Managing naturally occurring radioactive material (NORM) in mining and mineral processing — guideline

NORM–7

BOSWELL — assessment and reporting database

Government of **Western Australia**
Department of **Mines and Petroleum**
Resources Safety

The Chamber of Minerals & Energy Western Australia

MIAC

Reference

The recommended reference for this publication is:
Department of Mines and Petroleum, 2010. Managing naturally occurring radioactive material (NORM) in mining and mineral processing — guideline. NORM–7 BOSWELL — assessment and reporting database: Resources Safety, Department of Mines and Petroleum, Western Australia, 107pp. <www.dmp.wa.gov.au>

Published February 2010

Contents

List of Figures

List of Tables

1. General information

1.1. Purpose

To provide guidance in the use of the Boswell — Microsoft Access assessment and reporting database.

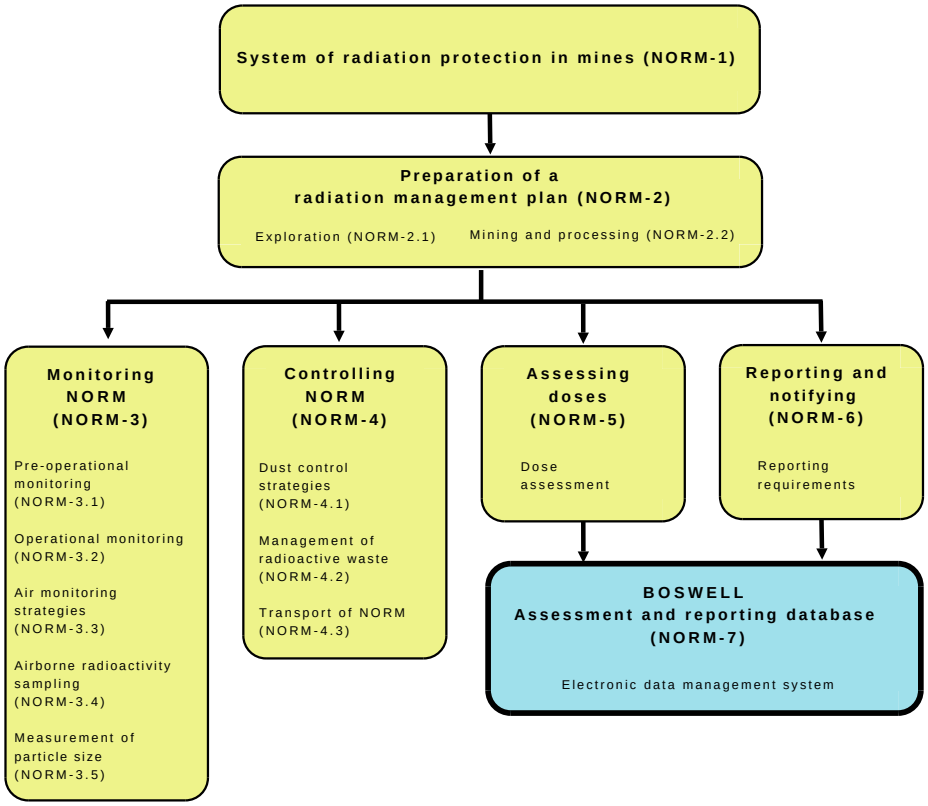
1.2. Scope

This guideline applies to all mining and mineral processing operations in Western Australia that use or handle naturally occurring radioactive material (NORM) and come within the scope of Part 16 of the Mines Safety and Inspection Regulations 1995 [1].

1.3. Relationship to other NORM guidelines

The flowchart in Figure 1.1 shows the arrangement of the Radiation Safety Guidelines.

Figure 1.1.: Relationship to other NORM guidelines



2. Guidance

2.1. Introduction

This guide assumes that you are familiar with Microsoft Windows and Microsoft Access. The purpose for the Boswell database is to have an electronic solution that it is:

- simple to use
- secure, consistent, storage of data
- uniform calculation methods
- uniform reporting methods
- uniform across the mining industry
- ability to compare mines sites and trends
- better auditing and error checking
- data is easily moved to other applications
- multi-user environment
- easy to maintain

Table 2.1.: What is a database?

Database File	This is your main file that encompasses the entire database and that is saved to your hard-drive, e.g. BoswellFrontend.mdb and boswellData.mdb.
Table	A table is a collection of data about a specific topic. There can be multiple tables in a database.
Field	Fields are the different categories within a Table. Tables usually contain multiple fields
Datatype	Data types are the properties of each field. A field only has 1 data type.
Value	The value of one piece of data.

2.2. Conceptual overview of the Boswell system

Figure 2.1 on the next page gives an overview of the concept of the Boswell database.

2.3. What is a database?

Here is the hierarchy that Microsoft Access uses in breaking down a database. Table 2.1 shows the components of a database.

2.4. History

In 1988 under the auspices of the Mines' Radiation Safety Board, a DBase IV database system called "MIDAS" (Mining Dose Assessment System) was developed to operate on a IBM PC using Microsoft DOS. It was designed principally because of a lack of uniformity between reports and reporting methods used by mining companies in WA.

It was very innovative and successful, with several versions released with improvements to the system. However, by 2001 MIDAS had become obsolete as the computer world had switched to Windows based interfaces and many users no longer had expedience with DOS.

