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Design and Implementation of the United Kingdom Mineral Statistics Database & A User Interface

Economic Minerals and Geochemical Baseline Programme

Commissioned Report CR/03/05N



BRITISH GEOLOGICAL SURVEY

COMMISSIONED REPORT CR/03/05N

Design and Implementation of the United Kingdom Mineral Statistics Database & a User Interface

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High-purity limestone
production, Derbyshire.

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Foreword

This report is the published product of an application designed and implemented by the British Geological Survey (BGS). It is prepared for the Office of the Deputy Prime Minister (Contract MP0649-04)

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Summary

This report describes work carried out under a project entirely funded by the former Department of Transport, Local Government and the Regions (DTLR) and latterly by the Office of the Deputy Prime Minister (ODPM). The aims of the work, in addition to routine publication of annual statistics, was to completely review the collection, compilation, analysis and dissemination of United Kingdom mineral statistics, which has hitherto been done manually, using spreadsheets. Members of the user community were interviewed and their requirements in terms of the data needed and the form in which it should be delivered were ascertained. That survey indicated that access to the data by means of the Internet was at least as important as the publication of conventional hard-copy products and the work described in this report helps to meet that requirement.

The annexes to this report detail the results of the work carried out. A database and a user interface have been designed and implemented using Microsoft Access 2000 software and loaded with selected UK mineral statistics data from the years 1972 to 2000. It has been tested using data obtained from the UK Minerals Yearbook 2000. The aim is to produce future editions of the annual publication *United Kingdom Minerals Yearbook* electronically from this database.

New products will be developed from the database, which will facilitate dissemination of UK mineral statistics via the Internet using the *Minerals: Britain and the World* site set up under the DTI/ Minerals Programme. Chief benefits include increased efficiency, improved quality, lower maintenance costs and the potential to increase income.

1 Introduction

This report describes work carried out as part, only, of a major project funded by the then DTLR, now ODPM. The project was agreed on 14th January 1999 and completed by 31st January 2003 as stipulated in the contract variation agreed by BGS and DTLR in November 2002. This report represents the final deliverable of the project. The new database, designated United Kingdom Minerals Statistics (UKMS) Database, is housed at the BGS headquarters at Keyworth, Nottingham where it is managed by staff attached to the Economic Minerals and Geochemical Baseline Programme.

The report documents the development of the UKMS database together with a user interface, covering the logical design, physical design and implementation phases. The application is developed using MS Access 2000 software and comprises simple screens that allow data to be entered and edited as well as production of hardcopy output based on user entered search criteria.

The creation of the UKMS database is needed so that it can store information as well as make it more accessible to users and more flexible in the way data can be manipulated and retrieved.

1.1 OBJECTIVE OF THE PROPOSED SYSTEM

The aims of the work were to design and implement a database to handle the compilation, dissemination and archiving of United Kingdom minerals statistics including production, consumption, reserves, imports and exports. An application that accesses this database to retrieve data based on the end users requirements will also be developed. The new database should increase efficiency, and provide a firm basis on which to build a modern information and advice service to industry that can use the Internet and generate an improved income stream.

The ability to search for UKMS information quickly and obtain results in digital format cannot be over-emphasised. UK policy makers, planners and businesses need to analyse what minerals are produced, consumed or sold in the various parts of the country. There is currently no UK-wide minerals statistics database, which makes it difficult for policy makers, planners and businesses to gain valuable information about UKMS quickly and in the format they desire.

1.2 BENEFITS

The main design goal for the UKMS database addresses the following issues:

- Provide improved access to UKMS data
- Improve the ways to store, analyse and manage UKMS data.
- Provide the facility for easy dissemination of UKMS data via the Internet.
- Ensure the long-term stability of information provision
- Increase efficiency in data gathering and interpretation
- Provide compatibility with other BGS databases and GIS systems
- Enable production of data in a form that is in line with the stated requirements of the user community in government, industry and other areas

1.3 WORK PROGRAMME

The objectives of the project were to be achieved through the following work programme.

- Undertake user requirements analysis.
- Produce logical and physical designs for the new database, based on the requirements analysis.
- Implement the physical design using Microsoft Access 2000 software.

- Populate the database with selected test data and generate a sample library of database reports and test outputs.
- Modify the database in the light of trial results to meet requirements.
- Transfer all relevant data to the new database.
- Produce a user manual and train staff to use the new database.
- Train UKMS staff to use the new database.

2 System Analysis

2.1 ANALYSIS OF CURRENT SYSTEM (UKMY)

The main aspects of the current system designated UK Minerals Yearbook (UKMY) are shown in the current logical data flow model (Figure 1).

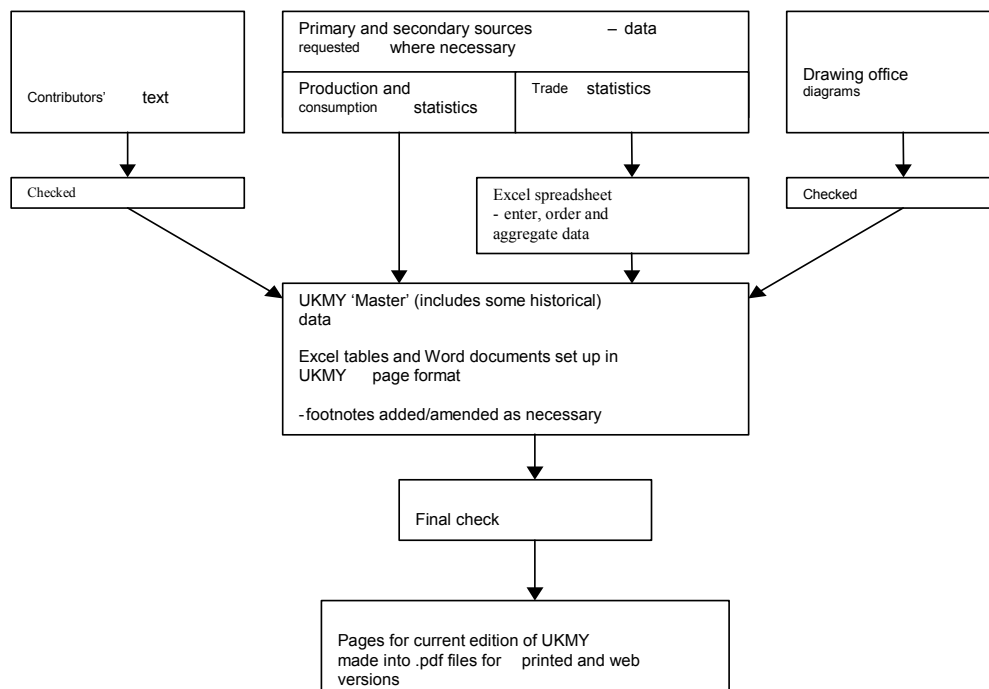


Figure 1 Current physical data flow diagram (UKMY)

2.1.1 Requirements

The main requirements of UKMY are as follows:

- Data is to be stored for all years for which there is information (approximately 150 years).
- Facility required for entering bulk (especially trade) data, preferably using a spreadsheet.
- Facility required for storing more than one figure for each item (if sources differ).

- Source information is to be stored in the database.
- Facility required for adding comments to each entry.
- Output is required by:
 - Production, consumption, exports, imports and value
 - One or more years
 - Country, region and MPA
 - Group, commodity, end use and product
- Facility for generating UKMY tables in Word is essential.

2.1.2 Production

Yearly production figures are entered from source documents onto Excel table set up in UKMY page format. Some figures may be entered more than once and footnotes are added/ amended as necessary.

2.1.3 Consumption

Yearly consumption figures are entered from source documents into Excel table set up in UKMY page format. Some figures may be entered more than once and footnotes are added or amended as necessary.

2.1.4 Trade

The current system employs the following procedure to manage trade statistics data:

- Yearly trade figures are entered from source documents onto an Excel spreadsheet in commodity trade code number order.
- This spreadsheet is then sorted into ‘Community Summaries’ order.
- The data are then manually summed where necessary and re-typed into Excel tables set up in UKMY page format. Some figures may be entered more than once and footnotes are added or amended as necessary.

2.1.5 Text

Text such as front pages and preface are dealt with by the following:

- Front pages – Word documents set up in UKMY page format are amended as necessary each year.
- Preface and Commodity text – Word documents received from authors are edited into UKMY page format.

