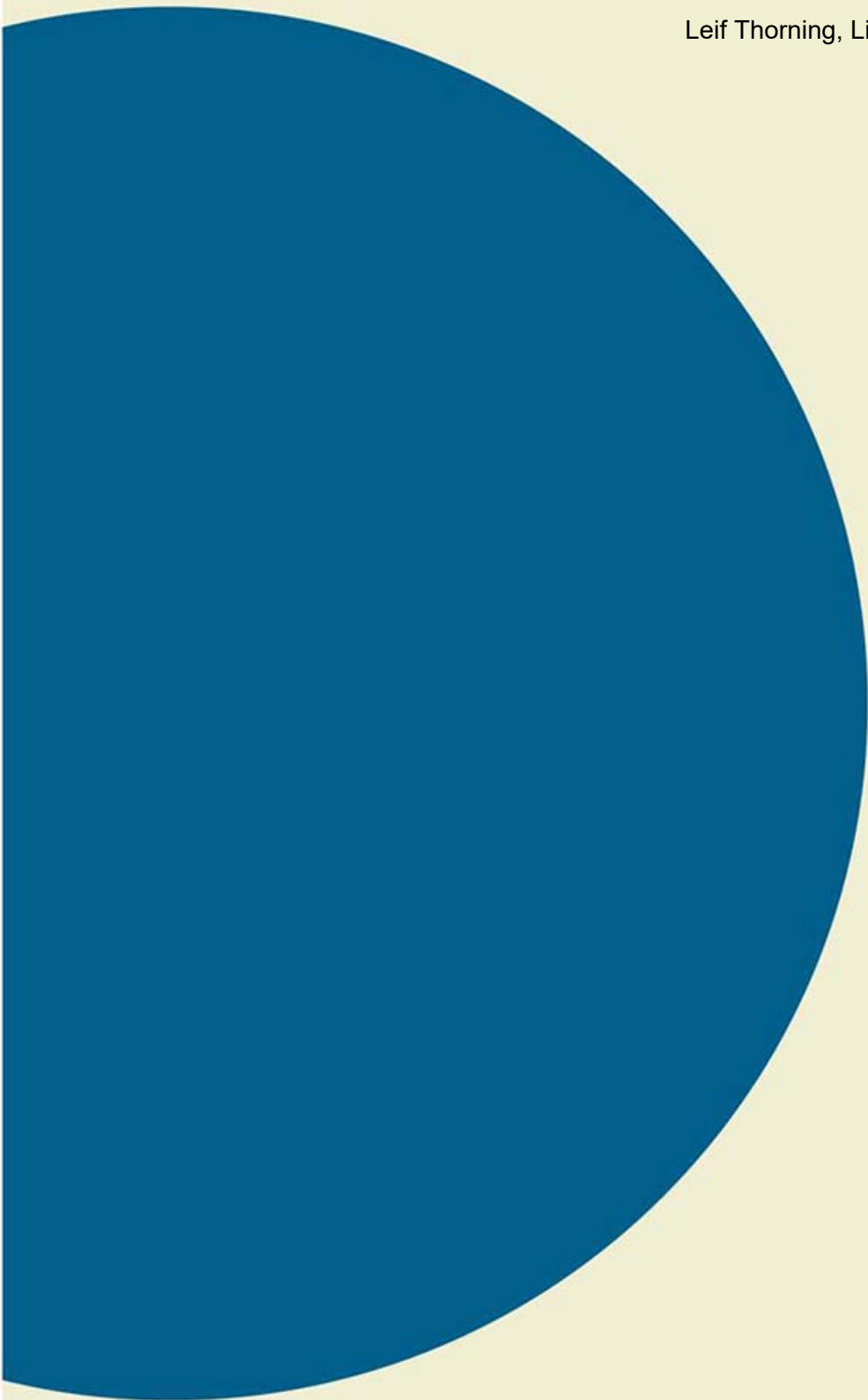


Database for titanium placer deposits

Proto type June 2004

Leif Thorning, Lisbeth Christensen and Henrik Stendal



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Abstract

In the joint project between DuPont and GEUS one of the tasks has been to construct a database to hold the results of the international scouting programme for interesting titanium placer deposits. This report briefly describes that database.

The database has been programmed in Microsoft Access 2000 and several versions have been in use. It consists of eight tables containing data on the deposits themselves and relevant references, maps and photos. In the latest version described in this report, a facility has been added allowing the calculation and storage of the value of a given deposit according to different price scenarios.

The database now contains information on visited and sampled deposits from Ghana, India, Mozambique, Namibia, Tasmania (King Island), and Vietnam. In addition, information from geological survey reports concerning titanium deposit especially from Australia is also incorporated in the database.

Background

Financed by DuPont Titanium Technologies a joint international scouting programme for titanium has been carried out by GEUS. By contacts to various organisations and persons in a number of countries, subsequent fieldwork and laboratory studies, a number of titanium placer deposits have been visited and sampled. The results are delivered to DuPont, but are also shared with the participating countries; all results will be kept at GEUS. A simple database was required for storing of all information obtained about the various placer titanium deposits; building on GEUS' own visits or on information obtained from other sources, e.g. the literature. Such a database has now been constructed by GEUS in co-operation with DuPont. This report describes the present version of the 'TITAN Database', replacing previous versions of descriptions in the form of preliminary GEUS design-notes. The purpose of the database is to serve as a tool for GEUS personnel carrying out the scouting programme to compile the information later to be used by DuPont. It may also become a tool for further use of the data contained in the database, e.g. in combination with an Oracle based, larger database containing the chemical results of the analytical programme. The smaller, easily transportable Access database has been used for GEUS' handling of the deposit data so far; future solutions may call for the merging of the deposit database and the analytical database, depending on future decisions concerning the final set-up.

The design of the 'TITAN deposit database' has taken the following requirements into accounts:

- The TITAN database should be able to contain all summary information about hand samples (not drill cores) collected by GEUS in the international scouting project. The database should be operational for both GEUS during the work and later for DuPont
- TITAN should be fairly simple to use and data entry should be possible by screen-forms as well as other standard Access methods
- TITAN should be easy to search. A few specific standard searches should be pre-defined, but otherwise it is assumed that users will be proficient in the use of standard Access search and report facilities
- TITAN should be able to assist the user in a simple calculation of the value of a deposit based on prices supplied by the user
- The database should be programmed in Access 2000
- TITAN should have the ability to receive, store and re-display excel files and images, such as maps, photos, and other figures, probably by use of the hyperlink field type in Access
- TITAN should be exportable (e.g. to DuPont) in such a way that the database itself and all the images can be transferred and become available in the receiving system
- Language in the database and on screens, reports etc. should be English.
- Simple, standard Access solutions should be preferred

It must be emphasised that it has been assumed that users of the database are fairly proficient in the use of Access 2000. Thus, only limited extra facilities have been included in the TITAN database because standard Access tools for searching and reporting can be employed.

The opening screen-form of the TITAN Database is shown below in Figure 1. The database is in its present form best used by a single user, but it can be set up as a multiple user facility given the right technical facilities. No special security facilities are built into the database, so frequent back-ups are recommended. The database is able to keep tab of who entered a record and when; it further allows the registration (of who/when) of one modification per record, usually the last one to be performed. The registration of users is totally dependent on the users own input; it does in the present version not work automatically.

