRIES lookup table. The code is checked against this table and is automatically translated to its equivalent description by the List Item field which is displayed in the window.

State (STATE) A three-character List Item representing an Australian state in which the site lies. This field is mandatory if the Country is Australia. The code is checked against the NGMA.AGSOSTATES lookup table.

Geological Region (REGNO) A five-digit numeric field representing a region in the NGMA.REGIONS lookup table. The number is checked against this table and is automatically converted to its equivalent description by the List Item field which is displayed in the window.

Geographic Area (GEOGAREA) An optional descriptive field of 64 characters for the geographic area (eg valley, plain, mountain range) the site is in.

Locality Description (LOCDESC) An optional 64 character field for additional information relating to the site's location, which is often an aid to locating the site in the field.

1:100K Map (HMAPNO) A five-digit numeric field representing a 1:100 000 scale map sheet area in the NGMA.HMAPS lookup table. The number is checked against this table and is automatically converted to its equivalent description by the List Item field which is displayed in the window. A valid entry will automatically insert the correct ***1:250K Map***.

1:250K Map (QMAPID) A five-digit numeric field representing a 1:250 000 scale map sheet area in the NGMA.QMAPS lookup table. The number is checked against this table and is automatically converted to its equivalent description by the List Item field which is displayed in the window.

Airphoto (AIRPHOTO) An optional field of 36 characters to identify the airphoto on which the site is located and/or was plotted. The field is for the name of the airphoto series, the run number and the photo number - for example 'Cloncurry 8/2134'.

AMG Easting (EASTING) Normally a 6-digit integer for the full AMG easting of the site in metres. If the site is in Australia, either AMG coordinates or latitude/longitude must be entered.

AMG Northing (NORTHING) Normally a 7-digit integer for the full AMG northing of the site in metres. If the site is in Australia, either AMG coordinates or latitude/longitude must be entered.

+/- m. (ACCURACY) A mandatory four-digit integer for the accuracy of the given coordinates of the site in metres on the ground.

Height (HEIGHT) An integer of up to 5 digits for the height of the site in metres above sea level.

+/- m. (HEIGHTACC) A 3-digit integer for the absolute error of the height of the site.

Latitude (DLAT) A positive numeric field with up to 2 digits in front of the decimal point, and up to 6 digits after. A validation trigger ensures the site lies within the given ***1:100K Map*** sheet area. If the site is in Australia, either AMG coordinates or latitude/longitude must be entered.

N/S (NS) A single character field that is either 'N', 'n', 'S' or 's'. Defaults to 'S' for the southern hemisphere. Upper case values indicate the latitude is the primary datum, and that the northing has been calculated from the latitude, whereas lower case values indicate the northing as the primary datum.

Longitude (DLONG) A positive numeric field with up to 3 digits in front of the decimal point, and up to 6 digits after. A validation trigger ensures the site lies within the given ***1:100K Map*** sheet area If the site is in Australia, either AMG coordinates or latitude/longitude must be entered.

E/W (EW) A single character field that is either 'E', 'e', 'W' or 'w'. Defaults to 'E' for the eastern hemisphere. Upper case values indicate the longitude is the primary datum, and that the easting has been calculated from the longitude, whereas lower case values indicate the easting as the primary datum.

Location Method (METHOD) A mandatory integer of up to 3 digits referencing a record in the NGMA.LOCMETHODS lookup table showing the method used to obtain the coordinates of the site. The code is checked against this table and is automatically translated to its equivalent description by the List Item field which is displayed in the window. Most entries automatically insert a default accuracy.

ROCK DETAILS

Rock No (ROCKNO) A mandatory positive integer of up to 6 digits which is the primary key for the NGMA.ROCKS table. This number is automatically inserted when a new ROCKS record is inserted. It is this item that is referenced by the ROCSTOR Samples record to establish a link to OZROX.

Sample ID (SAMPLEID) An optional field of up to 16 characters for the ID [illegible]ple. It must be unique to the Originator, but it need not be related to the Site ID. This value may correspond to one of the ROCSTOR sample IDs: ***Field ID***, ***Registered ID*** or ***Other ID***.

Rock Type (ROCKTYPE) An integer of one or two digits that identifies the basic rock type from a list in the NGMA.ROCKTYPES lookup table, for the "first pass" classification of rock types. The value is checked against this table and is automatically translated to its equivalent description by the List Item field which is displayed in the window.

Qualifier3, Qualifier2, Qualifier (QUALIFIER3, QUALIFIER2, QUALIFIER) Each of these optional 20-character fields is a qualifying term for the ***Lithology Name*** field that follows. These terms are from the NGMA.LITHNAMES view which is a union of qualifier terms in the NGMA.LITHOLOGIES lookup table and the NGMA.AGSOMINERALS lookup table.

Lithology Name (LITHNAME) An optional 32-character field referencing a lithology name in the NGMA.LITHOLOGIES lookup table.

Description (DESCRIPTION) An optional 64-character field for a description of the lithology. If the lithology is insufficiently characterised by the previous controlled fields then this field is used for the additional lithological information.

Stratigraphic Unit (STRATNO, STRATNAME) The Stratigraphic Unit Number (***STRATNO***) and its name (***STRATNAME***) come from the Stratigraphic Lexicon (Lenz *et al.*, in prep). Both of these fields have a List of Values available. (Press the List key - F9 - or choose ***List Values*** from the ***Field*** menu to access the list of values.) To the right of these fields is a command button which also accesses the List of Values. Because the number of entries in the lexicon is quite

large, you will be requested to supply some sort of search criteria to reduce the number of entries retrieved before the list is displayed.

Geological Province (GEOLPROVNO) A optional integer of up to 3 digits referencing a record in the STRATA.GEOPROVS lookup table showing the geological super-province, province, sub-province, domain or sub-domain of the rock sample. The value is checked against this table and is automatically translated to its equivalent description by the List Item field which is displayed in the window.

5 - LOOKUP TABLE WINDOWS

If the ROCSTOR Database Administrator has given you sufficient privileges to insert new records into an authority table the relevant list in the Samples and Loans windows will have the value "<New>" at the top. When you select this value, the corresponding window will be opened and all existing values in the underlying table displayed. If necessary, you may reduce the number of values displayed by performing a query on the underlying table.

Once you have activated a lookup table window, you must *close* the window before you can work on any other window. In a lookup table window, you may alter existing values as well as add one or more new values. When you save the additions and alterations you have made by choosing the ***Save*** button on the toolbar, the value on the current record is "remembered" and will be transferred to the starting window when you close the lookup table window by choosing the ***Exit*** button on the toolbar.

Each of the lookup table windows is described in the following sections.

BORROWERS WINDOW

Although somewhat arbitrarily classed here as a lookup table listing all borrowers of samples, the Borrowers table will require frequent additions of new borrowers. A borrower may be an AGSO staff member, a person from outside of AGSO, or another organisation. The Borrowers table accommodates those borrowers that do not appear in the AGSO staff database USERADMN.