2.1.6 Diagrams

Data for generation of diagrams and maps are supplied by BGS Cartographic Services.

2.1.7 Current Problems

The main problems of the UKMY system are as follows:

- Formatting Excel or word documents to produce UKMY pages is currently done manually. This process of manual formatting is very cumbersome and time consuming.
- Adding or amending footnotes and relating footnotes to historical data cannot be achieved with the current system.

- The current system lacks the facility for querying the database quickly and producing reports in digital. This hinders the accessibility of data and also the flexibility in the way data can be manipulated and retrieved.

2.2 SPECIFICATION OF REQUIREMENTS

The requirements for the proposed UKMS database are as follows (Figure 2):

- Data is to be stored for all years for which there is information.
- Data is not to be aggregated except during retrieval routines.
- Source information is to be stored in the database.
- A facility for querying the database, producing and disseminating reports in digital format.

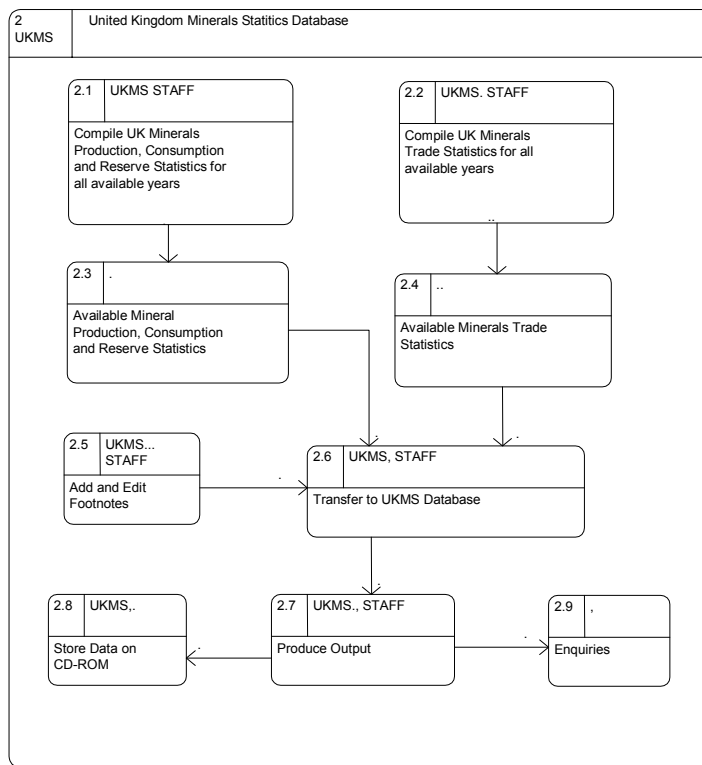


Figure 2 United Kingdom Minerals Statistics Database logical data flow diagram

3 LOGICAL DESIGN

Relational Data Analysis and Entity Modelling

Figure 3 is an outline representation of an entity model for the UKMS Database for production, consumption and reserves. According to the model, a mineral commodity may belong to a Mineral Group (e.g. Construction Minerals, Energy Minerals, etc.). There may be more than one mineral commodity for one Mineral Group. There may be more than one commodity having the same End Use. The United Kingdom may consist of several Nations. A Nation may consist of more than one Region, each consisting of one or more Mineral Planning Authority.

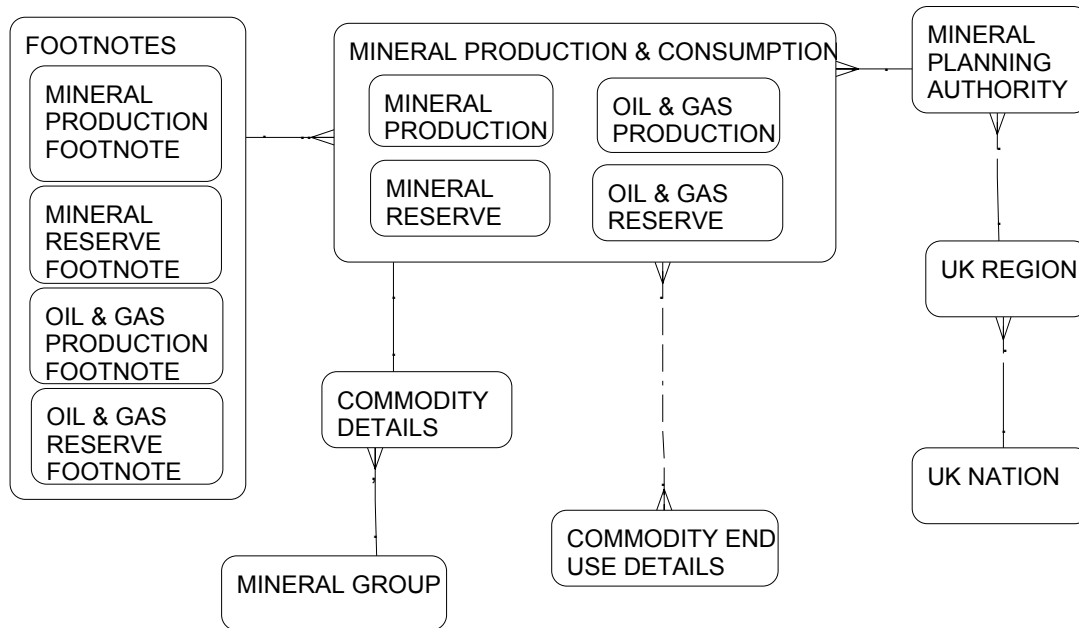


Figure 3 UK Minerals Statistics Database Entity Relationship Model

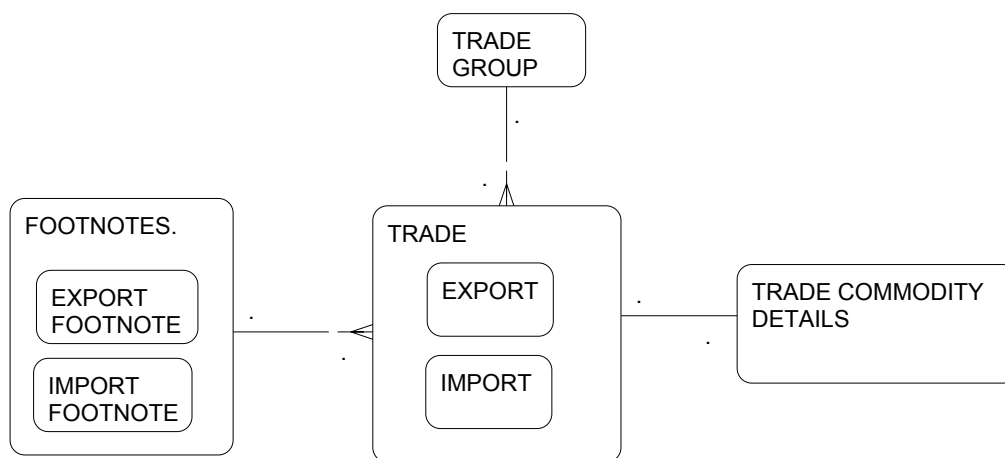


Figure 4 United Kingdom Minerals Statistics Database Entity Model for Trade

Figure 4 is an outline representation of an entity model for the UKMS Database for Mineral Trade. According to the model, the United Kingdom may trade (export or import) an amount of a commodity over a given period (usually a year) to and from another country. A traded commodity might have international trade classification codes (and a UKMS code). A traded commodity may be a sub commodity of another traded commodity.

The mineral production and trade data have different attributes and so will become different physical structures. Also, the mineral production as well as the trade figures may have one or more footnotes. Figures 5 and 6 are database design models for mineral production (including consumption and reserves) and trade respectively.