If a certain structure of the directory tree is maintained, the database and associated files can be copied onto a CD-ROM or similar and used from there or be copied to another computer. The details of this operation depend on the set-up used; please contact GEUS for advice if necessary.

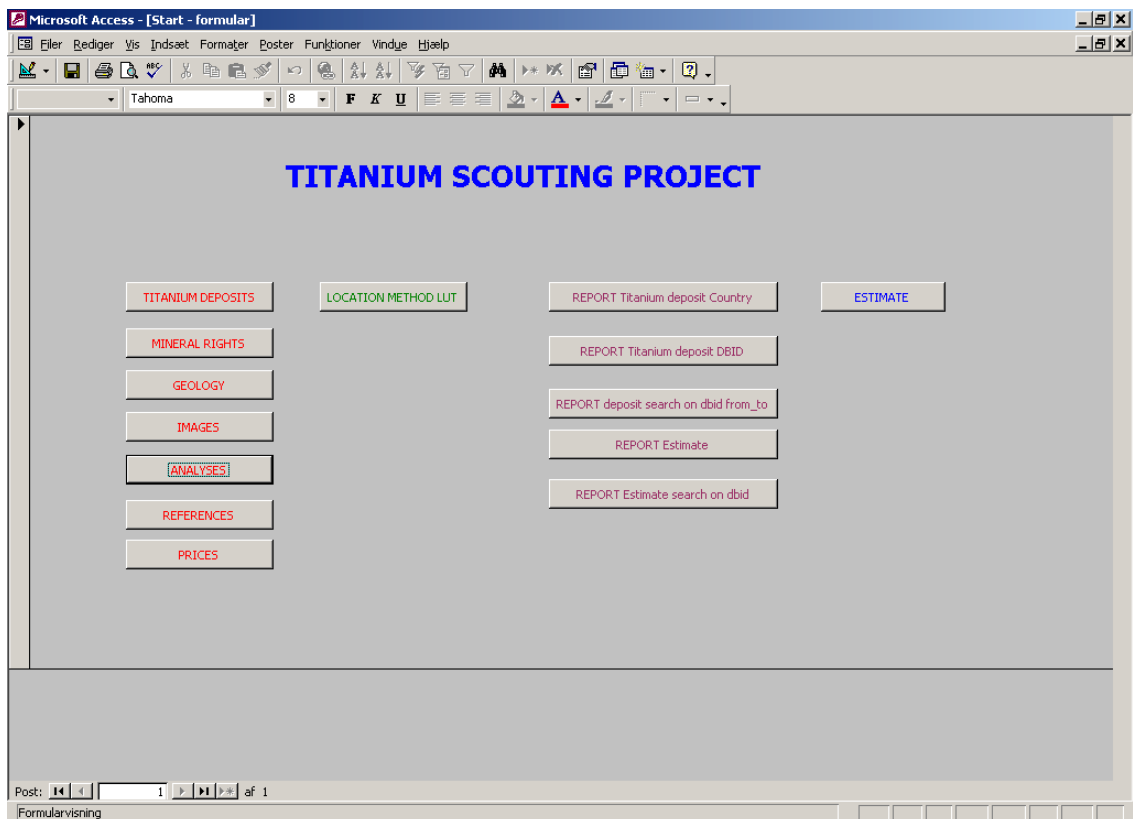


Figure 1. The main access to the TITAN database constructed for the data compiled in the Titanium scouting project. The buttons activate screen-forms for input, editing tools for LUTs, standard reports and a special screen-form containing a facility for the calculation of total value of a deposit.

Database content

The database comprises the first descriptive information on visited and sampled deposits from Ghana, India, Mozambique, Namibia, Tasmania (King Island), and Vietnam. Information from geological survey reports concerning titanium deposit, especially from Australia, is also incorporated. In addition, the database includes deposits, which are published in the literature.

The database does not include information about hard rock titanium deposits, only information about placer deposit. The most common placer deposit types are the beach and the aeolian placers. The types of placer deposits taken into consideration are:

- Alluvial placer
- Eluvial placer
- Beach placer
- Lacustrine placer
- Aeolian placer
- Off shore placer
- Fossil placers, e.g. Tertiary placers, which can be any of the types mentioned above.

Overview of the TITAN Database

This section of the report provides a summary overview of the database and gives some hints to users. The fields on the screen-forms depicted in the figures are not all explained in detail, but the user may check definitions and other relevant information concerning the attributes later in the report in the section 'Attributes and tables'.

The database has been programmed in Microsoft Access 2000. It consists of eight tables containing data on the deposits themselves and relevant references, maps and photos. A facility has been added allowing the calculation of the value of a given deposit according to different price scenarios. Another facility added to the program is the possibility to extract reports containing information concerning a specific ore deposits, a series of deposits or deposits from a particular country.

The start page for the database is shown in Figure 1. The user should remember that the deposit id is generated when using the screen-form shown in Figure 2. Therefore, this is the first form to be used for the adding of new deposits to the database. Once a deposit has been registered here, the other forms can be used to add further information related to the deposit in question. This is done by calling up the other forms as required (using the buttons of the start form shown in Figure 1), making sure that the correct deposit id is displayed in its field and then proceed to add more information to the forms. This method ensures much flexibility in the use of the database; it allows the user to return at a later time to add additional information, as it becomes available. If the user is not careful, it also adds a risk of relating given information to the wrong deposit; the user should always check that the deposit id on a given form is correct before he enters more information.

A LUT has been defined for the country attribute (see Figure 2) to ensure that the country named is spelled correctly and the same way every time so that searches on country finds all relevant data. A special button marked 'Map' will display a map of the country in question, provided a digital version of the map have been filled into the LUT at the space prepared for this. Presently, not all country records in the LUT are filled with a digital map.

On the following pages the screen-forms corresponding to different tables and functions are shown in Figures 2 – 12. For users knowledgeable of titanium mining, most of the screen-forms are straightforward to use and do not need any further explanation. The screen-form for 'Estimates' may be an exception (Figure 10). This facility was added to the system late in the process by request from DuPont and is a composite form giving the user the possibility to choose a deposit (left side of screen), choose a price scenario or create a new one if the required scenario is not available (centre screen), and then calculate the resulting total value of the deposit (right side of screen). For a given deposit, many estimates can be performed (and stored if the user so wishes), by choosing different scenarios (and they will of course be given different ids in the Estimate table, where the results can be stored). The result of a calculation will only be saved in the database with a new estimate id if the user specifically tells the database to do so by clicking on 'Save'. The 'Update' button must be used to reset the calculation, whenever a new combination of prices and deposit has been chosen, and before clicking 'Calculate' will perform the calculation correctly.

Titanium DB

Deposit db-id: [1] [Exit form]

Identification | Data

Country	Map: Namibia	First entry by	Mads
Local name	Walvis Bay Dune Field	Date first entry	27-06-2002
Province	Swakopmund	Date last modified	20-06-2003
Local contact		Modified by	Henrik Stendal
Visited by	Henrik Stendal	General comments	
Visited at date	30-04-2001	Identification comments	
Position of deposit - longitude	14.5800000	Depositional comments	
Position of deposit - latitude	-22.8100000		
Map sheet (Name and scale)			
Height (m)	30		
Location method	GPS		
Map sheet (Full reference)			

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DB identification of each deposit entered into the db (generated by db)

Figure 2. The main screen-form used for the registration of deposits. The form has two parts – it is recommended to start with 'Identification' and then proceed to 'data' – see Figure 3.