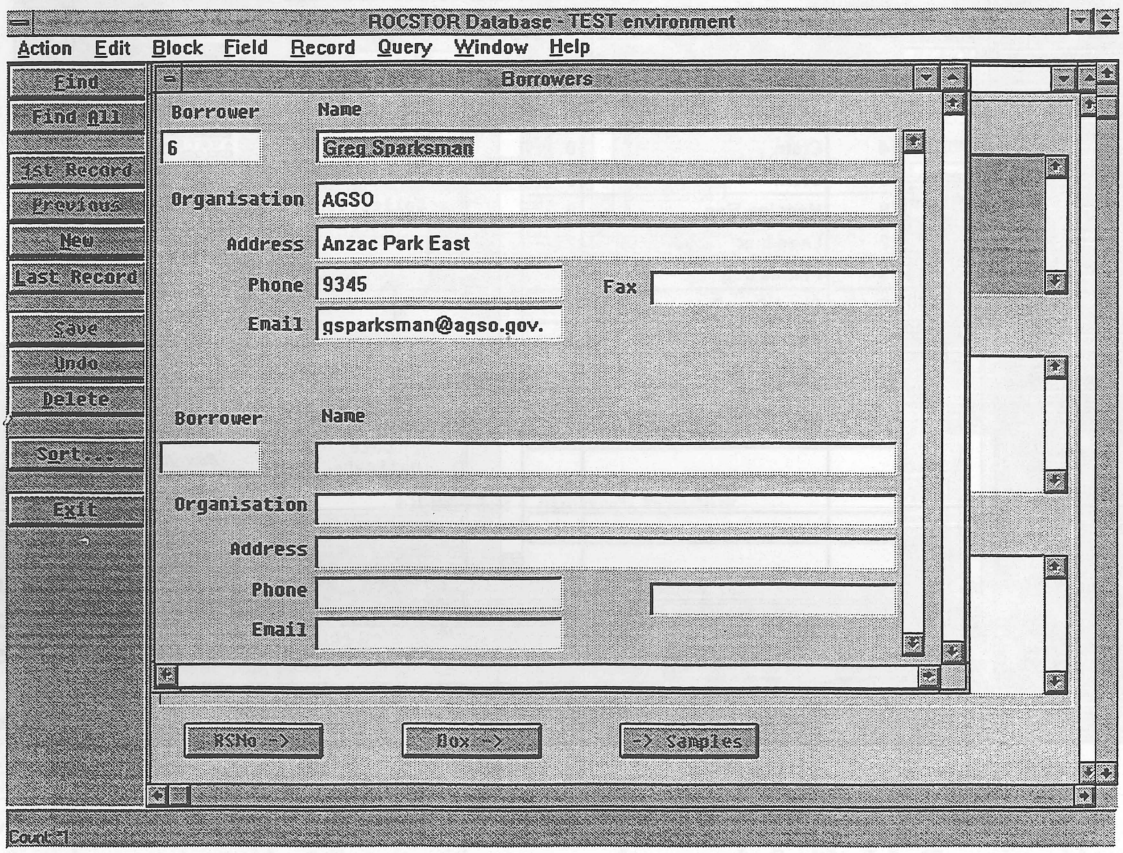

Figure 10: Borrowers Window

Borrower (BORROWER) This is a system-assigned number to uniquely identify each borrower. You may only query on this value.

Name (NAME) A mandatory field of up to 50 characters for the name of the individual responsible for the sample whilst on loan from the Rock Store.

Organisation (ORGANISATION) An optional field of up to 50 characters for the name of the organisation to which the borrower belongs.

Address (ADDRESS) An optional field of up to 50 characters for the postal or street address at which the borrower may be contacted.

Phone (PHONE) An optional field of up to 20 characters for the telephone number at which the borrower may be contacted.

FAX (FAX) An optional field of up to 20 characters for the facsimile number at which the borrower may be contacted.

Email (EMAIL) An optional field of up to 20 characters for the electronic mail address at which the borrower may be contacted.

BOXTYPES WINDOW

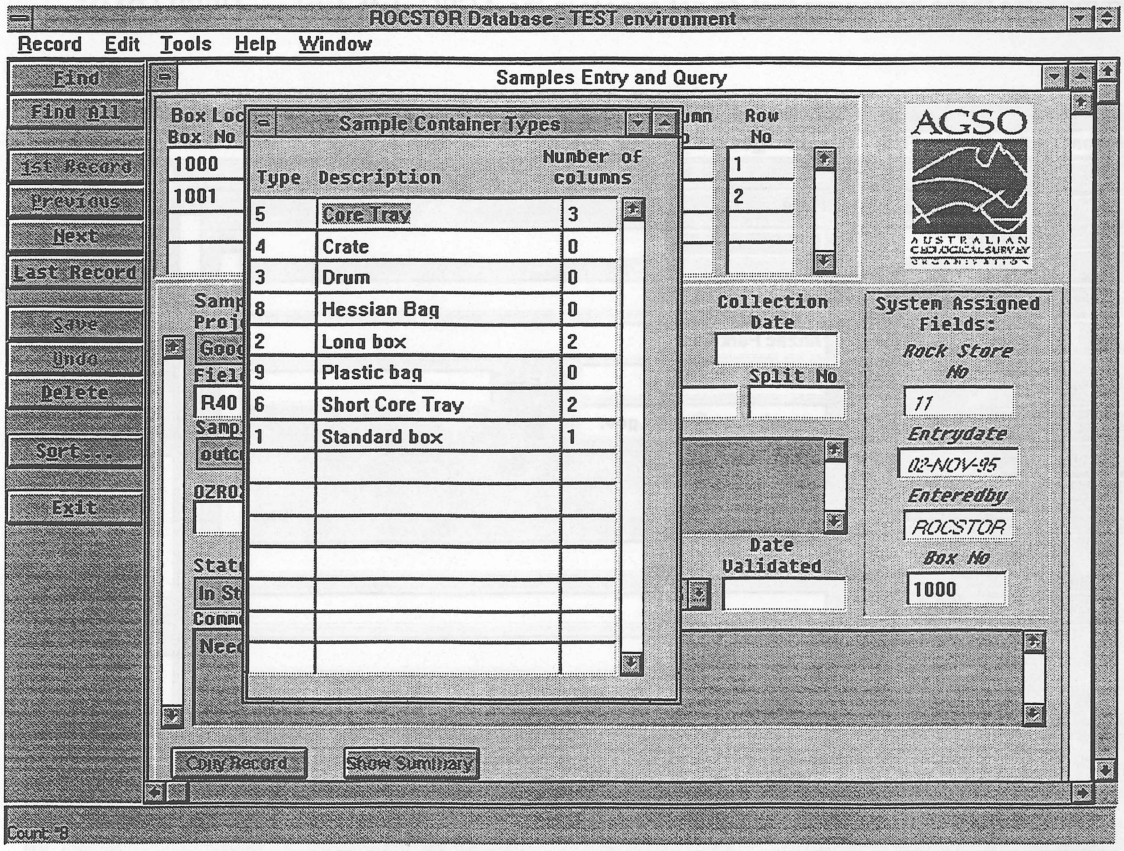

Figure 11: Box Types Window

The BOXTYPES table is a lookup table listing all the types of sample containers.

Type (TYPE) This is a two-digit number assigned by the system when a container type is first added to the table. The field is only available for querying.

Description (TYPEDESC) A mandatory field of up to 20 characters describing the container type. The description must be unique.

Number of columns (NUMCOLS) A mandatory one-digit numeric field indicating how many columns of a compactus the container type occupies. This value is used for validating the location of a container in the compactus.

COLLECTORS WINDOW

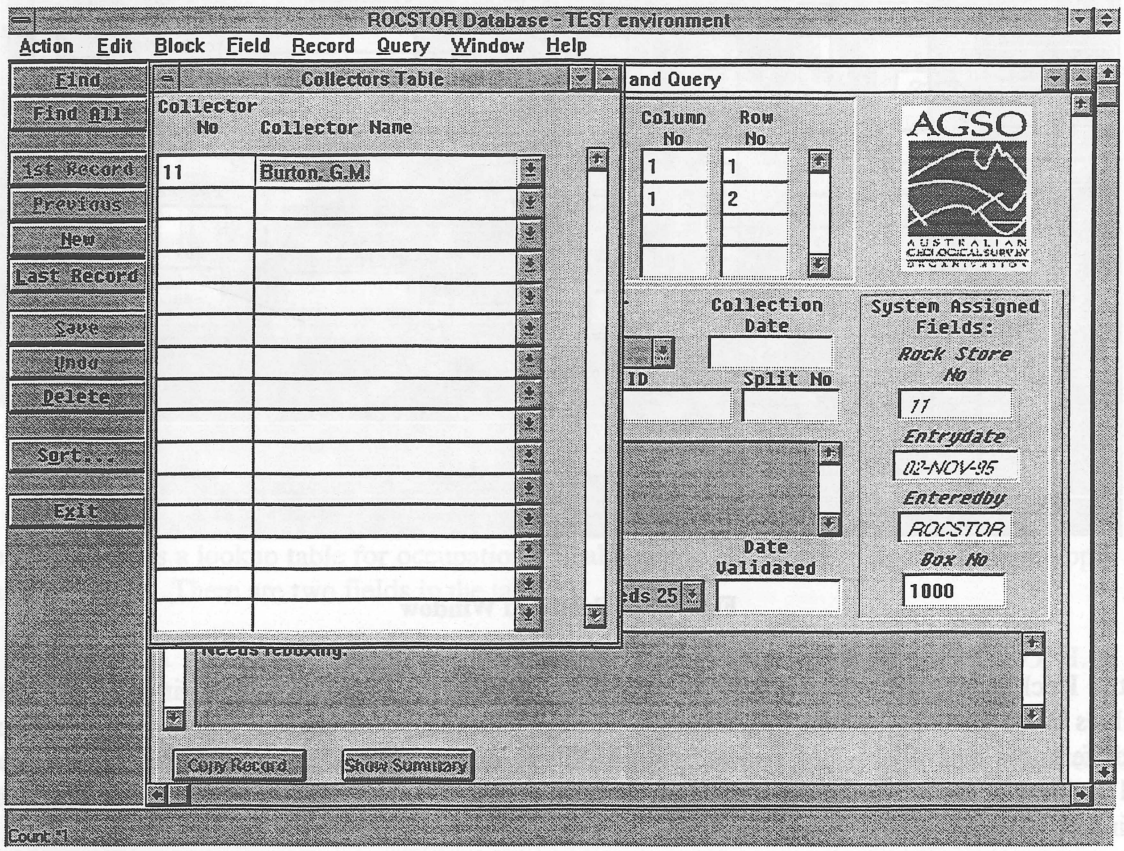

Figure 12: Collectors Window

The COLLECTORS table is a lookup table listing collectors of rock samples. The collector of a rock sample can be different to the 'originator' of the same sample in the OZROX database. There are only two fields in the table:

Collector Number (COLLNO) A mandatory, system-assigned five digit number to uniquely identify the collector. The field is only available for querying.