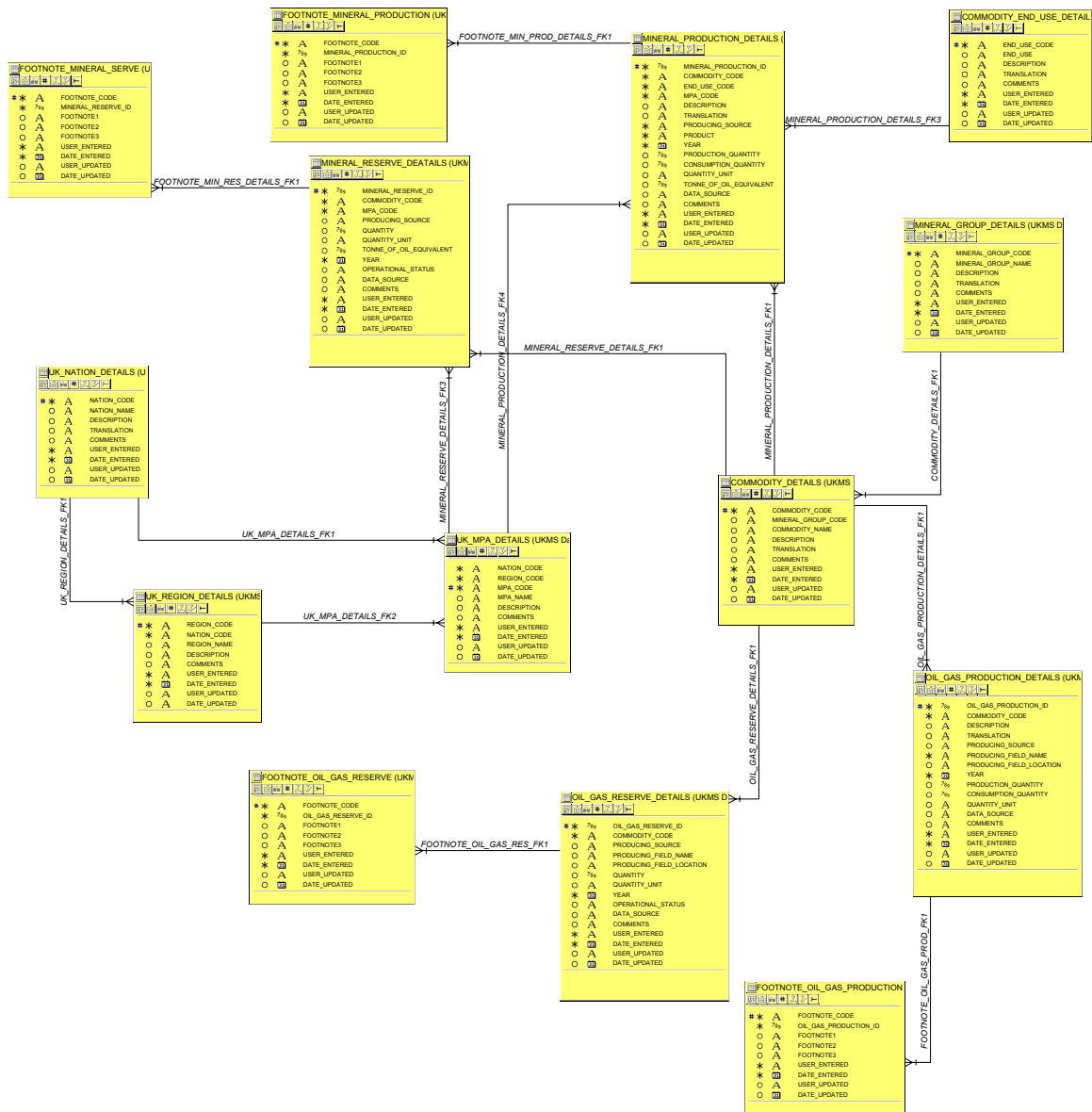
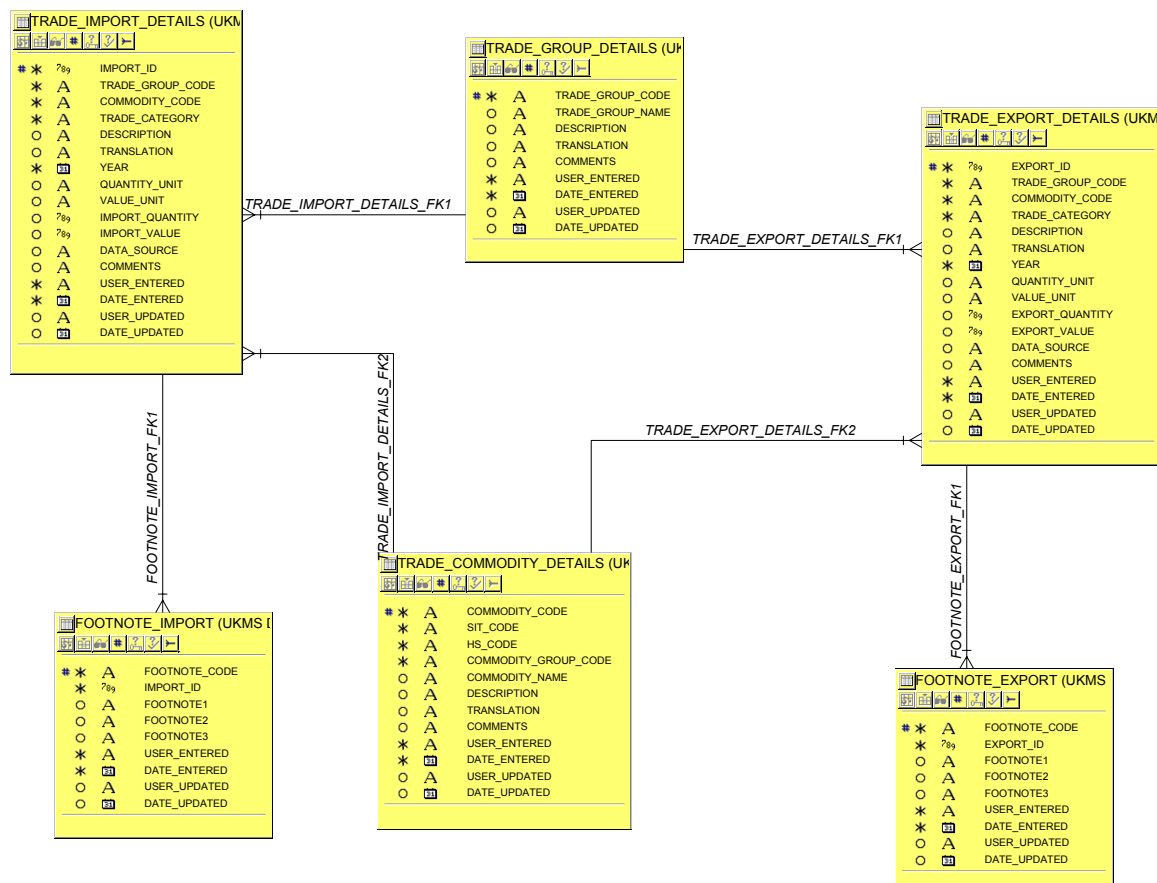


Figure 5 United Kingdom Mineral Statistics Database Server Model Diagram for Production/ Reserve



Key:

: Primary Key, * : Mandatory field, 789 : Numeric field, A : Text field, o : Nullable field and [31]: Date field

Figure 6 United Kingdom Mineral Statistics Database Server Model Diagram for Trade

4 PHYSICAL DESIGN

In order to resolve the difficulties arising as a result of variations in the attributes, mineral production, consumption, reserve and trade data are to be stored in separate tables. Also, oil and gas data is to be stored separately from data for other minerals for the same reason as are end use details. This will facilitate reinforcement of integrity and also alleviate some of the retrieval problems. The problems associated with traded and produced commodity sub-entities are resolved by storing the entity that holds the list of commodities used for trade in a separate table from those used for mineral production, consumption and reserve.

A summary of the various database entity tables (Tables 1 to 20) is provided in Appendix 1.

5 APPLICATION DESIGN

The application is developed using MS Access 2000 software and comprises simple screens that allow data to be entered and edited. The application also enables the production of hardcopy output based on user-entered search criteria.

Figure 7 is a picture of the first screen (switchboard) displayed on entering the application. The user can choose data viewing/ entry or report generating screens via a further five forms (Figures 8 to 12).