Titanium DB

Deposit db-id: [1] [Exit form]

Identification | Data

Deposit type	Aeolian placer	Tonnage leuco (*1000 t)	
Width of deposit (m)	2,000-4,000	% leucovene	
Length of deposit (m)	30,000	Tonnage other (*1000 t)	
Average thickness of deposit (m)	5-30	% others	
Arial extent (km2)	100	Other minerals	Garnet
Thickness of overburden (m)		TiO2% of ilmenite	53
Water depth (m)		Ten TiO2 ilme (*1000 t)	
Total raw (*1000 t)		Average grain size (um)	
Total HM (*1000 t)	39.125	Shape comments	
Tonnage ilmenite (*1000 t)	36.000	Exploration history	
% ilmenite		Feasibility study	
Tonnage zircon (*1000 t)	15.400		
% zircon			
Tonnage monazite (*1000 t)	9.000		
% monazite			
Tonnage rutile (*1000 t)			
% of rutile			

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Total weight of raw ore (tonnes)

Figure 3. The screen-form used for entering data for a titanium deposit.

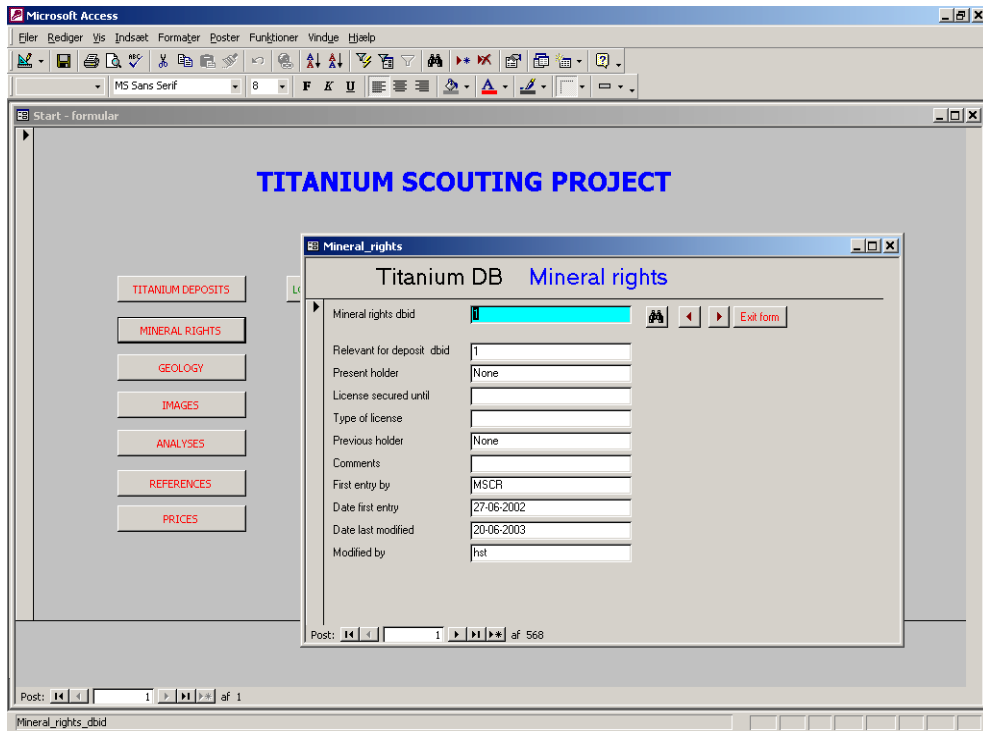


Figure 4. Screen-form used for entering of mineral rights information for a deposit. The user must choose the correct deposit id.

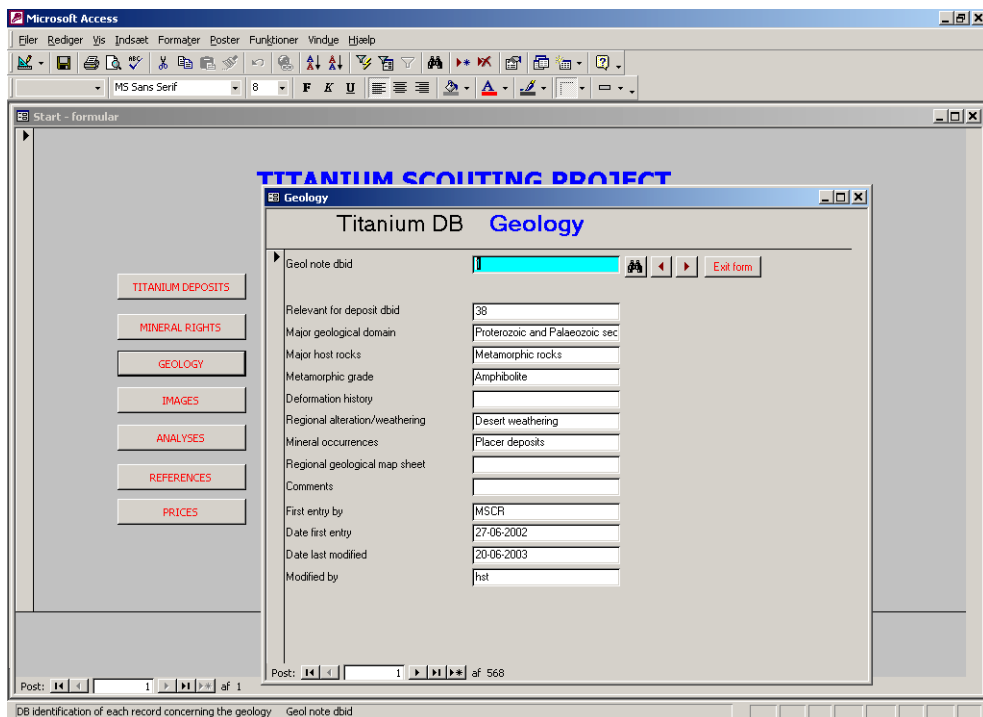


Figure 5. Screen-form for the entering of additional information on the geology of the deposit.