Collector (COLLNAME) The name of the collector in the format Surname, Initials. where the initials are separated by full stops without spaces, for example ***Smith, J.J.*** To assist with entry

of collector names, there is a list of the NGMA Originators lookup table from the OZROX database available. A name may occur only once in the table.

COMPACTI WINDOW

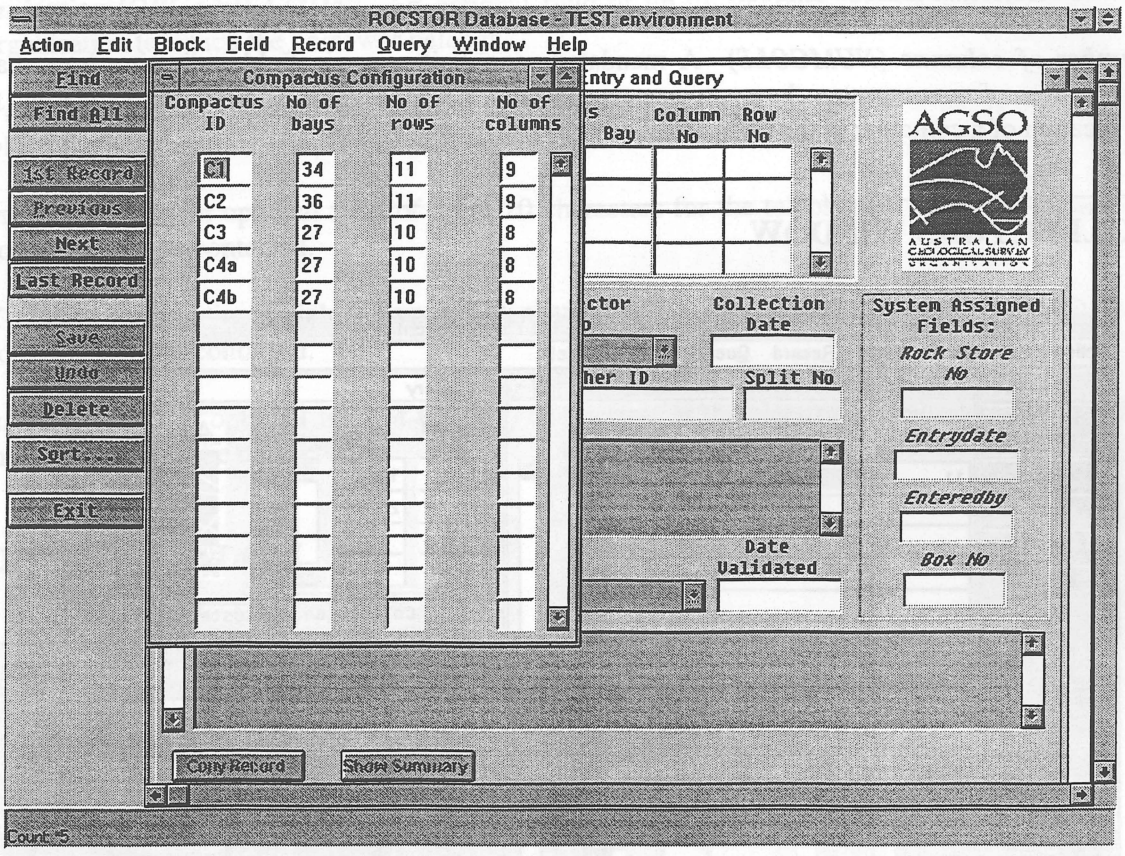

Figure 13: Compacti Window

In the Rock Store, the vast majority of samples are stored in boxes which are in turn stored on shelves in a compactus system with a number of bays with adjustable shelves and dividers. Because of differences in available box and compactus dimensions over time, the number of units, shelves and dividers of the various compactuses are not consistent. The COMPACTI table is a lookup table listing all compactus configuration details.

Compactus ID (COMPACTUS) This is a mandatory mixed-case, three-character field that uniquely identifies the compactus that has been assigned to a compactus by the Rock Store adminstrator.

No of Bays (MAXBAYS) This is a mandatory two-digit field that indicates the number of bays in the compactus.

No of Rows (MAXROWS) This is a mandatory two-digit field that indicates the number of rows in the compactus.

No of Columns (MAXCOLS) This is a mandatory two-digit field that indicates the number of columns in the compactus.

O. H. & S. WINDOW

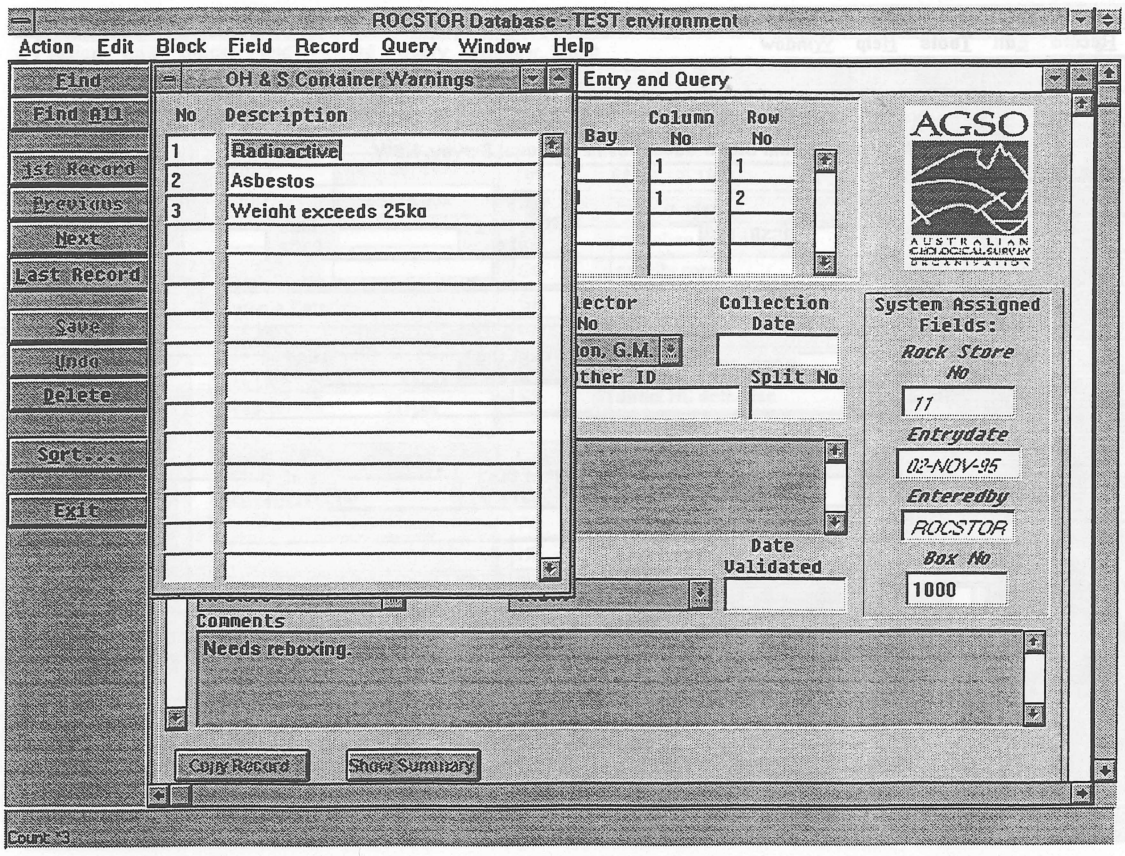

Figure 14: O. H. & S. Window

The OHS table is a lookup table for occupational health and safety warning tags that might apply to a sample or box. There are two fields in the table:

No (OHSNO) A mandatory, system-supplied unique two-digit number to identify the O. H. & S. tag. This field is only available for querying.

Name (OHSNAME) A mandatory, unique field of up to 32 characters for the name of the O. H. & S. tag.