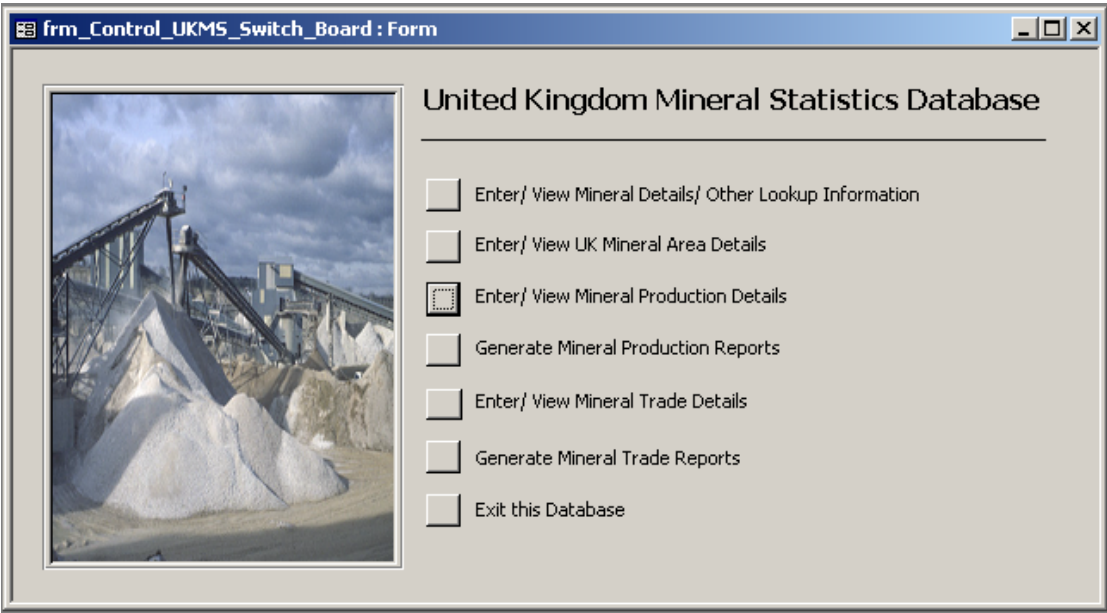


Figure 7 Screenshot of the opening screen

5.1 Data Entry

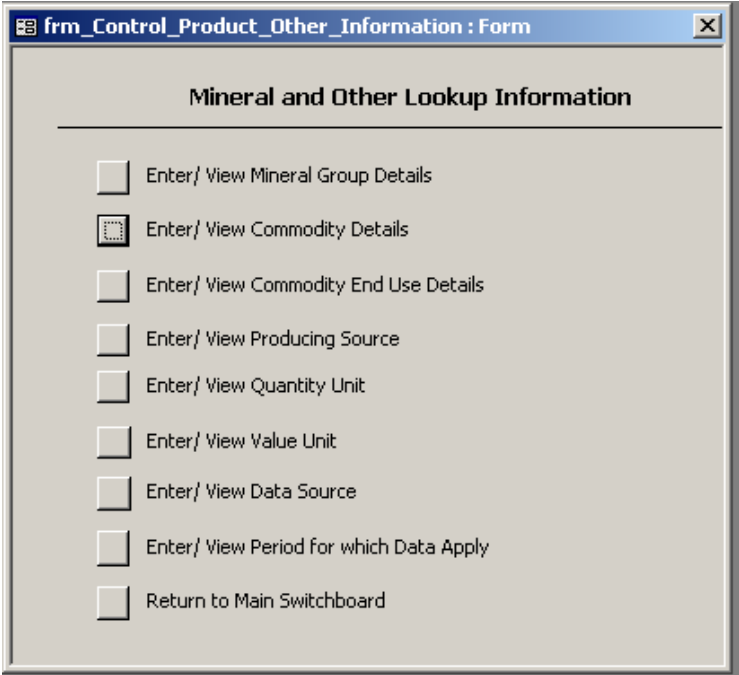


Figure 8 Form for mineral and other look up table information

The screenshot shows a software window with a blue title bar containing the text "frm_Control_UK_Location_Details : Form" and a close button. The main content area has a light gray background and is titled "United Kingdom Mineral Area Details" in bold black text, underlined. Below the title, there are four menu items, each with a small square icon to its left. The first icon is a square with a dotted border, while the others are solid gray. The menu items are: "Enter/ View Mineral Planning Authority (MPA) Details", "Enter/ View Region Details", "Enter/ View UK Nation Details", and "Return to Main Switchboard".

Figure 9 Form for United Kingdom mineral area details

The screenshot shows a software window with a blue title bar containing the text "frm_Control_Mineral_Statistics_Details : Form" and a close button. The main content area has a light gray background and is titled "United Kingdom Mineral Production Details" in bold black text, underlined. Below the title, there are five menu items, each with a small square icon to its left. The second icon is a square with a dotted border, while the others are solid gray. The menu items are: "Enter/ View Mineral Production Details", "Enter/ View Mineral Reserves Details", "Enter/ View Oil and Gas Production Details", "Enter/ View Oil and Gas Reserves Details", and "Return to Main Switchboard".

Figure 10 Form for mineral production details

frm_Control_Statistics_Reports : Form

United Kingdom Mineral Production Reports

- Mineral Production / Reserves (Excluding Oil _Gas)
- Summary/ Total Mineral Production by Nation
- Coal Production/ Reserves
- Oil and Gas Production/ Reserves
- Return to Main Switchboard

Figure 11 Form for generating mineral production reports

frm_Control_UK_Mineral_Trade_Details : Form

United Kingdom Mineral Trade Details

- Enter/ View Trade Group Details
- Enter/ View Trade: Commodity Details
- Enter/ View Trade: Export Details
- Enter/ View Trade: Import Details
- Return to Main Switchboard

Figure 12 Form for mineral trade details

For example, the form illustrated by Figure 8 allows the user to choose which of the screens to use to enter or view look up information such as mineral group details, commodity details, commodity end use, etc, (Figure 13). The form for United Kingdom mineral area (Figure 9) allows the user to choose the screen (Figure 14) to enter or view UK mineral area details such as mineral planning authority, region or nation.

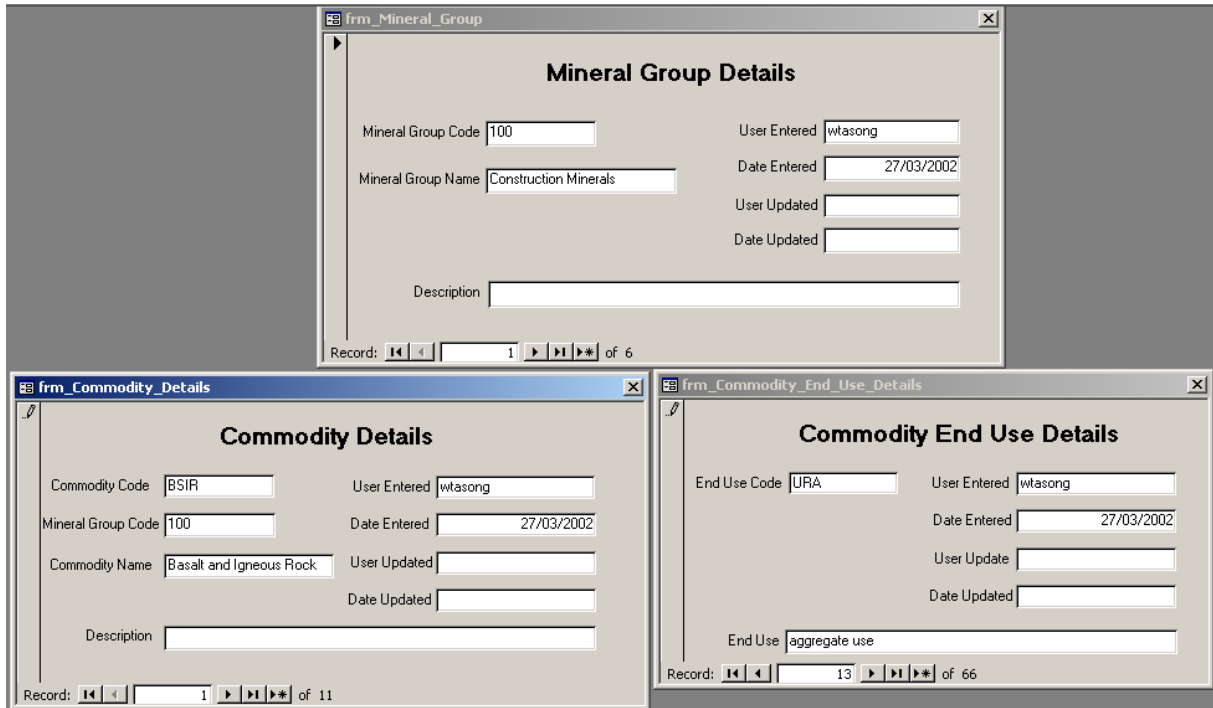


Figure 13 Examples of forms for data entry or viewing look up information



Figure 14 Forms for data entry or viewing UK mineral area details

Similarly, the form for mineral production (Figure 10) allows the user to choose the screen to enter or view mineral production details (Figure 15), mineral reserve details (Figure 16), oil and gas production details (Figure 17) or oil and gas reserve details (Figure 18).