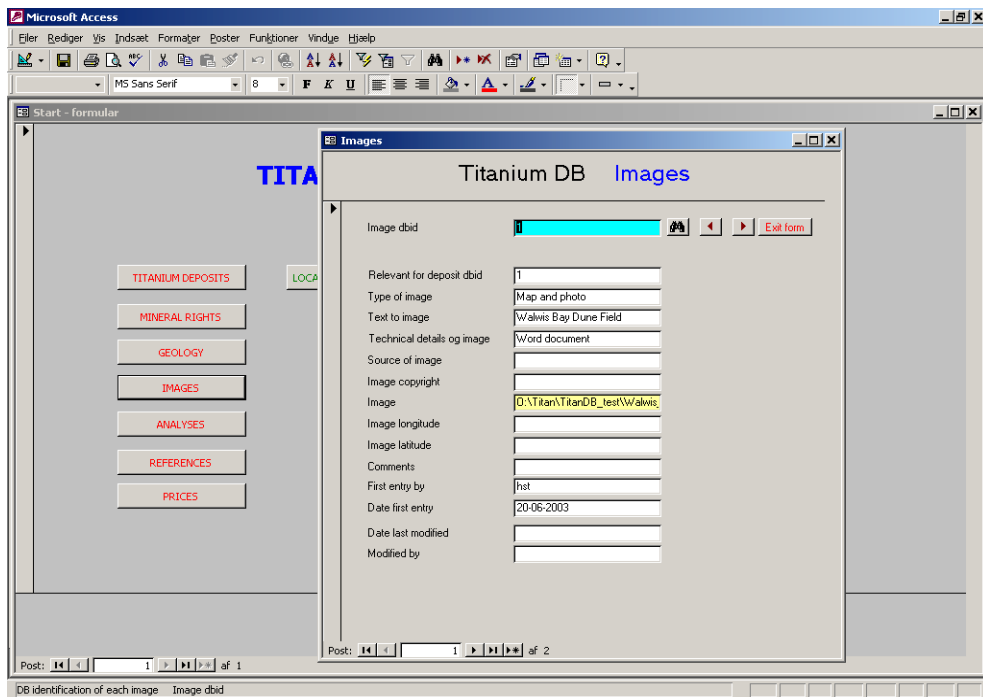


Figure 6. Screen-form for the entering of information concerning images related to a deposit. These can be of different types, e.g. photos, maps, etc. The database contains the hyperlink to the file with the image.

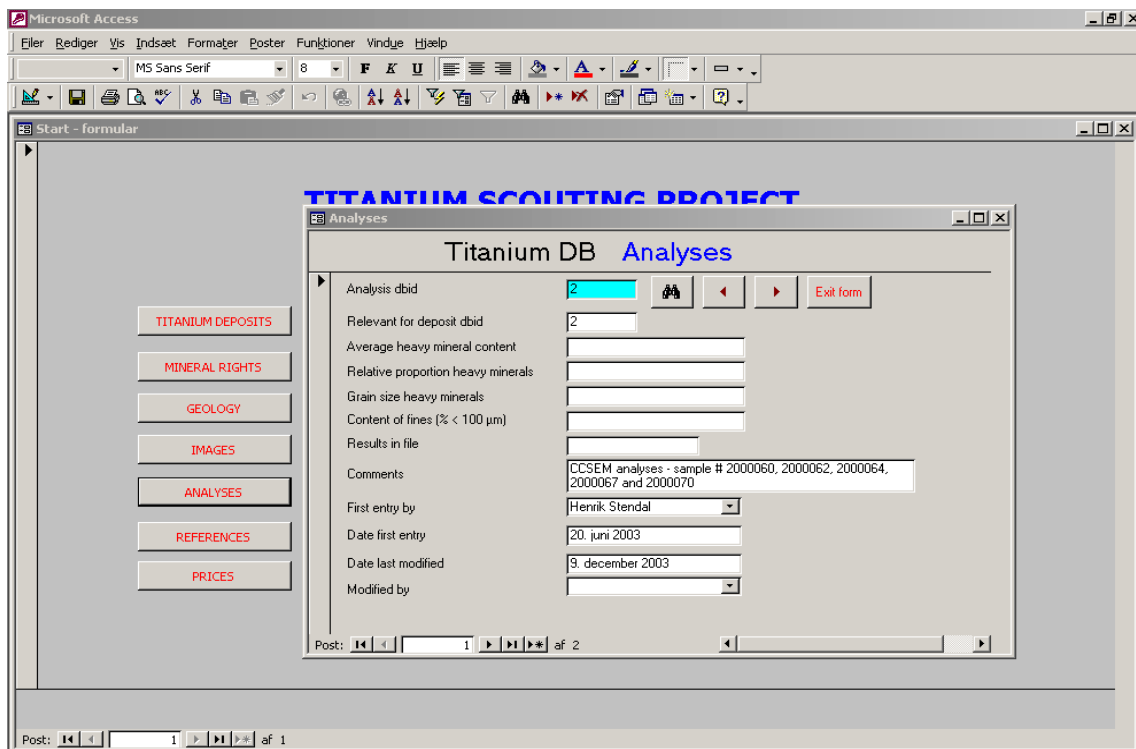


Figure 7. Screen-form for entering information (metadata) concerning analyses of samples from the deposit, one form/record for each analysis. The hyperlink gives access to the details of the analysis in the form of a pdf-file.

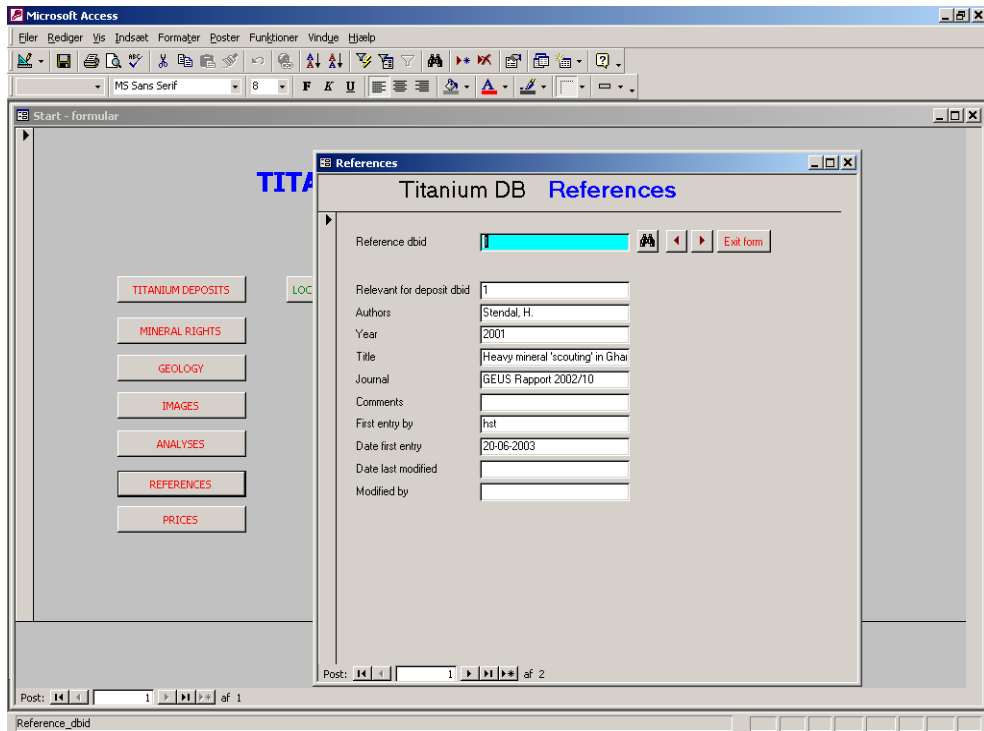


Figure 8. Screen-form for references related to a deposit.