PROJECTS WINDOW

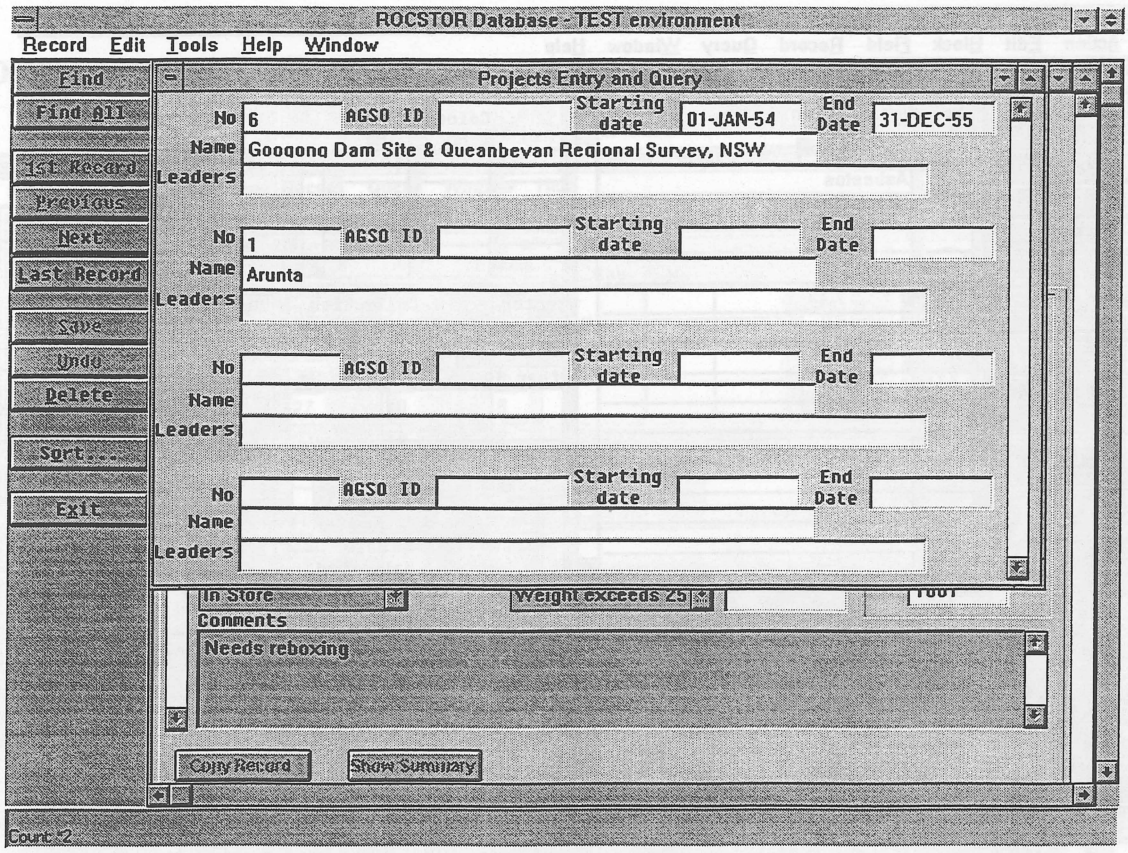

Figure 15: Projects Window

The PROJECTS table is a lookup table listing all relevant field projects. It is expected that the projects are "generic" such as "Tanami", or "Cape York" and that the project may span several years. The registered AGSO sample number of samples collected for more recent projects are validated against the PROJYEARS table which contains an entry for each year of a project. This latter table is maintained automatically during sample data entry.

No (PROJNO) This is a mandatory unique system-assigned five-digit field to identify the project.

AGSO ID (AGSOID) An optional field of up to ten characters for the AGSO project identifier (such as 260.16) where the ID is consistent for the life of the project.

Starting Date (STARTDATE) An optional date field for the start date of a project, in the Oracle format **dd-MON-yy**. If the actual day of the month is not known, assume the 1st; if the month is unknown, assume January.

Ending Date (ENDDATE) An optional date field for the end date of a project in the Oracle format **dd-MON-yy**. If the actual day of the month is not known, assume the last day of the month; if the month is unknown, assume December.

Project Name (PROJNAME) Mandatory field of 50 characters for the unique name of a project.

Leaders (LEADERS) An optional field of 100 characters for recording the names of the leaders of the project.

SAMPLE TYPES WINDOW

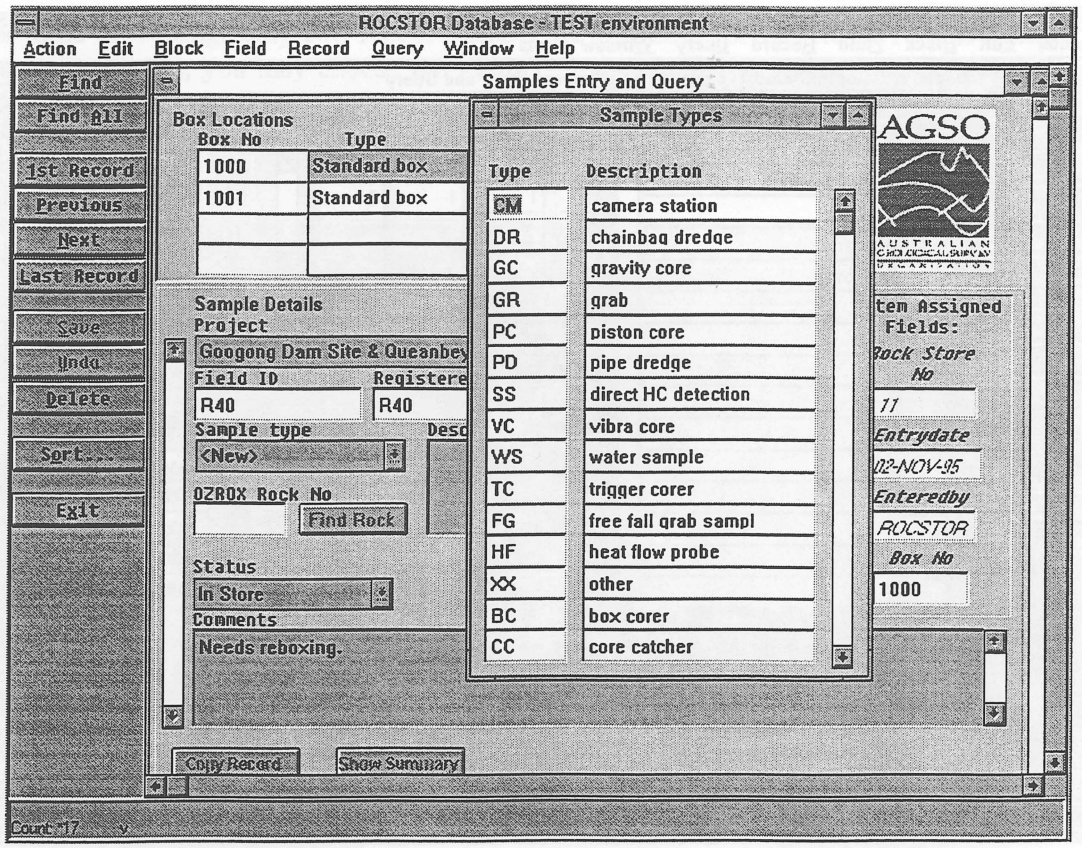

Figure 16: Sample Types Window

The SAMPTYPES table is a lookup table listing those permissible sample types which do not appear in the equivalent OZROX table. Data in the SAMPLES table is validated against the SAMPLETYPES *view* which is a union of SAMPTYPES and OZROX sample types (see the APPENDIX B. ROCSTOR DATABASE SCHEMA in Appendix B, starting page 35).

Type (TYPE) A mandatory two-character mnemonic code which is unique to the SAMPLETYPES view.

Description (TYPEDESC) A mandatory field of up to 20 characters describing the sample type which is unique to the SAMPLETYPES view.