frm_Mineral_Production

Mineral Production Details

Mineral Production ID: * Description:

Commodity Code: * Year: * MPA Code: * User Entered: *

Production Quantity: Region Code: * Date Entered: *

Producing Source: * Consumption Quantity:

Product: * Quantity Unit: * User Updated:

Tonne of Oil Equivalent: Data Source: * Date Updated:

End Use Code: * Comments: * Transfer:

Mineral Production ID *	Footnote Code *	Footnote1	Footnote2	Footnote3
<input type="text" value="3"/>	<input type="text" value="a"/>	Slurry etc. recovered from dumps, ponds.	<input type="text"/>	<input type="text"/>

Record: of 1

Record: of 494

Figure 15 Data entry and viewing form for mineral production details

frm_Mineral_Reserve

Mineral Reserves Details

Mineral Reserve ID: * Year: * Operational Status: * User Entered: *

Quantity: MPA Code: * Date Entered: *

Commodity Code: * Quantity Unit: * User Updated:

Producing Source: * Tonne of Oil Equivalent: Region Code: * Date Updated:

Data Source: * Transfer:

Comments: *

Mineral Reserve ID *	Footnote Code *	Footnote1	Footnote2
<input type="text" value="1"/>	<input type="text" value="a"/>	Refers to test data only	<input type="text"/>

Record: of 1

Record: of 3

Figure 16 Data entry and viewing form for mineral reserves details

frm_Oil_Gas_Production

Oil and Gas Production Details

Oil Gas Production ID: * Description:

Commodity Code: NG * Year: 1996 * User Entered: wlasong *

Producing Source: Colliery * Production Quantity: 304 Date Entered: 15/04/2002 *

Producing Field Name: U * Consumption Quantity: User Updated:

Producing Field Location: Onshore * Quantity Unit: Thousand Tonnes * Date Updated:

Data Source: Office of National Statistics * Transfer:

Comments: Producing Source: Colliery(a)

Oil Gas Production ID	Footnote Code	Footnote1	Footnote2
2 *	a *	Gas obtained as by product of coal mining	

Record: 1 of 1

Record: 1 of 3

Figure 17 Form to enter or view oil and gas production details

frm_Oil_Gas_Reserve

Oil and Gas Reserves Details

Oil Gas Reserve ID: * Year: 1995 * User Entered: wlasong *

Commodity Code: CO * Quantity: 283939 Date Entered: 16/04/2002 *

Producing Source: U * Quantity Unit: Thousand Tonnes * User Updated:

Producing Field Name: U * Operational Status: U * Date Updated:

Producing Field Location: Onshore * Data Source: Office of National Statistics * Transfer:

Comments: Quantity: 283939(h)

Oil Gas Reserve ID	Footnote Code	Footnote1	Footnote2
1 *	h *	Include oil recovered from disused fields	

Record: 1 of 1

Record: 1 of 2

Figure 18 Form to enter or view oil and gas reserves details

5.2 Data Retrieval

Report templates were constructed in Microsoft Access 2000 to produce printed reports based on user chosen options. There is also a provision for the user to export the output to another package such as Microsoft Excel where further reformatting can be carried out if required.

Access to report generating screens for mineral production is via the form for mineral production reports (Figure 11). This form allows the user to choose which screen to use to generate reports for mineral production and reserves (Figure 19), coal production and reserves (Figure 20), oil and gas production, and reserves (Figure 21) or summary and total mineral production by UK nation (Figure 22). It should be noted that separate report generating forms are preferred as opposed to one general form for reason of simplicity and ease of use. The use of multiple screens is also intended to resolve some of the difficulties associated with variations in attributes for the various entities as explained in the system logical design.

Each of the report generating forms provides the user with various search criterion options. For example, the form allow the user to specify the search requirements by selecting an appropriate search criterion from drop down lists or by entering search criteria required in the combo boxes provided. Alternatively, the user can query all records by leaving the criteria blank. Once the criteria have been selected, the user can then chose to preview and print the report or export data to another package such as Excel. For instance, in order to produce reports for mineral production statistics, the user can choose search criteria (Figure 19) such as end use, product, mineral producing authority, period, etc., and then preview, print the report or export the data to an Excel file.

The screenshot shows a software window titled "frm_rpt_Minerals : Form" with a close button in the top right corner. The main content area is titled "United Kingdom Minerals Production Statistics". It is divided into four distinct panels, each with a title and search criteria:

- Mineral Production by End Use:** Includes dropdowns for "Choose or Enter End Use", "Choose or Enter Product", and "Choose or Enter Period". Below are checkboxes for "Preview Report", "Print Report", and "Send Output to Excel File". A note reads "N/B: Leave blank to search all records".
- Mineral Production by MPA:** Includes dropdowns for "Choose or Enter MPA", "Choose or Enter Product", and "Choose or Enter Period". Below are checkboxes for "Preview Report", "Print Report", and "Send Output to Excel File". A note reads "N/B: Leave blank to search all records".
- Mineral Production by Mineral Group:** Includes dropdowns for "Choose or Enter Min Group", "Choose or Enter MPA", and "Choose or Enter Period". Below are checkboxes for "Preview Report", "Print Report", and "Send Output to Excel File". A note reads "N/B: Leave blank to search all records".
- Mineral Reserves by MPA:** Includes dropdowns for "Choose or Enter MPA", "Choose or Enter Commodity", and "Choose or Enter Period". Below are checkboxes for "Preview Report", "Print Report", and "Send Output to Excel File". A note reads "N/B: Leave blank to search all records".

Figure 19 Screen for generating mineral production and reserves report

Alternatively, the user can search for coal production or coal reserve statistics data using a search screen (Figure 20) built purposely for use to produce report output for coal. The screen allows the user to produce report output for coal based on user requirements. For instance the user can specify their requirement by entering or selecting search criteria such as producing source, period and MPA from combo drop down lists.

Also, the user can search and generate summary and totals of minerals produce by the various UK nations using a search screen (Figure 21) built to report output for summary and totals of mineral production by UK nation.

The screenshot shows a software window titled "frm_rpt_Coal : Form" with a close button. The main heading is "United Kingdom Coal Production Statistics". Below this, there are two side-by-side panels. The left panel is titled "Coal Production" and contains a dropdown menu labeled "Choose or Enter Producing Source", another dropdown menu labeled "Choose or Enter Period", the text "N/B: Leave blank to search all records", and three checkboxes: "Preview Report", "Print Report", and "Send Output To Excel File". The right panel is titled "Coal Reserves" and contains a dropdown menu labeled "Choose or Enter MPA", another dropdown menu labeled "Choose or Enter Period", the text "N/B: Leave blank to search all records", and three checkboxes: "Preview Report", "Print Report", and "Send Output To Excel File".

Figure 20 Screen for generating coal production and reserves report

The screenshot shows a software window titled "frm_rpt_Mineral_Nation : Form" with a close button. The main heading is "United Kingdom Mineral Production by Nation". Below this, there are two side-by-side panels. The left panel is titled "Mineral Production" and contains three dropdown menus: "Choose or Enter UK Nation", "Choose or Enter Commodity", and "Choose or Enter Period", the text "N/B: Leave blank to search all records", and three checkboxes: "Preview Report", "Print Report", and "Send Output to Excel File". The right panel is titled "Summary and Totals" and contains three dropdown menus: "Choose or Enter UK Nation", "Choose or Enter Commodity", and "Choose or Enter Period", the text "N/B: Leave blank to search all records", and three checkboxes: "Preview Report", "Print Report", and "Send Output to Excel File".