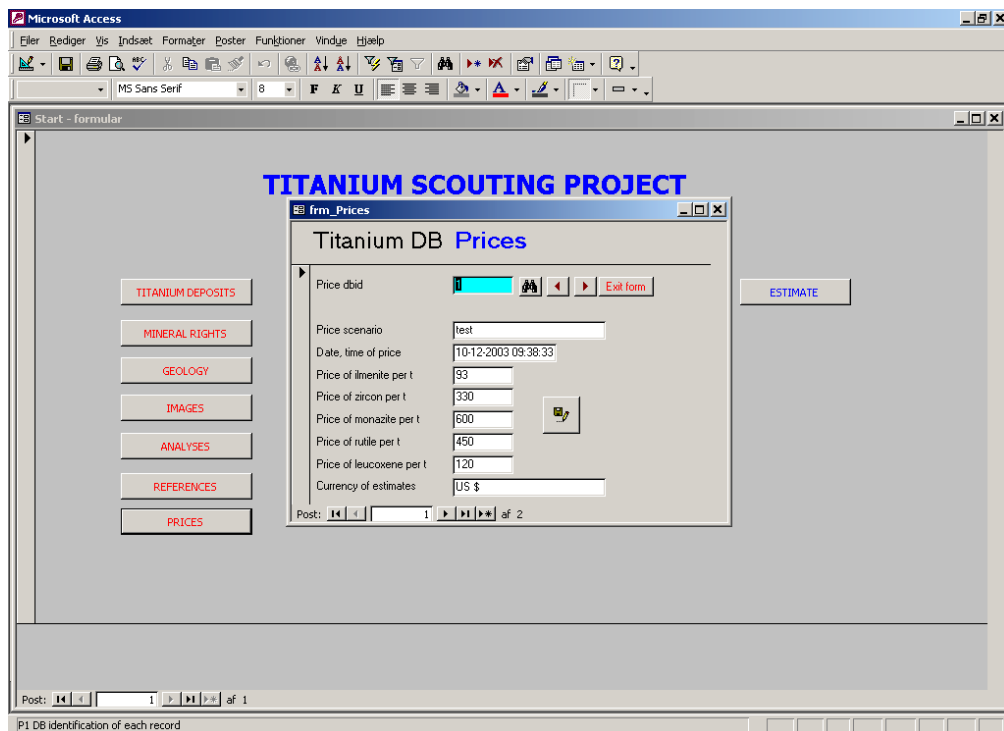


Figure 9. Screen-form with information on prices of the various commodities. Note that there can be several sets of prices corresponding to different scenarios.

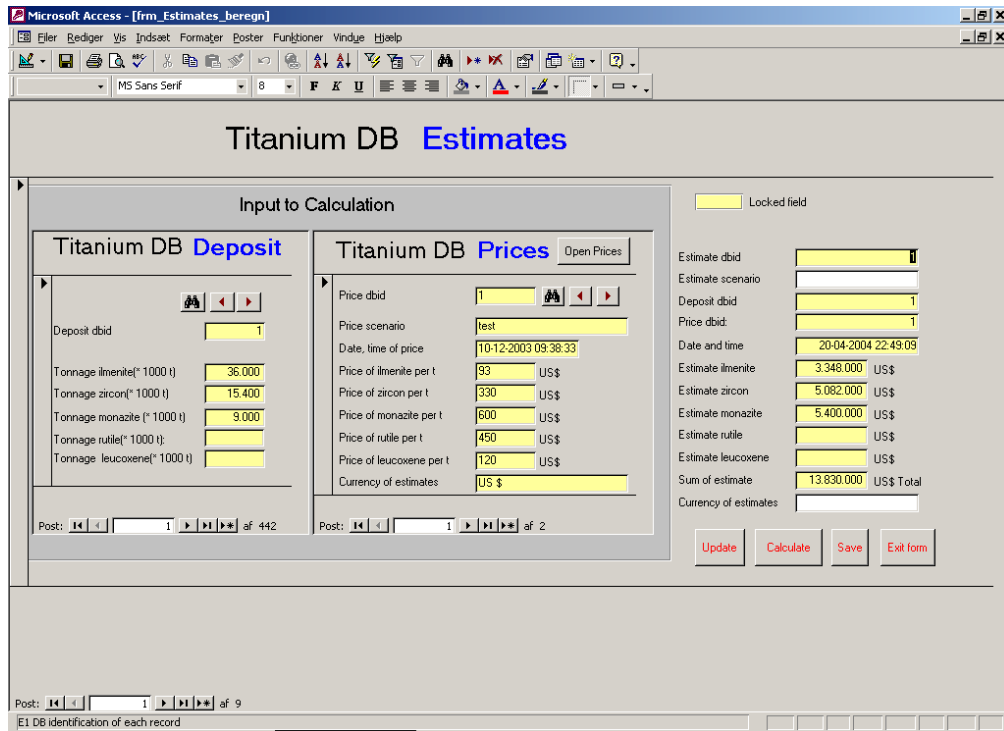


Figure 10. Set-up for a calculation of the total value of a deposit based on a certain price scenario. Results can be saved in the Estimates table if the user so wishes. See text for further explanation.

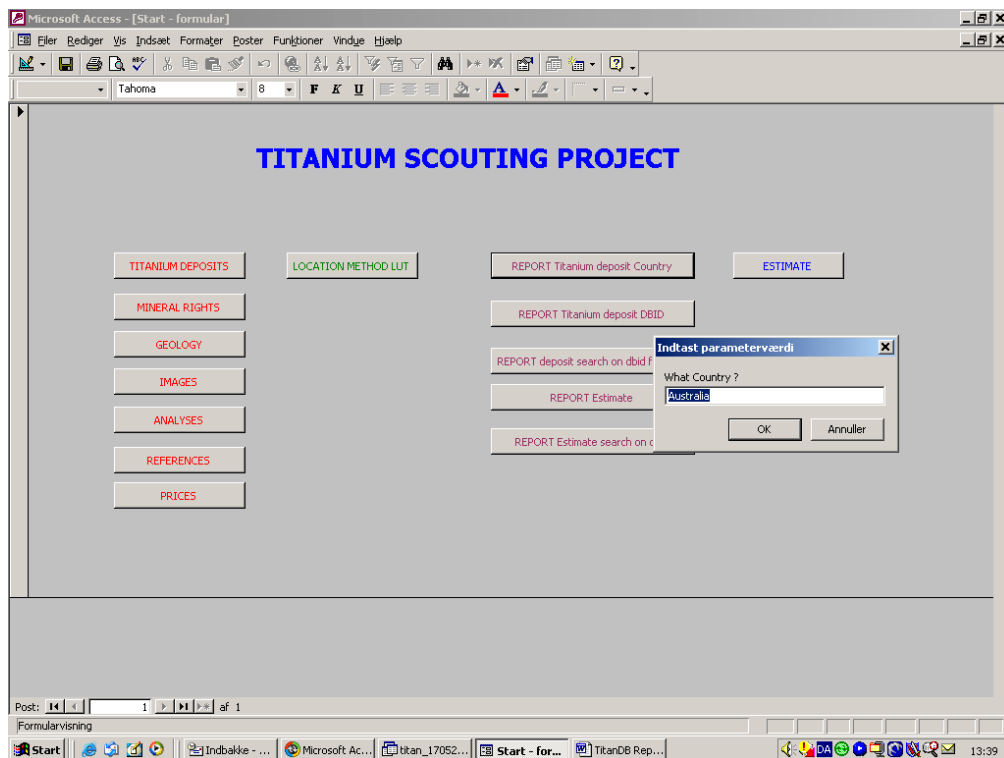


Figure 11. As an example of a search facility in the TITAN database: a report based on selection of country (Australia) has been requested by the user.