STATUS WINDOW

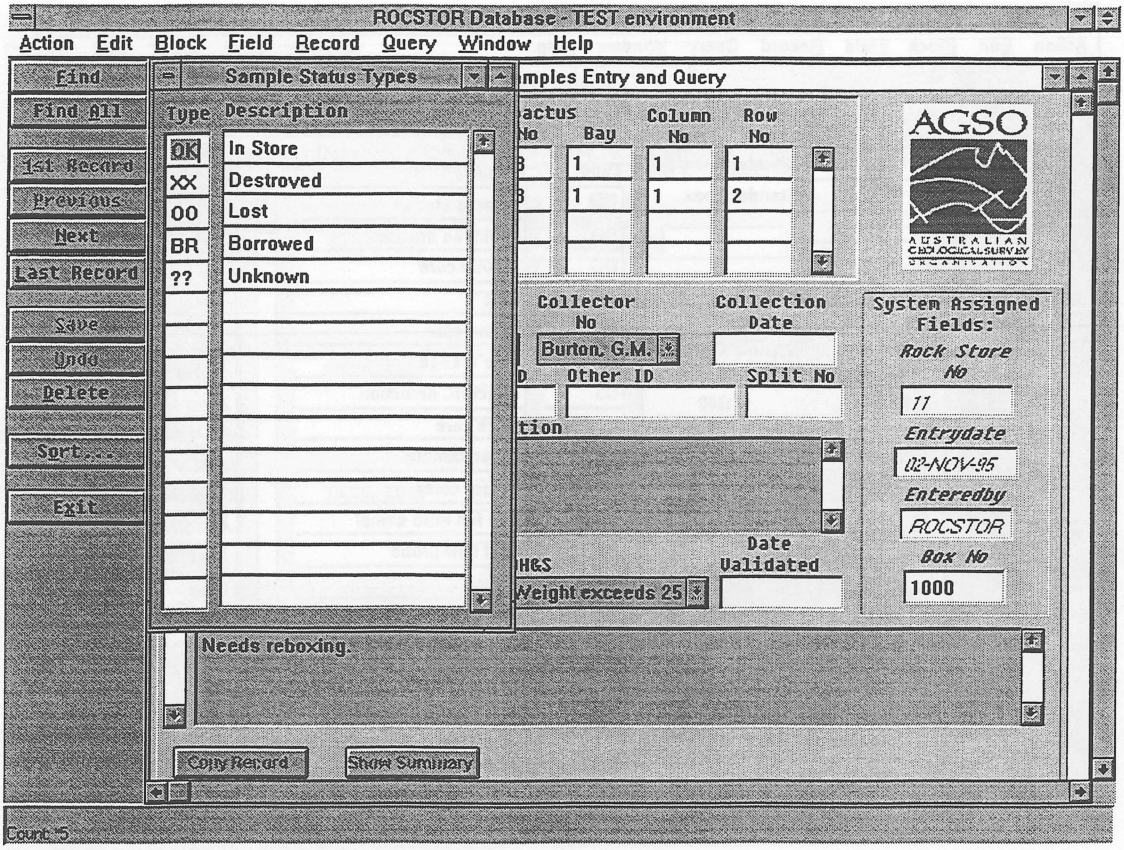

Figure 17: Status Window

The STATUSTYPES table is a lookup table listing all sample status types.

Type (TYPE) A mandatory, unique, two-character field for a mnemonic code for the status.

Description (TYPEDESC) A mandatory 20-character field for a description of the status.

6 - CREATING REPORTS

At the time of writing, only two report formats are available for the ROCSTOR Database. To access these reports, you may choose the ***Print*** button on the toolbar in the Samples window, to bring forward the Create a Report dialogue shown in Figure 18 below.

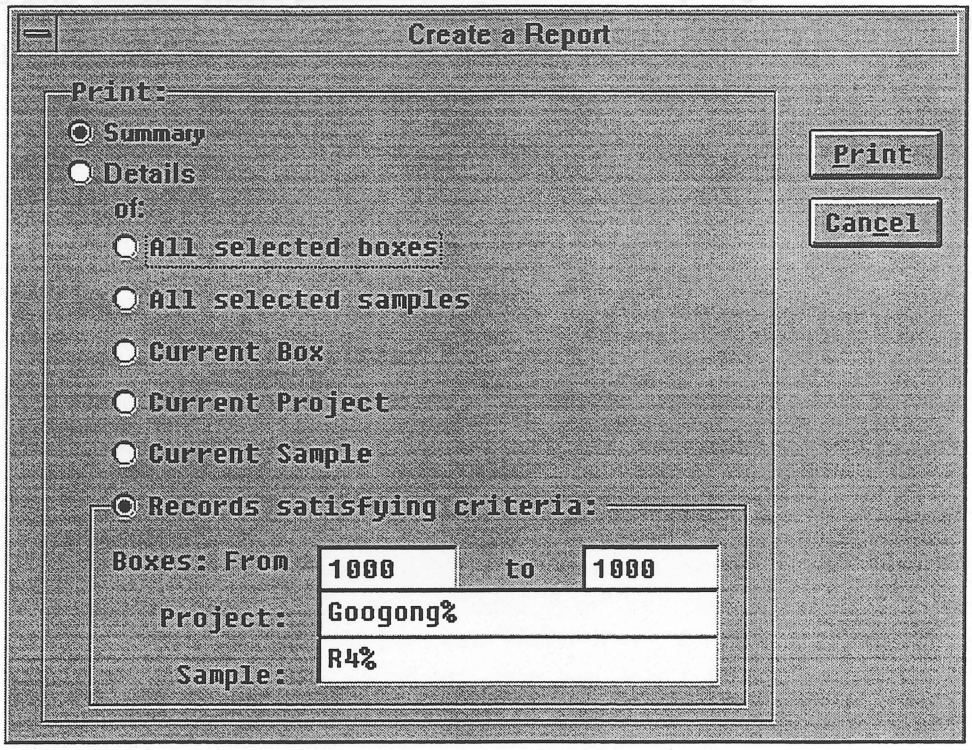

Figure 18: Create a Report dialogue

Two report formats are available, a "detailed" report with all information for each sample or a "summary" report, which summarises the details and then lists all samples with similar details in columns. The dialogue allows you to specify the range of samples or boxes (containers) to be included in the report by choosing the appropriate radio button. All but the last of these correspond to the set of data currently retrieved and displayed in the Samples window. The last radio button option allows you to specify criteria different to that currently displayed. In the example shown above, all samples belonging to projects like "Googong" with a field ID, Registered ID or Other ID like "R4" will be retrieved. (This search could also have been performed in the Samples window, and the "All selected samples" radio button would generate the same report.) Example reports are shown in Appendix C on page 41.

The reports may also be run directly from Oracle Report 2.5 runtime, by invoking the BOXES1.REP runtime report file for a detailed report, or the BOXES2.REP runtime report file for a summary report. You should be aware that the combination of both Oracle Forms 4.5 and Oracle Reports 2.5 consumes much of your PC's memory; you may find that there is insufficient to have both these programs running whilst any other program is in memory. If this is the case the report parameter window will not appear, but the error will be reported in the Oracle Reports Server log file.

7 - ACKNOWLEDGMENTS

Many people have contributed to ROCSTOR during its development, particularly Peter Flanagan and Dave Crombie of AGSO's Corporate Services. In 1994, Phil West was employed to look into the Rock Store situation. He identified the need for a proper database and constructed a simple pilot database in Microsoft Access.

This Record has benefited greatly from reviews by Mirek Kucka, Morrie Duggan, Greg Sparksman and Sonja Lenz.

8 - REFERENCES

Lenz, S.L., Ryburn, R.J. & Kucka, M., 1993. Users' Guide to AGSO's Oracle Database System. Australian Geological Survey Organisation, Record, 1993/81.

Ryburn, R.J., Bond, L.D., & Hazell, M.S., 1995. Guide to OZROX. AGSO's Field Geology Database. Australian Geological Survey Organisation, Record, 1995/79.

Lenz, S.L., Ryburn, R.J., Brown, C.E. & Bond, L.D., in prep. Guide to the Australian Stratigraphic Names Database. Australian Geological Survey Organisation, Record.

9 - APPENDICES

APPENDIX A: INSTALLING THE ROCSTOR DATABASE APPLICATION

For ease of maintenance of the application, it is recommended that the various files be placed in a directory on a network file server. The application files themselves are relatively small, and do not occupy much disk space, nor do they take long to load over a network. By centralising the storage location of the application files, it is far easier to upgrade the application. Over time, it means that it is likely that there will be no need to install the individual files, as they will be probably have been installed either by your network administrator, or the ROCSTOR administrator.

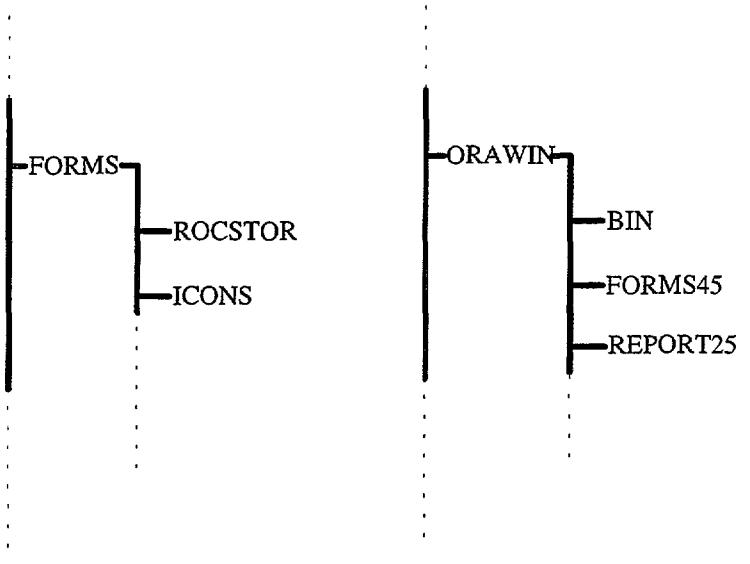

Figure 19: Recommended Directory structure.