Figure 21 Screen for generating summary and total mineral production by UK nation reports

The screenshot shows a software window titled "frm_rpt_Oil_Gas : Form" with a main heading "United Kingdom Oil and Gas Production Statistics". It contains four distinct report generation panels arranged in a 2x2 grid:

- Oil_Gas Production by Producing Field:** Includes dropdowns for "Choose or Enter Producing Field", "Choose or Enter Commodity", and "Choose or Enter Period". It also has a note "N/B: Leave blank to search all records" and checkboxes for "Preview Report", "Send Output to Excel File", and "Print Report".
- Oil_Gas Production by Commodity:** Includes dropdowns for "Choose or Enter Commodity", "Choose or Enter Producing Field Location", and "Choose or Enter Period". It also has a note "N/B: Leave blank to search all records" and checkboxes for "Preview Report", "Print Report", and "Send Output to Excel File".
- Oil_Gas Reserves by Producing Field:** Includes dropdowns for "Choose or Enter Producing Field", "Choose or Enter Commodity", and "Choose or Enter Period". It also has a note "N/B: Leave blank to search all records" and checkboxes for "Preview Report", "Print Report", and "Send Output to Excel".
- Oil_Gas Reserves by Commodity:** Includes dropdowns for "Choose or Enter Commodity", "Choose or Enter Producing Field Location", and "Choose or Enter Period". It also has a note "N/B: Leave blank to search all records" and checkboxes for "Preview Report", "Print Report", and "Send Output to Excel File".

Figure 22 Screen for generating oil and gas production and reserves report

Similarly, the screen (Figure 23) for producing reports for mineral trade statistics is accessible via the main switchboard (Figure 7). The trade statistics screen allows the user to specify the search requirements by selecting an appropriate search criterion from drop down lists or by entering search criteria required in the combo boxes provided. Once the criteria have been selected, the user can then chose to preview and then print or export the reports to another package such as Excel. For instance, in order to produce reports for mineral trade statistics, the user can chose search criteria (Figure 23) such as traded commodity and period for which data applies and then preview, print or export the report to Excel file.

Examples of some of the various report output produced using the new UKMS application are provided in the Appendix 2.

The screenshot shows a software window titled "frm_rpt_Trade : Form" with a main heading "United Kingdom Mineral Trade Statistics". The window is divided into two side-by-side panels. The left panel is titled "Trade: Export" and the right panel is titled "Trade: Import". Each panel contains the following elements: a "Choose or Enter Commodity" dropdown menu, a "Choose or Enter Period" dropdown menu, a note "N/B: Leave blank to search all records", and three checkboxes labeled "Preview Report", "Print Report", and "Send Output to Excel File".

Figure 23 Screen for generating mineral trade statistics reports

Appendix 1

Tables 1 to 20 are summaries of the various database entity tables.

Table 1 Mineral_Group_Details

Field Name	Field Description	Data Type	Size	Mandatory
Mineral_Group_Code	Unique identification code of mineral group	Varchar2	10	Yes (pk)
Mineral_Group_Name	Name of mineral group	Varchar2	20	Yes
Description	Text description of mineral group	Varchar2	250	
Translation	Short concise description for use in list boxes, etc.	Varchar2	50	
User_Entered	The user who entered the record	Varchar2	10	Yes
Date_Entered	The date a record was entered by a user	Date		Yes
User_Updated	The user who updated the record	Varchar2	10	
Date_Updated	The date a record was updated	Date		

Table 2 Commodity_Details

Field Name	Field Description	Data Type	Size	Mandatory
Commodity_Code	Unique identification code of commodity end use	Varchar2	10	Yes (pk)
Mineral_Group_Code	Unique identification code of mineral group	Varchar2	10	Yes (fk)
Commodity_Name	Name of Commodity	Varchar2	20	Yes
Description	Text description of commodity	Varchar2	250	
Translation	Short concise description for use in list boxes, etc.	Varchar2	50	
User_Entered	The user who entered the record	Varchar2	10	Yes
Date_Entered	The date a record was entered by a user	Date		Yes
User_Updated	The user who updated the record	Varchar2	10	
Date_Updated	The date a record was updated	Date		

Table 3 Commodity_End_Use_Details

Field Name	Field Description	Data Type	Size	Mandatory
End_Use_Code	Unique identification code of commodity end use	Varchar2	10	Yes (pk)
End_Use	Text description of commodity end use	Varchar2	250	Yes
Translation	Short concise description for use in list boxes, etc.	Varchar2	50	
User_Entered	The user who entered the record	Varchar2	10	Yes
Date_Entered	The date a record was entered by a user	Date		Yes
User_Updated	The user who updated the record	Varchar2	10	
Date_Updated	The date a record was updated	Date		

Table 4 Mineral_Production_Details

Field Name	Field Description	Data Type	Size	Mandatory
Mineral_Production_ID	Unique identification number of record in mineral production table	Number	10	Yes (pk)
Commodity_Code	Unique identification code of Commodity	Varchar2	10	Yes (fk)
Description	Text description of Commodity	Varchar2	250	
Translation	Short concise description for use in list boxes, etc.	Varchar2	50	
Producing_Source	Source of commodity, e.g. marine dredged, etc	Varchar2	20	Yes (fk)
Product	Product which is produced from mineral commodity	Varchar2	20	Yes (fk)
Year	Date which the data apply	Date		Yes (pk)
Production_Quantity	Amount of commodity	Number	15	
Consumption_Quantity	Amount of commodity	Number	15	
Quantity_Unit	Unit of the amount figure	Varchar2	10	
Tonne_of_Oil_Equivalent	Tonnes of oil equivalent of amount	Number	15	
End_Use_Code	Unique identification code of end use of commodity	Varchar2	20	Yes (fk)
MPA_Code	Unique identification code of mineral planning authority where commodity was produced	Varchar2	10	Yes (fk)
Region_Code	Unique identification code of Region where commodity was produced	Varchar2	10	Yes (fk)
Data_Source	Source organisation from which data was obtained	Varchar2	20	
Comments	Any other comments	Varchar2	50	
User_Entered	The user who entered the record	Varchar2	10	Yes
Date_Entered	The date a record was entered by a user	Date		Yes
User_Updated	The user who updated the record	Varchar2	10	
Date_Updated	The date a record was updated	Date		

Table 5 Mineral_Reserve_Details

Field Name	Field Description	Data Type	Size	Mandatory
Mineral_Reserve_ID	Unique identification number of record in Mineral Reserve table	Number	10	Yes (pk)
Commodity_Code	Unique identification code for commodity	Varchar2	10	Yes (fk)
Producing_Source	Source of commodity, e.g. Marine dredged, etc	Varchar2	20	
Quantity	Estimated amount of commodity in reserve	Number	15	
Quantity_Unit	Unit of the amount figure	Varchar2	10	
Tonne_of_Oil_Equivalent	Tonnes of oil equivalent of amount	Number	15	
Year	Date which the data apply	Date		Yes (fk)
Operational_Status	Active/ inactive	Varchar2	20	
MPA_Code	Unique identification code of mineral planning authority where commodity is in reserve	Varchar2	10	Yes (fk)
Region_Code	Unique identification code of Region where commodity is in reserve	Varchar2	10	Yes (fk)
Data_Source	Source organisation from which data was obtained	Varchar2	20	
Comments	Any other comments	Varchar2	50	
User_Entered	The user who entered the record	Varchar2	10	Yes
Date_Entered	The date a record was entered by a user	Date		Yes
User_Updated	The user who updated the record	Varchar2	10	
Date_Updated	The date a record was updated	Date		

Table 6 Oil_Gas_Production_Details

Field Name	Field Description	Data Type	Size	Mandatory
Oil_Gas_Production_ID	Unique identification number of record in oil and gas production table	Number	10	Yes (pk)
Commodity_Code	Unique identification code of commodity	Varchar2	10	Yes (fk)
Description	Text description of commodity	Varchar2	250	
Translation	Short concise description for use in list boxes, etc.	Varchar2	50	
Producing_Source	Source of commodity, e.g. Marine dredged, etc	Varchar2	20	
Producing_Field_Name	Name of producing field, e.g. oil field name	Number	20	Yes (fk)
Producing_Field_Location	Location of producing field, e.g. onshore or offshore	Varchar2	20	
Year	Date which the data apply	Date		Yes (pk)
Production_Quantity	Amount of commodity	Number	15	
Consumption_Quantity	Amount of commodity	Number	15	
Quantity_Unit	Unit of the amount figure	Varchar2	10	
Data_Source	Source organisation from which data was obtained	Varchar2	20	
Comments	Any other comments	Varchar2	50	
User_Entered	The user who entered the record	Varchar2	10	Yes
Date_Entered	The date a record was entered by a user	Date		Yes
User_Updated	The user who updated the record	Varchar2	10	
Date_Updated	The date a record was updated	Date		