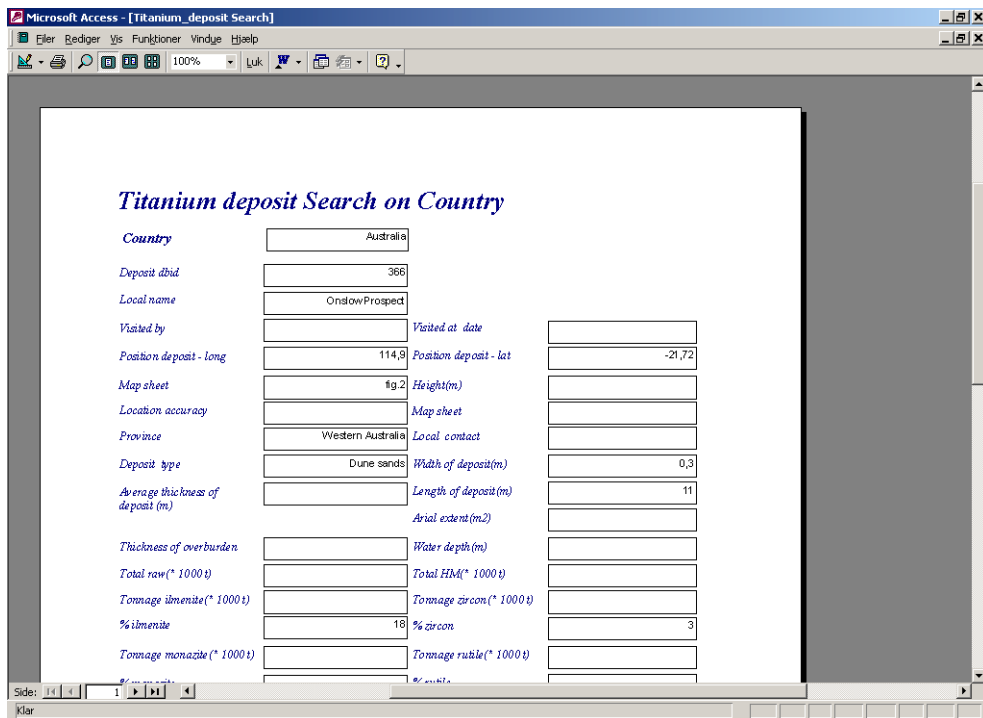


Figure 12. Standard layout of the report from the search requested in Figure 11. Alternative outputs can of course be used according to normal Access facilities. Reports can also be saved as Word files and edited for appearance.

Directories and files

The Titan database contains hyperlinks to different files. The hyperlinks are entered into the database in a format relative to where the database file itself is stored. When copying the database from a CD-ROM to a hard disk, or from one hard disk to another, it is therefore important that the directory structure and the file names remain the same in the new position. When copying the database and associated files, the directory TITAN and everything in or under it must be transferred with the internal structure intact. In Figure 13 are shown four subdirectories for maps (e.g. maps and illustrations etc.), photos, Texts (e.g. pdf-files) and Analyses (pdf-files containing output of Excel spreadsheets used in the analysis programme for storing of results).

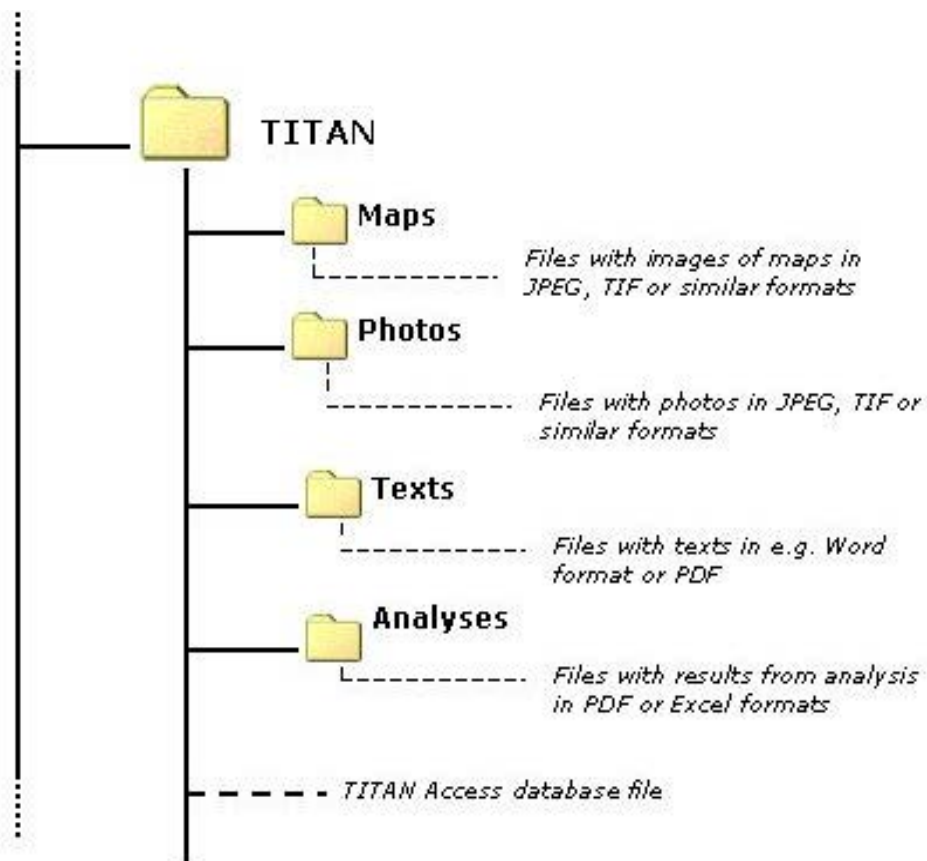


Figure 13. The directory structure used for the storing of the database and its associated files. For example, an analysis must be stored with the file name *analyses/200356* and this is the string that should be entered in the appropriate hyperlink field on the screen-form (Figure 7).

Attributes and tables

The following main tables have been defined to hold the information that needs to be in the database. A few explanatory comments are added to the description. The attribute number is in heavy black for the attributes that are obligatory, i.e., which must be filled before the record can be stored in the database. Under the heading of Type is indicated what type of database field has been used.