Conversely, it is highly recommended that the Forms 4.5 runtime, Reports 2.5 runtime and SQL*Net programs be installed locally, even though they occupy a significant amount of disk space (> 35MB) the time saved in being able to load directly from locally is also significant. When installing Forms 4.5 runtime, Reports 2.5 runtime and SQL*Net, install to the directories suggested by the installation program. You should contact the Oracle Database Administrator regarding installation of Oracle Forms 4.5 runtime and SQL*Net.

The diagram shown in Figure 19 indicates the standard configuration for the ROCSTOR Database Application.

All files are located in the \FORMS\ROCSTOR directory, preferably on the network file server. Icons used by the ROCSTOR application (and by other AGSO Forms 4.5 applications) are located in the \FORMS\ICONS directory.

Oracle Forms 4.5 runtime program, F45RUN.EXE, and the Reports 2.5 runtime program, R25RUN.exe, are located in \ORAWIN\FORMS45 and \ORAWIN\REPORT25 respectively on a local hard drive; support files are located (*inter alia*) \ORAWIN\BIN directory.

Once you have installed the necessary Oracle programs and support files, you must modify the [FORMS45] and [REPORTS25] sections of the Oracle initialisation file ORACLE.INI which the installation procedure created in your windows directory (usually C:\WINDOWS) as follows:

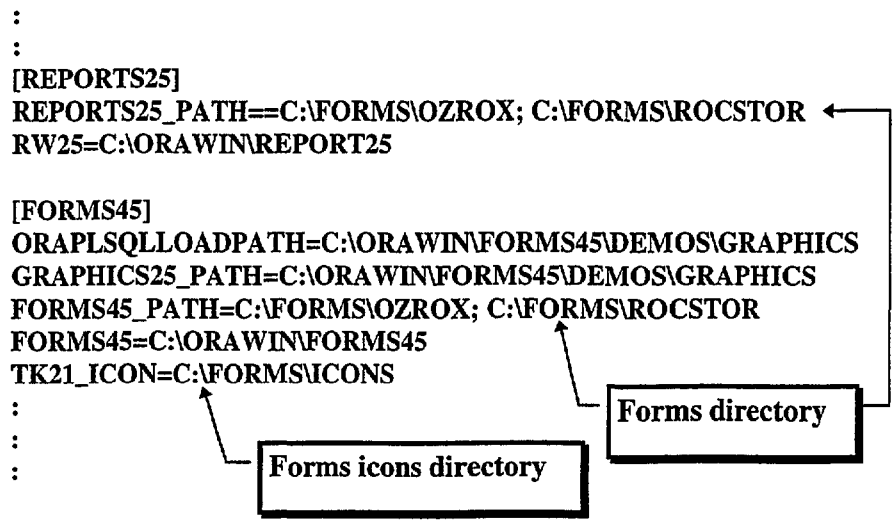

Figure 20: [FORMS45] and [REPORTS25] sections of ORACLE.INI

Append the path in which you installed the ROCSTOR application files to the REPORTS25_PATH and the FORMS45_PATH environment variable definitions, separated from the preceding path by a semi-colon; if the line does not exist in your ORACLE.INI, add the entire line. An example of the two sections of the ORACLE.INI configuration file is shown in Figure 20. If the line for the TK21_ICON environment variable definition does not appear in the [FORMS45] section of ORACLE.INI, add it; otherwise append the path in which you placed the icons for the forms if different from that existing definition.

ROCSTOR Application Files

Following files are required for the ROCSTOR Application:

File Name	Approximate Size (Bytes)	Description	Directory
BORROWER.FMX	32,000	Borrowers window	Forms
BOXES.FMX	33,000	Boxes lookup table window	"
BOXES1.REP	82,000	ROCSTOR detailed report defintion	"
BOXES2.REP	78,000	ROCSTOR summary report defintion	"
BOXTYPE.FMX	31,000	Box Types lookup table window	"
CLLCTRS.FMX	31,000	Collectors lookup table window	"
COMPACTI.FMX	30,000	Compactus lookup table window	"
FLD_DATA.FMX	77,000	Field Data window	"
LISTVAL.ICO	1,000	List of values button icon	Icons
LOANS.FMX	56,000	Loans window	Forms
MAXNOS.FMX	30,000	Maximum numbers maintenance window	"
OHS.FMX	29,000	OHS lookup table window	"
ORACLE.INI	1,000	Example Oracle initialisation file	WINDOWS
PROJECTS.FMX	34,000	Projects lookup table window	Forms
PROJYEAR.FMX	31,000	Projects/Years table maintenance window	"

File Name	Approximate Size (Bytes)	Description	Directory
SAMPLES.FMX	295,000	Samples window	"
SAMPTYPE.FMX	30,000	Sample types lookup table window	"
SORTING.FMX	19,000	Sort order window	"
STATUS.FMX	29,000	Sample Status lookup table window	"
Approximately	**1**	**MB of disk space required**	