Table 7 Oil_Gas_Reserve_Details

Field Name	Field Description	Data Type	Size	Mandatory
Oil_Gas_Reserve_ID	Unique identification number of record in oil and gas reserve table	Number	10	Yes (pk)
Commodity_Code	Unique identification code for commodity	Varchar2	10	Yes (fk)
Producing_Source	Source of commodity, e.g. Marine dredged, etc	Varchar2	20	
Producing_Field_Name	Name of producing field, e.g. oil field name	Number	20	
Producing_Field_Location	Location of producing field, e.g. onshore or offshore	Varchar2	20	
Quantity	Estimated amount of commodity in reserve	Number	15	
Quantity_Unit	Unit of the amount figure	Varchar2	10	
Year	Date which the data apply	Date		Yes (pk)
Operational_Status	Active/ inactive	Varchar2	20	
Data_Source	Source organisation from which data was obtained	Varchar2	20	
Comments	Any other comments	Varchar2	50	
User_Entered	The user who entered the record	Varchar2	10	Yes
Date_Entered	The date a record was entered by a user	Date		Yes
User_Updated	The user who updated the record	Varchar2	10	
Date_Updated	The date a record was updated	Date		

Table 8 Trade_Group_Details

Field Name	Field Description	Data Type	Size	Mandatory
Trade_Group_Code	Unique identification code of Trade Group	Varchar2	10	Yes (pk)
Trade_Group_Name	Import or Export	Varchar2	20	Yes
Description	Text description of Trade Group	Varchar2	250	
Translation	Short concise description for use in list boxes, etc.	Varchar2	50	
User_Entered	The user who entered the record	Varchar2	10	Yes
Date_Entered	The date a record was entered by a user	Date		Yes
User_Updated	The user who updated the record	Varchar2	10	
Date_Updated	The date a record was updated	Date		

Table 9 Trade_Commodity_Details

Field Name	Field Description	Data Type	Size	Mandatory
Commodity_Code	Unique identification code of commodity (according to UKMS)	Varchar2	10	Yes (pk)
SIT_Code	Unique identification code of commodity (according to SIT)	Varchar2	10	
HS_Code	Unique identification code of commodity (according to HS)	Varchar2	10	
Commodity_Group_Code	Unique identification code of commodity group	Varchar2	10	Yes
Commodity_Name	Name of Commodity	Varchar2	20	Yes
Description	Text description of commodity	Varchar2	250	
Translation	Short concise description for use in list boxes, etc.	Varchar2	50	
User_Entered	The user who entered the record	Varchar2	10	Yes
Date_Entered	The date a record was entered by a user	Date		Yes
User_Updated	The user who updated the record	Varchar2	10	
Date_Updated	The date a record was updated	Date		

Table 10 Trade_Export_Details

Field Name	Field Description	Data Type	Size	Mandatory
Export_ID	Unique identification number of record in Export table	Number	10	Yes (pk)
Export_Code	Unique identification code of Export	Number	10	Yes (fk)
Trade_Group_Code	Unique identification code of Trade	Number	10	Yes (fk)
Commodity_Code	Unique identification code of Commodity (according to UKMS)	Number	10	Yes (fk)
Trade_Category	Trade category, e.g., intra or extra	Varchar2	20	Yes
Description	Text description of Export	Varchar2	250	
Translation	Short concise description for use in list boxes, etc.	Varchar2	50	
Year	Date which the data apply	Date		Yes (pk)
Quantity_Unit	Unit of the amount figure	Varchar2	10	
Value_Unit	Unit of the value figure	Varchar2	10	
Export_Quantity	Amount of commodity	Number	15	
Export_Value	Value of commodity	Number	15	
Data_Source	Source organisation from which data was obtained	Varchar2	20	
Comments	Any other comments	Varchar2	50	
User_Entered	The user who entered the record	Varchar2	10	Yes
Date_Entered	The date a record was entered by a user	Date		Yes
User_Updated	The user who updated the record	Varchar2	10	
Date_Updated	The date a record was updated	Date		

Table 11 Trade_Import_Details

Field Name	Field Description	Data Type	Size	Mandatory
Import_ID	Unique identification number of record in Import table	Number	10	Yes (pk)
Import_Code	Unique identification code of Export	Varchar2	10	Yes (fk)
Trade_Group_Code	Unique identification code of Trade	Varchar2	10	Yes (fk)
Commodity_Code	Unique identification code of Commodity (according to UKMS)	Varchar2	10	Yes (fk)
Trade_Category	Trade category, e.g., intra or extra	Varchar2	20	Yes
Description	Text description of Import	Vrarchar2	250	
Translation	Short concise description for use in list boxes, etc.	Varchar2	50	
Year	Date which the data apply	Date		Yes (pk)
Quantity_Unit	Unit of the amount figure	Varchar2	10	
Value_Unit	Unit of the value figure	Varchar2	10	
Import_Quantity	Amount of commodity	Number	15	
Import_Value	Value of commodity	Number	15	
Data_Source	Source organisation from which data was obtained	Varchar2	20	
Comments	Any other comments	Varchar2	50	
User_Entered	The user who entered the record	Varchar2	10	Yes
Date_Entered	The date a record was entered by a user	Date		Yes
User_Updated	The user who updated the record	Varchar2	10	
Date_Updated	The date a record was updated	Date		

Table 12 UK_Nation_Details

Field Name	Field Description	Data Type	Size	Mandatory
Nation_Code	Unique identification code of Nation	Varchar2	10	Yes (pk)
Nation_Name	Name of Nation	Varchar2	20	Yes
Description	Text description of Nation	Varchar2	250	
User_Entered	The user who entered the record	Varchar2	10	Yes
Translation	Short concise description for use in list boxes, etc.	Varchar2	50	
Date_Entered	The date a record was entered by a user	Date		Yes
User_Updated	The user who updated the record	Varchar2	10	
Date_Updated	The date a record was updated	Date		

Table 13 UK_Region_Details

Field Name	Field Description	Data Type	Size	Mandatory
Region_Code	Unique identification code of Region	Number	10	Yes (pk)
Nation_Code	Unique identification code of Nation	Number	10	Yes (fk)
Region_Name	Name of Region	Varchar2	20	Yes
Description	Text description of Region	Varchar2	250	
Translation	Short concise description for use in list boxes, etc.	Varchar2	50	
User_Entered	The user who entered the record	Varchar2	10	Yes
Date_Entered	The date a record was entered by a user	Date		Yes
User_Updated	The user who updated the record	Varchar2	10	
Date_Updated	The date a record was updated	Date		

Table 14 UK_Mineral_Planning_Authority_Details

Field Name	Field Description	Data Type	Size	Mandatory
MPA_Code	Unique identification code of mineral planning authority	Varchar2	10	Yes (pk)
Region_Code	Unique identification code of Region	Varchar2	10	Yes (fk)
Nation_Code	Unique identification code of Nation	Varchar2	10	Yes (fk)
MPA_Name	Name of Mineral Planning Authority	Varchar2	20	Yes
Description	Text description of MPA	Varchar2	250	
Translation	Short concise description for use in list boxes, etc.	Varchar2	50	
User_Entered	The user who entered the record	Varchar2	10	Yes
Date_Entered	The date a record was entered by a user	Date		Yes
User_Updated	The user who updated the record	Varchar2	10	
Date_Updated	The date a record was updated	Date		

Table 15 Footnote_Mineral_Production

Field Name	Field Description	Data Type	Size	Mandatory
Footnote_Code	Unique identification code of Footnote	Varchar2	10	Yes (pk)
Mineral_Production_ID	Unique identification number of Commodity Master record	Number	10	Yes (fk)
Footnote1	Footnote content1	Varchar2	100	
Footnote2	Footnote content2	Varchar2	100	
Footnote3	Footnote content3	Varchar2	100	
User_Entered	The user who entered the record	Varchar2	10	Yes
Date_Entered	The date a record was entered by a user	Date		Yes
User_Updated	The user who updated the record	Varchar2	10	
Date_Updated	The date a record was updated	Date		