TABLE: Titanium Deposit

Attribute Ref no	Attribute	Definition	Type	Comments
TD1	Deposit dbid	DB identification of each deposit entered into the db (generated by db)	Integer; key	Unique; generated by db
TD2	Local Name	The name used locally/officially for the deposit	Text	
TD3	Visited by	The name of the person visiting the deposit and making the observations summarised in this database	Text	Also code for none
TD4	Visited at date	The date of the visit	DD/MM/YYYY	User decides which date if more than one visit
TD5	Position of deposit - long	Longitude	Real	Decimal degrees.
TD6	Position of deposit - lat	Latitude	Real	Decimal degrees.
TD7	Map Sheet	Name and scale of Map Sheet	Text	
TD8	Height	The height above sea level	Real	One height
TD10	Location accuracy	Estimate (meters) of positional accuracy	LUT	LUT (Location_met)
TD11	Map Sheet	Full reference to map sheet	Text	Free text – author, title, series, year, etc. if possible
TD12	Province	Name of Geographical Province	Text	Official names only
TD13	Country	Name of Country	Text	LUT (countries); when a digital map image has been entered into the LUT (as an OLE), the map can be displayed on screen.
TD14	Local Contact	Name etc of local contact	Text	Full details necessary
TD15	Deposit Type	Classification of type	Text	
TD16	Width of deposit	Estimate of width of deposit (km)	Real	
TD17	Length of deposit	Estimate of length of deposit (km)	Real	
TD18	Average Thickness of deposit	The best estimate/guess of the average thickness	Real	Meters
TD19	Arial extent	Area of deposit projected to surface	Real	Estimate; km ²

Attribute Ref no	Attribute	Definition	Type	Comments
TD20	Thickness of Overburden	Average thickness of overburden	Real	Estimate in metres
TD21	Water depth	Depth of water for offshore deposits	Real	Meters.
TD22	Total Raw	Total weight of raw ore (tonnes)	Real	
TD23	Total HM	Total weight of Heavy Minerals (1000 tonnes)	Real	
TD24	Tonnage Ilmenite	Content of ilmenite in 1000 tonnes	Real	
TD25	Tonnage Zircon	Content of zircon in 1000 tonnes	Real	
TD26	Tonnage Monazite	Content of monazite in 1000 tonnes	Real	
TD27	Tonnage Rutile	Content of rutile in 1000 tonnes	Real	
TD28	Tonnage Leucoxene	Content of leucoxene in 1000 tonnes	Real	
TD29	Tonnage Others	Content of others in 1000 tonnes	Real	
TD30	Other minerals	List of other minerals	Text	
TD31	TiO ₂ % Ilmenite	Percentage of Ilmenite	Real	
TD32	Tonnage TiO ₂ ilmenite	Tonnage corresponding to TD31	Real	
TD33	Grain size	Average grain size	Real	
TD34	General comments	General comments of the user's choice	Text	
TD35	Identification comments	Comments concerning the identification and visit to the deposit	Text	
TD36	Depositional Comments	Comments concerning the depositional environment	Text	
TD37	Shape comments	Comments concerning shape and size of deposit	Text	
TD38	Exploration History	An account of the exploration history and discovery	Text	
TD39	Feasibility Study	Reference to feasibility study	Text	
TD40	Date First Entry	Date/time for first entry into database	Date/time	Input by user
TD41	Date Last Modified	Date/time for modification of entry	Date/time	Input by user
TD42	Modified by	Name or initials of the person who made the First Entry or Last Modified.	Text	LUT (Names)
TD43	First Entry by	Initials of the person who made the first entry	Text	LUT (Names)
TD44	% ilmenite	% of Ilmenite	Real	
TD45	% zircon	% of zircon	Real	
TD46	% monazi	% of monazite	Real	
TD47	% rutile	% of rutile	Real	
TD48	% leucoxene	% of leucoxene	Real	
TD49	% other	% of other	Real	

Notes:

1. The position of a deposit is indicated by one point. Real extent must be shown by description or map.
2. Several other LUTS are possible at a later time. Usually there is a choice between a LUT or just free text. If from a geological point of view it is important to have a systematic description, a LUT is recommended and time agreeing on definitions etc must be used. This issue must be decided for each of the attributes in question – modifications are possible.
3. Information on 'Geology' has been split into another table (see below). The link between the two tables will be ensured by the inclusion of attribute TD1 as a **foreign key** in the 'Geology' table. Similar principles apply with other secondary tables. Note that 'Geology' refers to the deposit, not the surrounding geology.
4. The 'comments' attributes have been maintained as three separate attributes to secure enough space.
5. Please also note that information on 'Ownership of mineral rights', 'References', and all the images desired to be stored under many of the other headings in the Write-up are **not in this table**, but have been gathered in separate tables, though they are all related to 'deposit'. This is for technical reasons (normalisation). In these separate tables, information relating to a certain deposit can be found by using composite (and partly foreign) keys.

TABLE: Geology

Attribute Ref no	Attribute	Definition	Type	Comments
G1	Geol note dbid	DB identification of each record concerning the geology	Integer; key	Unique; generated by db
G2	Relevant for deposit dbid	Reference to the deposit for which this record is relevant	Foreign Key TD1	Records in 'Geology' can only be entered if G2 exists as TD1
G3	Major Geological Domain	Major Geological Domain according to strict sense geology	Text	
G4	Major Host Rocks	Description of major host rocks for the deposit	Text	Free text
G7	Regional Alteration/weathering	Description of the regional alteration and/or weathering	Text	Free text
G8	Mineral Occurrences	Description	Text	Free text
G9	Regional Geological Map Sheet	Name etc of	Text	Free text
G10	Comments	Regional Geology Comments	Text	Free text
G11	Date First Entry	Date/time for first entry into database	Date/time	Input by user
G14	First Entry by	Name of person who entered this record the first time	Text	LUT (Names)
G12	Date Last Modified	Date/time for modification of entry	Date/time	Input by user
G13	Modified by	Name or initials of the person who made the First Entry or Last Modified.	Text	LUT (Names)

Notes:

1. Note that because G2 is obligatory and part of a composite key to find information for a particular deposit, records in this table can only be filled if a pre-existing deposit dbid (G2) can be referred to. This means that descriptions of geology are only relevant if they can be attached to a deposit.
2. Most of the attributes are just free text, to allow for very varied input depending on the situation. However, it may be desirable at a later time to tighten up the description by more frequent use of LUTs.

TABLE: Images

Attribute Ref no	Attribute	Definition	Type	Comments
IM1	Image dbid	DB identification of each image	Integer; key	Unique; generated by db
IM2	Relevant for deposit dbid	Reference to the deposit for which this image is relevant	Foreign Key TD1	Records can only be entered if IM2 exists
IM3	Type of Image	Description of Image Type	Text	See note (1) below
IM4	Text to Image	A descriptive text to the image	Text	Free text; should be thought of as text to a figure
IM5	Technical details of Image	A specification of technical details	Text	Free text; formats, resolution etc.
IM6	Source of Image	Source of the image	Text	Free text or LUT; Photo by Author, scanned from paper, etc
IM7	Image Copyright	The correct copyright statement	Text	Free text
IM8	Image	File containing the image	Hyperlink	
IM9	Image - Long	Longitude of position of Image	Real	Decimal degrees
IM10	Image- lat	Latitude of the position of image	Real	Decimal degrees
IM10	Comments	Any other comments	Text	Free text
IM11	Date First Entry	Date/time for first entry into database	Date/time	Input by user
IM14	First Entry by	Name of person who entered this record the first time	Text	LUT (names)
IM12	Date Last Modified	Date/time for modification of entry	Date/time	Input by user
IM13	Modified by	Name or initials of the person who made the First Entry or Last Modified.	Text	LUT (Names)

Notes:

1. The LUT (IM3) is used to store the type of image; at the present time, these could be e.g.: Site Photo, Figure relevant to depositional environment, Model, Geological Map, Regional Geology Figure, Exploration/Exploitation site photo. Can be changed into LUT if required.
2. The image itself is stored by a link to the file containing the image. This means that conventions will have to be defined for where/how to store these files. Probably a fixed and lasting directory structure for the images must be defined. Browsing this directory structure and accepting the correct file will generate the hyperlink entry to an image.
3. If one considers displaying maps with locations and links to images, it may be a good idea to include a position for each image (IM9&10). This can be used as a quick display on a map e.g. by giving opportunity for a hotlink in ArcView from a symbol placed at the position indicated.