APPENDIX B. ROCSTOR DATABASE SCHEMA

```
REM ************************************************************
REM ***          ROCSTOR - AGSO's ROCK STORE DATABASE          ***
REM ***  FOR SIMPLICITY, ALL STORAGE SPECIFICATIONS ARE OMITTED  ***
REM ************************************************************


REM ************************************************************
REM ***  MAXNOS IS USED TO KEEP TRACK OF SYSTEM-GENERATED KEYS  ***
REM ************************************************************


CREATE TABLE MAXNOS (
        IDMAXNO         VARCHAR2 (8)     NOT NULL,
        MAXNO           NUMBER   (6,0)   NOT NULL );

ALTER TABLE MAXNOS ADD CONSTRAINT PK_MAXNOS PRIMARY KEY (IDMAXNO);

GRANT SELECT, UPDATE ON MAXNOS TO INTERNAL;

INSERT INTO MAXNOS (IDMAXNO, MAXNO) VALUES ('PROJNO',    0);
INSERT INTO MAXNOS (IDMAXNO, MAXNO) VALUES ('COLLNO',    0);
INSERT INTO MAXNOS (IDMAXNO, MAXNO) VALUES ('RSNO',      0);
INSERT INTO MAXNOS (IDMAXNO, MAXNO) VALUES ('BORROWER',  0);
INSERT INTO MAXNOS (IDMAXNO, MAXNO) VALUES ('LOANNO',    0);


REM  SAMPTYPES IS A LOOKUP TABLE LISTING ALL PERMISSIBLE SAMPLE
TYPES

CREATE TABLE SAMPTYPES (
        TYPE            VARCHAR2 (4)     NOT NULL,
        TYPEDESC        VARCHAR2 (32)    NOT NULL );

ALTER TABLE SAMPTYPES ADD CONSTRAINT PK_SAMPTYPES PRIMARY KEY
(TYPE);

ALTER TABLE SAMPTYPES ADD CONSTRAINT UK_SAMPTYPES UNIQUE (TYPEDESC);


CREATE VIEW SAMPLETYPES AS
        SELECT TYPE,TYPEDESC FROM ROCSTOR.SAMPTYPES
    UNION
        SELECT SUBTYPE,SUBDESC FROM NGMA.LITHDATATYPES
            WHERE DATATYPE = 'ST';
```

```
REM  BOXTYPES IS A LOOKUP TABLE LISTING ALL THE TYPES OF SAMPLE BOX

CREATE TABLE BOXTYPES (
        TYPE          NUMBER    (2,0)  NOT NULL,
        TYPEDESC      VARCHAR2  (20)   NOT NULL,
        NUMCOLS       NUMBER    (1,0)  NOT NULL   DEFAULT 1 );

ALTER TABLE BOXTYPES ADD CONSTRAINT PK_BOXTYPES PRIMARY KEY (TYPE);

ALTER TABLE BOXTYPES ADD CONSTRAINT UK_BOXTYPES UNIQUE (TYPEDESC);

REM  STATUSTYPES IS A LOOKUP TABLE LISTING ALL SAMPLE STATUS TYPES

CREATE TABLE STATUSTYPES (
        TYPE          VARCHAR2 (2)     NOT NULL,
        TYPEDESC      VARCHAR2(20)     NOT NULL );

ALTER TABLE STATUSTYPES ADD CONSTRAINT PK_STATUSTYPES
        PRIMARY KEY(TYPE);

ALTER TABLE STATUSTYPES ADD CONSTRAINT UK_STATUSTYPES
        UNIQUE (TYPEDESC);


REM  COMPACTI IS A LOOKUP TABLE LISTING ALL COMPACTUS UNIT DETAILS

CREATE TABLE COMPACTI (
        COMPACTUS     VARCHAR2 (3)     NOT NULL,
        MAXBAYS       NUMBER   (2,0)   NOT NULL,
        MAXROWS       NUMBER   (2,0)   NOT NULL,
        MAXCOLS       NUMBER   (2,0)   NOT NULL );

ALTER TABLE COMPACTI ADD CONSTRAINT PK_COMPACTI
        PRIMARY KEY(COMPACTUS);


REM ************************************************************
REM *** BOXES IS THE MAIN DATA TABLE FOR ROCK STORE SAMPLE BOXES ***
REM ************************************************************


CREATE TABLE BOXES (
        BOXNO         VARCHAR2 (6)     NOT NULL,
        TYPE          NUMBER   (2,0)   NOT NULL,
        COMPACTUS     VARCHAR2 (3)     NOT NULL,
        BAY           NUMBER   (2,0)   NOT NULL,
        ROWNO         NUMBER   (2,0)   NOT NULL,
        COLNO         NUMBER   (2,0)   NOT NULL );

ALTER TABLE BOXES ADD CONSTRAINT PK_BOXES PRIMARY KEY (BOXNO);

ALTER TABLE BOXES ADD CONSTRAINT UK_BOXES
        UNIQUE (COMPACTUS,BAY,COLNO,ROWNO);
```



```
ALTER TABLE BOXES ADD CONSTRAINT FK_BOXES_TYPE
        FOREIGN KEY (TYPE) REFERENCES BOXTYPES (TYPE);

ALTER TABLE BOXES ADD CONSTRAINT FK_BOXES_COMPACTUS
        FOREIGN KEY (COMPACTUS) REFERENCES COMPACTI (COMPACTUS);


REM  COLLECTORS IS A LOOKUP TABLE LISTING COLLECTORS OF ROCK SAMPLES

CREATE TABLE COLLECTORS (
        COLLNO          NUMBER    (5,0)   NOT NULL,
        COLLNAME        VARCHAR2  (22)    NOT NULL);

ALTER TABLE COLLECTORS ADD CONSTRAINT PK_COLLECTORS
        PRIMARY KEY (COLLNO);

ALTER TABLE COLLECTORS ADD CONSTRAINT UK_COLLECTORS
        UNIQUE (COLLNAME);


REM   PROJECTS IS A LOOKUP TABLE LISTING ALL RELEVANT FIELD PROJECTS

CREATE TABLE PROJECTS (
        PROJNO          NUMBER    (5)     NOT NULL,
        AGSOID          VARCHAR2  (10),
        PROJNAME        VARCHAR2  (50)    NOT NULL,
        STARTDATE       DATE,
        ENDDATE         DATE,
        LEADERS         VARCHAR2  (100) );

ALTER TABLE PROJECTS ADD CONSTRAINT PK_PROJECTS
        PRIMARY KEY (PROJNO);

ALTER TABLE PROJECTS ADD CONSTRAINT UK_PROJECTS
        UNIQUE (PROJNAME);


REM  PROJYEARS IS A LOOKUP TABLE WITH ALL YEAR/PROJECT COMBINATIONS

CREATE TABLE PROJYEARS (
        PROJNO          NUMBER    (5)     NOT NULL,
        PROJCODE        VARCHAR2  (2)     NOT NULL,
        PROJYEAR        VARCHAR2  (2)     NOT NULL );

ALTER TABLE PROJYEARS ADD CONSTRAINT PK_PROJYEARS
        PRIMARY KEY (PROJYEAR, PROJCODE);

ALTER TABLE PROJYEARS ADD CONSTRAINT UK_PROJECT_YEARS
        UNIQUE (PROJYEAR, PROJNO);
```

```
REM  OHS IS A LOOKUP TABLE FOR OCCUPATIONAL HEALTH AND SAFETY TAGS

CREATE TABLE OHS (
        OHSNO          NUMBER    (2)     NOT NULL,
        OHSNAME        VARCHAR2  (32)    NOT NULL );

ALTER TABLE OHS ADD CONSTRAINT PK_OHS
        PRIMARY KEY (OHSNO);

ALTER TABLE OHS ADD CONSTRAINT UK_OHS
        UNIQUE (OHSNAME);


REM ************************************************************
REM ***  SAMPLES IS THE MAIN DATA TABLE FOR ROCKS SAMPLES  ***
REM ************************************************************

CREATE TABLE SAMPLES (
        RSNO           NUMBER    (6)     NOT NULL,
        PROJNO         NUMBER    (5)     NOT NULL,
        COLLNO         NUMBER    (5)     NOT NULL,
        FIELDID        VARCHAR2  (16)    NOT NULL,
        REGID          VARCHAR2  (16),
        OTHERID        VARCHAR2  (16),
        SPLITNO        NUMBER    (2),
        SAMPTYPE       VARCHAR2  (4)     NOT NULL,
        ROCKNO         NUMBER    (6),
        BOXNO          VARCHAR2  (5)     NOT NULL,
        COLLDATE       DATE,
        VALIDATED      DATE,
        DESCRIPTION    VARCHAR2  (64),
        COMMENTS       VARCHAR2  (255),
        STATUS         VARCHAR2  (2)     NOT NULL,
        OHSNO          NUMBER    (2),
        ENTRYDATE      DATE              NOT NULL,
        ENTEREDBY      VARCHAR2  (8)     NOT NULL );

ALTER TABLE SAMPLES ADD CONSTRAINT PK_SAMPLES
        PRIMARY KEY (RSNO);

ALTER TABLE SAMPLES ADD CONSTRAINT UK_SAMPLES
        UNIQUE (PROJNO,COLLNO,FIELDID,SPLITNO)

ALTER TABLE SAMPLES ADD CONSTRAINT FK_SAMPLES_SAMPTYPE
        FOREIGN KEY (SAMPTYPE)REFERENCES SAMPTYPES(TYPE);

ALTER TABLE SAMPLES ADD CONSTRAINT FK_SAMPLES_BOXNO
        FOREIGN KEY (BOXNO) REFERENCES BOXES(BOXNO);

ALTER TABLE SAMPLES ADD CONSTRAINT FK_SAMPLES_STATUS
        FOREIGN KEY (STATUS) REFERENCES STATUSTYPES(TYPE);

ALTER TABLE SAMPLES ADD CONSTRAINT FK_SAMPLES_PROJNO
        FOREIGN KEY (PROJNO) REFERENCES PROJECTS(PROJNO);
```



```
ALTER TABLE SAMPLES ADD CONSTRAINT FK_SAMPLES_OHSNO
        FOREIGN KEY (OHSNO) REFERENCES OHS(OHSNO);


REM  BORROWERS IS A LOOKUP TABLE LISTING ALL BORROWERS OF SAMPLES

CREATE TABLE BORROWERS(
        BORROWER      NUMBER    (5)     NOT NULL,
        NAME          VARCHAR2  (50)    NOT NULL,
        ORGANISATION  VARCHAR2  (50),
        ADDRESS       VARCHAR2  (50),
        PHONE         VARCHAR2  (20),
        FAX           VARCHAR2  (20),
        EMAIL         VARCHAR2  (20) );

ALTER TABLE BORROWERS ADD CONSTRAINT PK_BORROWERS
        PRIMARY KEY (BORROWER);

ALTER TABLE BORROWERS ADD CONSTRAINT UK_BORROWERS
        UNIQUE (NAME);

REM ****************************************************************
REM ***  LOANS IS THE MAIN DATA TABLE FOR LOAN OF ROCKS SAMPLES   ***
REM ****************************************************************


CREATE TABLE LOANS (
        RSNO          NUMBER    (6)     NOT NULL,
        BOXNO         VARCHAR2  (5)     NOT NULL,
        BORROWER      NUMBER    (5)     NOT NULL,
        DATEOUT       DATE              NOT NULL,
        DATEDUE       DATE,
        DATEBACK      DATE,
        COMMENTS      VARCHAR2  (255) );

CREATE INDEX LOANS_RSNO ON LOANS(RSNO);

CREATE INDEX LOANS_BORROWER ON LOANS(BORROWER);

CREATE INDEX LOANS_DATEDUE ON LOANS(DATEDUE);

ALTER TABLE LOANS ADD CONSTRAINT FK_LOANS_BORROWER
        FOREIGN KEY (BORROWER) REFERENCES BORROWERS(BORROWER);

ALTER TABLE LOANS ADD CONSTRAINT FK_LOANS_RSNO
        FOREIGN KEY (RSNO) REFERENCES SAMPLES(RSNO);

ALTER TABLE LOANS ADD CONSTRAINT FK_LOANS_BOXNO
        FOREIGN KEY (BOXNO) REFERENCES BOXES(BOXNO);
```

```
REM  TRIGGER INS_UPD_BOXES ENSURES LOCATION OF CONTAINER IS VALID

CREATE OR REPLACE TRIGGER INS_UPD_BOXES
      BEFORE INSERT OR UPDATE
      ON ROCSTOR.BOXES
      FOR EACH ROW
      DECLARE
          NUMBAYS      NUMBER;
          NUMROWS      NUMBER;
          NUMCOLS      NUMBER;
      BEGIN
          IF :NEW.COMPACTUS IS NOT NULL THEN
               SELECT MAXBAYS INTO NUMBAYS FROM ROCSTOR.COMPACTI
                WHERE COMPACTUS = :NEW.COMPACTUS;
               SELECT MAXROWS INTO NUMROWS FROM ROCSTOR.COMPACTI
                WHERE COMPACTUS = :NEW.COMPACTUS;
               SELECT MAXCOLS INTO NUMCOLS FROM ROCSTOR.COMPACTI
                WHERE COMPACTUS = :NEW.COMPACTUS;
               IF NUMBAYS < :NEW.BAY THEN
                 RAISE_APPLICATION_ERROR ( -20901,'COMPACTUS ' ||
                   :NEW.COMPACTUS || ' HAS ONLY ' || TO_CHAR(NUMBAYS)
                   || ' BAYS.');
               ELSIF NUMROWS < :NEW.ROWNO THEN
                 RAISE_APPLICATION_ERROR ( -20902,'COMPACTUS ' ||
                   :NEW.COMPACTUS || ' HAS ONLY ' || TO_CHAR(NUMROWS)
                   || ' ROWS.');
               ELSIF NUMCOLS < :NEW.COLNO THEN
                 RAISE_APPLICATION_ERROR ( -20903,'COMPACTUS ' ||
                   :NEW.COMPACTUS || ' HAS ONLY ' || TO_CHAR(NUMCOLS)
                   || ' COLS.');
            END IF;
          END IF;
      END;
/
```