Table 16 Footnote_Mineral_Reserve

Field Name	Field Description	Data Type	Size	Mandatory
Footnote_Code	Unique identification code of Footnote	Varchar2	10	Yes (pk)
Mineral_Reserve_ID	Unique identification number of Commodity in reserve record	Number	10	Yes (fk)
Footnote1	Footnote content1	Varchar2	100	
Footnote2	Footnote content2	Varchar2	100	
Footnote3	Footnote content3	Varchar2	100	
User_Entered	The user who entered the record	Varchar2	10	Yes
Date_Entered	The date a record was entered by a user	Date		Yes
User_Updated	The user who updated the record	Varchar2	10	
Date_Updated	The date a record was updated	Date		

Table 17 Footnote_Oil_Gas_Production

Field Name	Field Description	Data Type	Size	Mandatory
Footnote_Code	Unique identification code of Footnote	Varchar2	10	Yes (pk)
Oil_Gas_Production_ID	Unique identification number of Commodity in reserve record	Number	10	Yes (fk)
Footnote1	Footnote content1	Varchar2	100	
Footnote2	Footnote content2	Varchar2	100	
Footnote3	Footnote content3	Varchar2	100	
User_Entered	The user who entered the record	Varchar2	10	Yes
Date_Entered	The date a record was entered by a user	Date		Yes
User_Updated	The user who updated the record	Varchar2	10	
Date_Updated	The date a record was updated	Date		

Table 18 Footnote_Oil_Gas_Reserve

Field Name	Field Description	Data Type	Size	Mandatory
Footnote_Code	Unique identification code of Footnote	Varchar2	10	Yes (pk)
Oil_Gas_Reserve_ID	Unique identification number of Commodity in reserve record	Number	10	Yes (fk)
Footnote1	Footnote content1	Varchar2	100	
Footnote2	Footnote content2	Varchar2	100	
Footnote3	Footnote content3	Varchar2	100	
User_Entered	The user who entered the record	Varchar2	10	Yes
Date_Entered	The date a record was entered by a user	Date		Yes
User_Updated	The user who updated the record	Varchar2	10	
Date_Updated	The date a record was updated	Date		

Table 19 Footnote_Export

Field Name	Field Description	Data Type	Size	Mandatory
Footnote_Code	Unique identification code of Footnote	Varchar2	10	Yes (pk)
Export_ID	Unique identification number of Export record	Number	10	Yes (fk)
Footnote1	Footnote content1	Varchar2	100	
Footnote2	Footnote content2	Varchar2	100	
Footnote3	Footnote content3	Varchar2	100	
User_Entered	The user who entered the record	Varchar2	10	Yes
Date_Entered	The date a record was entered by a user	Date		Yes
User_Updated	The user who updated the record	Varchar2	10	
Date_Updated	The date a record was updated	Date		

Table 20 Footnote_Import

Field Name	Field Description	Data Type	Size	Mandatory
Footnote_Code	Unique identification code of Footnote	Varchar2	10	Yes (pk)
Import_ID	Unique identification number of Import record	Number	10	Yes (fk)
Footnote1	Footnote content1	Varchar2	100	
Footnote2	Footnote content2	Varchar2	100	
Footnote3	Footnote content3	Varchar2	100	
User_Entered	The user who entered the record	Varchar2	10	Yes
Date_Entered	The date a record was entered by a user	Date		Yes
User_Updated	The user who updated the record	Varchar2	10	
Date_Updated	The date a record was updated	Date		

Appendix 2

Tables 1 and 2 are examples of some of the various reports output produced using the new UKMS application.

Table 1 United Kingdom Mineral Production by Region

Region Name	Mineral Group Name	Commodity Name	Product	Producing Source	Year	Production Quantity	Consumption Quantity	Quantity Unit
East Anglia	Construction Minerals	Crushed Rock	Crushed Rock	U	1972	502		Thousand Tonnes
South East	Construction Minerals	Crushed Rock	Crushed Rock	U	1972	2299		Thousand Tonnes
Yorkshire and	Construction Minerals	Crushed Rock	Crushed Rock	U	1972	6225		Thousand Tonnes
West Midlands	Construction Minerals	Crushed Rock	Crushed Rock	U	1972	8360		Thousand Tonnes
Northern	Construction Minerals	Crushed Rock	Crushed Rock	U	1972	9827		Thousand Tonnes
North West	Construction Minerals	Crushed Rock	Crushed Rock	U	1972	10100		Thousand Tonnes
East Midlands	Construction Minerals	Crushed Rock	Crushed Rock	U	1972	12200		Thousand Tonnes
South West	Construction Minerals	Crushed Rock	Crushed Rock	U	1972	22844		Thousand Tonnes
South East	Construction Minerals	Crushed Rock	Crushed Rock	U	1973	0		Thousand Tonnes
East Anglia	Construction Minerals	Crushed Rock	Crushed Rock	U	1973	0		Thousand Tonnes
North West	Construction Minerals	Crushed Rock	Crushed Rock	U	1973	6301		Thousand Tonnes
Northern	Construction Minerals	Crushed Rock	Crushed Rock	U	1973	10241		Thousand Tonnes
West Midlands	Construction Minerals	Crushed Rock	Crushed Rock	U	1973	10321		Thousand Tonnes
Yorkshire and	Construction Minerals	Crushed Rock	Crushed Rock	U	1973	13708		Thousand Tonnes

Footnote(s):

ç From 2000 Northern became North East

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Table 2 Summary of United Kingdom Mineral Production by Nation

Nation Name	Mineral Group Name	Commodity Name	Product	Producing Source	Year	Total Production Quantity	Total Consumption Quantity	Quantity Unit
England	Construction Minerals	Crushed Rock	Crushed Rock	U	1972	72357	0	Thousand Tonnes
England	Construction Minerals	Crushed Rock	Crushed Rock	U	1973	88823	0	Thousand Tonnes
England	Construction Minerals	Crushed Rock	Crushed Rock	U	1974	84678	0	Thousand Tonnes
England	Construction Minerals	Crushed Rock	Crushed Rock	U	1975	75867	0	Thousand Tonnes
England	Construction Minerals	Crushed Rock	Crushed Rock	U	1976	48423	0	Thousand Tonnes
England	Construction Minerals	Crushed Rock	Crushed Rock	U	1977	69121	0	Thousand Tonnes
England	Construction Minerals	Crushed Rock	Crushed Rock	U	1978	71004	0	Thousand Tonnes
England	Construction Minerals	Crushed Rock	Crushed Rock	U	1979	73907	0	Thousand Tonnes
England	Construction Minerals	Crushed Rock	Crushed Rock	U	1980	72679	0	Thousand Tonnes
England	Construction Minerals	Crushed Rock	Crushed Rock	U	1981	65448	0	Thousand Tonnes
England	Construction Minerals	Crushed Rock	Crushed Rock	U	1982	72491	0	Thousand Tonnes
England	Construction Minerals	Crushed Rock	Crushed Rock	U	1983	77346	0	Thousand Tonnes
England	Construction Minerals	Crushed Rock	Crushed Rock	U	1984	77451	0	Thousand Tonnes
England	Construction Minerals	Crushed Rock	Crushed Rock	U	1985	83203	0	Thousand Tonnes
England	Construction Minerals	Crushed Rock	Crushed Rock	U	1986	89640	0	Thousand Tonnes
England	Construction Minerals	Crushed Rock	Crushed Rock	U	1987	104296	0	Thousand Tonnes
England	Construction Minerals	Crushed Rock	Crushed Rock	U	1988	120282	0	Thousand Tonnes

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References

Most of the references listed below are held in the Library of the British Geological Survey at Keyworth, Nottingham. Copies of the references may be purchased from the Library subject to the current copyright legislation.

MACKENZIE, A.C., STOCKWELL, L.E., COOPER, D.C., WHITE, R., COATS, J.S., CHAPMAN, G.R., MILLS, A.J. 1999. Modernisation of the World Mineral Statistics Database. Report on a BGS/DTI Joint Project. *British Geological Survey Technical Report*, WF/99/8R.

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