TABLE: Mineral rights

Attribute Ref no	Attribute	Definition	Type	Comments
MR1	Mineral Rights dbid	DB identification of each record concerning ownership of mineral rights	Integer; key	Unique; generated by db
MR2	Relevant for deposit dbid	Reference to the deposit for which this record is relevant	Foreign Key TD1	records can only be entered if MR2 exists (TD1)
MR3	Present Holder	Name, address and other details of the person or company now owing the mineral rights	Text	Free text
MR4	License secured until	The date until which the present owner has the license	Text	Free text
MR5	Type of License	Type of license according to local scheme of things	Text	Free text
MR6	Previous Holder	Name, address and other details of the person or company previously owing the mineral rights	Text	Free text
MR7	Comments	Any comments	Text	Free text
MR8	Date First Entry	Date/time for first entry into database	Date/time	Input by user
MR11	First Entry by	Name of person who entered this record the first time	Text	LUT (names)
MR9	Date Last Modified	Date/time for modification of entry	Date/time	Input by user
MR10	Modified by	Name or initials of the person who made the First Entry or Last Modified.	Text	LUT (Names)

Notes:

1. Same principle as the previous table: Composite key gives access to a record for a certain deposit.

TABLE: References

Attribute Ref no	Attribute	Definition	Type	Comments
RE1	Reference dbid	DB identification of each reference record	Integer; key	Unique; generated by db
RE2	Relevant for deposit dbid	Reference to the deposit for which this record is relevant	Foreign Key TD1	LUT (deposits); records can only be entered if RE2 exists (D1)
RE4	Authors	Names,	Text	Free text
RE5	Year	Year of the publication	Text	Free text
RE6	Title	Title of the reference	Text	Free text
RE7	Journal	Name of journal and pages etc	Text	Free text
RE8	Comments	Any comments	Text	Free text
RE8	Date First Entry	Date/time for first entry into database	Date/time	Generated by database
RE11	First Entry by	Name of person who entered this record the first time	Text	LUT (names)
RE9	Date Last Modified	Date/time for modification of entry	Date/time	Generated by database
RE10	Modified by	Name or initials of the person who made the First Entry or Last Modified.	Text	LUT Names?

TABLE: Analysis

Attribute Ref no	Attribute	Definition	Type	Comments
A1	Analysis dbid	DB identification of each analysis record	Integer; key	Unique; generated by db
A2	Relevant for deposit dbid	Reference to the deposit for which this record is relevant	Foreign Key TD1	LUT (deposits); records can only be entered if A2 exists (TD1)
A3	Average Heavy Mineral Content	As obtained in the analysis	Real	The data must be read from the spreadsheet referenced in A7
A4	Relative Proportion Heavy Minerals	As obtained in the analysis	Real	The data must be read from the spreadsheet referenced in A7
A5	Grain size heavy Minerals	As obtained in the analysis	Real	The data must be read from the spreadsheet referenced in A7
A6	Content of Fines	As obtained in the analysis	Real	The data must be read from the spreadsheet referenced in A7
A7	Comments	Any comments	Text	
A12	Results	Results in pdf-file	Hyperlink	e.g. the standard output of a GEUS SEM analysis
A8	Date First Entry	Date/time for first entry into database	Date/time	Input by user
A11	First Entry by	Name of person who entered this record the first time	Text	LUT (names)
A9	Date Last Modified	Date/time for modification of entry	Date/time	Input by user
A10	Modified by	Name or initials of the person who made the First Entry or Last Modified.	Text	LUT(Names)

Notes:

1. It is assumed that the results of the analysis are in spreadsheets and that the user has extracted whatever is necessary to fill this database (tonnage etc., etc...). This table only provides the basic information that GEUS has made an analysis of samples from the deposit in question. The results of the analysis can then be seen in the spread sheet with figures and pictures (the hyperlink).

TABLE: Prices

Attribute Ref no	Attribute	Definition	Type	Comments
P1	prices dbid	DB identification of each record	Integer; key	Unique; generated by db
P2	Price scenario	Reference to the deposit for which this record is relevant	Text	Used for naming of the set of prices corresponding to this record
P3	Date time of price	Time stamp of set of prices	Date/time	
P4	P_ilmenite	Price of ilmenite per tonne	Real	
P5	P_zircon	Price of zircon per tonne	Real	
P6	P_monazite	Price of monazite per tonne	Real	
P7	P_rutile	Price of rutile per tonne	Real	
P8	P_leucoxene	Price of leucoxene per tonne	Real	
P10	P_currency	Currency of price	Text	e.g. US \$

Notes:

1. The results of the calculations based on these prices and the particulars for a certain deposit are saved in a table, see Table (Estimates).

TABLE: Estimates

Attribute Ref no	Attribute	Definition	Type	Comments
E1	Estimate dbid	DB identification of each record	Integer; key	Unique; generated by db
E2	Estimate scenario	Reference to the deposit for which this record is relevant	Text	Name of scenario of this estimate
E3	Deposit id	Reference to deposit record no	Foreign Key (TD1)	The deposit id of the set of tonnage values extracted from the (pre-existing) deposit (TD1)
E4	Price id	Dbid of price set used	Foreign key	The price id (P1) of the price scenario used for this estimate
E5	Date time of estimate	Time stamp of estimate	Date/time	
E6	E_ilmenite	Total value of ilmenite	real	Calculated field = TD24 * 1000 * P4
E7	E_zircon	Total value of zircon	real	Calculated field = TD25 * 1000 * P5
E8	E_monazite	Total value of monazite	real	Calculated field = TD26 * 1000 * P6
E9	E_rutile	Total value of rutile	real	Calculated field = TD27 * 1000 * P7
E10	E_leucoxene	Total value leucoxene	real	Calculated field = TD28 * 1000 * P8
E11	Sum of estimates	Total value of all five	real	Sum (E6, E7, E8, E9, E10)
E11	P_currency	Currency of estimates	text	e.g. US \$

Notes:

This table is for saving those estimates that the user deems worth saving. The procedure will be like this:

1. The user makes sure that a suitable price scenario is available; if not, a desired new price scenario (set of prices with supporting information) can be entered.
2. The user points to the deposit tonnage estimates by selecting the proper deposit id (help tools will be available on the screen-form, displaying suitable subset of attributes, among them the tonnage of the five minerals). If a tonnage value for a mineral is missing, the value '0' will be used in the calculation.
3. When the user is assured that the necessary data are available, clicking on 'calculate' starts the calculation. The result of the calculation will be displayed on the screen form. If the user wants to save the estimate (click on save), this will be done in the Table (Estimates). If the user wants to perform a new calculation, all fields on the screen form are reset and the procedure can be repeated.