APPENDIX C. GLOSSARY

BLOCK	A subdivision of a **form** usually representing one or more records from a *single* **table**
DATABASE SCHEMA	Structure of the database, indicating the **table** definitions, indexes, inter-relationships between **tables** and "rules" for enforcing integrity of the data. A schema is often illustrated by the SQL commands for creating the database.
DIALOGUE	A window displaying messages and fields and other **GUI** objects, requiring user interaction or response.
ENTER-QUERY MODE	The mode of a **form** in which the user is able to enter database retrieval criteria by entering values (usually) in fields in a template record, which is then used as an example to locate records in the underlying database **table** that satisfy the criteria.
FORM	In **GUI** terminology, a window or collection of windows for display, query and editing of data.
GUI	**G**raphical **U**ser **I**nterface: a style of computer/user interface that incorporates graphical objects such as scroll bars, command buttons in windows, and using icons, menus and pop-ups.
LOOKUP TABLE	A database **table** of records usually consisting of a code (or some other identifier) and the corresponding description of the code. Other database tables may then store the code, instead of the long descriptive field thus reducing storage requirements, minimising potential typographic errors and localising maintenance of the descriptive field to just one table. Applications may "translate" the code to the description by looking it up in the table and confirm that a code is valid by allowing only those that occur in the table.
OPEN QUERY	A database retrieval in which *no* criteria are specified, and therefore *all* records are records in the underlying database **table** are returned.
QUERY	A retrieval from the database, usually based on a set of criteria.
RECORD	A row from a database **table**; the collection of data pertaining to a single entity, such as the various descriptive fields for a sample.
SORTING ORDER	The order in which **rows** from a **table** are returned (and hence displayed in a **block**). Some **forms** have a predefined order for display of records; others do not. The retrieval process in general is faster if the database can display each record as it is found because it does not have to retrieve all records *and then sort them* before displaying the first of them.
SQL	**S**tructured **Q**uery **L**anguage - a "standard" English-like language for defining relational databases and manipulation of the data in them.
TABLE	A grid of columns and rows; the basic unit of database storage; each row contains the same columns of information about entities.

APPENDIX D: EXAMPLE REPORTS

ROCSTOR Report - Search parameters

Boxes **1000-1000**

Sample **R4%**

Project **Googong Dam Site & Queanbeyan Regional Survey, NSW**

Other conditions

Box No **1000** Type **1** Compactus **C3** Bay **1** Row No **1** Column No **1**
Validated Entry date **02-NOV-95** Entered by **ROCSTOR**
Project **Googong Dam Site & Queanbeyan Regional Survey, NSW**
Collector **Burton, G.M.** Date Collected
Sample Type **outcrop sample** Status **In Store**
O.H.& S. **Weight exceeds 25kg**
Field ID (Registered ID if different [Other ID if different]/Splitno {OZROX Rock No} : Comments

R40 Needs reboxing.

R41 Needs reboxing.

R42 Needs reboxing.

R46 Needs reboxing.

R46s Needs reboxing.

R47 Needs reboxing.

R48 Needs reboxing.

ROCSTOR Report - Search parameters

Boxes **1000-1000**

Sample **R4%**

Project **Googong Dam Site & Queanbeyan Regional Survey, NSW**

Other conditions

Box No	Type	Compactus	Bay	Row No	Column No
1000	1	C3	1	1	1

Rock Store No **11** Project **Googong Dam Site & Queanbeyan Regional Survey, NSW** Entry date **02-NOV-95**
Entered by **ROCSTOR**
Sample Type **outcrop sample** Collector **Burton, G.M.** Split No
Field ID **R40** Reg. ID **R40** Other ID
Status **In Store** O.H.& S **Weight exceeds 25kg**
OZROX Rock No Validated Collection Date
Description
Comments **Needs reboxing.**

Rock Store No **12** Project **Googong Dam Site & Queanbeyan Regional Survey, NSW** Entry date **02-NOV-95**
Entered by **ROCSTOR**
Sample Type **outcrop sample** Collector **Burton, G.M.** Split No
Field ID **R41** Reg. ID **R41** Other ID
Status **In Store** O.H.& S **Weight exceeds 25kg**
OZROX Rock No Validated Collection Date
Description
Comments **Needs reboxing.**

Rock Store No **13** Project **Googong Dam Site & Queanbeyan Regional Survey, NSW** Entry date **02-NOV-95**
Entered by **ROCSTOR**
Sample Type **outcrop sample** Collector **Burton, G.M.** Split No
Field ID **R42** Reg. ID **R42** Other ID
Status **In Store** O.H.& S **Weight exceeds 25kg**
OZROX Rock No Validated Collection Date
Description
Comments **Needs reboxing.**

Rock Store No **14** Project **Googong Dam Site & Queanbeyan Regional Survey, NSW** Entry date **02-NOV-95**
Entered by **ROCSTOR**
Sample Type **outcrop sample** Collector **Burton, G.M.** Split No
Field ID **R46** Reg. ID **R46** Other ID
Status **In Store** O.H.& S **Weight exceeds 25kg**
OZROX Rock No Validated Collection Date
Description
Comments **Needs reboxing.**

Rock Store No **43** Project **Googong Dam Site & Queanbeyan Regional Survey, NSW** Entry date **02-NOV-95**
Entered by **ROCSTOR**
Sample Type **outcrop sample** Collector **Burton, G.M.** Split No
Field ID **R46s** Reg. ID **R46s** Other ID
Status **In Store** O.H.& S **Weight exceeds 25kg**
OZROX Rock No Validated Collection Date
Description
Comments **Needs reboxing.**

Box No	Type	Compactus	Bay	Row No	Column No
1000	1	C3	1	1	1

Rock Store No **15** Project **Googong Dam Site & Queanbeyan Regional Survey, NSW** Entry date **02-NOV-95**
Entered by **ROCSTOR**
Sample Type **outcrop sample** Collector **Burton, G.M.** Split No
Field ID **R47** Reg. ID **R47** Other ID
Status **In Store** O.H.& S **Weight exceeds 25kg**
OZROX Rock No Validated Collection Date
Description
Comments **Needs reboxing.**

Rock Store No **16** Project **Googong Dam Site & Queanbeyan Regional Survey, NSW** Entry date **02-NOV-95**
Entered by **ROCSTOR**
Sample Type **outcrop sample** Collector **Burton, G.M.** Split No
Field ID **R48** Reg. ID **R48** Other ID
Status **In Store** O.H.& S **Weight exceeds 25kg**
OZROX Rock No Validated Collection Date
Description
Comments **Needs reboxing.**