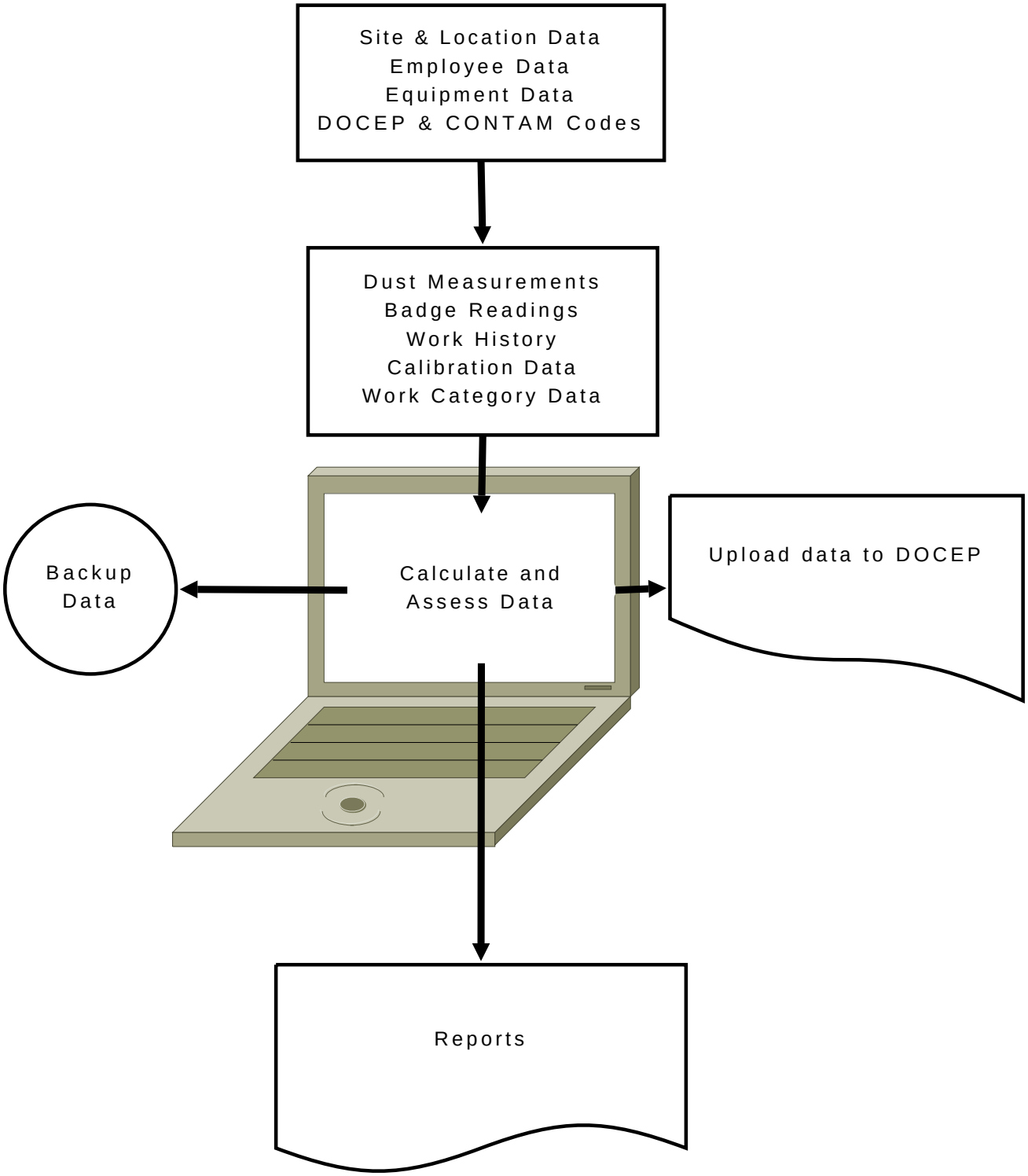
In 2001, the Radiation Industry Group hired Mr Mike Brown, a programmer, to redesign MIDAS. Boswell has been further developed by Mr Ivan Fetwadjieff, Senior Scientific Officer at DMP who is the current Boswell software maintainer.

2.5. Computer system

The following computer system is the minimum required to run Boswell:

- P4 or better, 500MB RAM, 12MB space on HDD.
- Windows XP, Microsoft Access 2003 or better.

Figure 2.1.: The Boswell System



Desirable options are:

- Internet access
- Colour printer
- Cute PDF writer or Adobe installed (Cute PDF is Freeware and available from www.cutepdf.com)
- CD burner to backup data
- Network for multi-user access

2.6. Microsoft Access

To run Boswell on a computer system, Microsoft Access must be installed on that computer. Microsoft Access, is a relational database management system from Microsoft which combines the relational Microsoft Jet Database Engine with a graphical user interface and software development tools.

Skilled software developers and data architects use it to develop application software. Relatively unskilled programmers and non-programmer 'power users' can use it to build simple applications.

Microsoft Access was used as the foundation of this database as:

- Access is the most widely used desktop database system in the world;
- Access has more support and consultants available than any other desktop database system;
- Access integrates well with the other members of the Microsoft Office suite of products (Excel, Word, Outlook, etc.);
- Access is available with the Microsoft Office Professional suite of business products therefore no additional database software is required if your company purchases computers with this suite of products already installed; and
- Access is likely to be available and supported for years to come because Microsoft is a leading software company.

Boswell has been tested with Access 2000, Access XP, Access 2003, Access 2007 and found to operate correctly in those versions.

2.7. Data storage

The data Boswell stores is mainly to do with:

- Equipment — holders, pumps, counters
- Employees — the people exposed
- Employee Work Times — times in different locations
- Site Work Groups — different occupation groups
- Site Work Areas — different monitoring points at a location
- Measurement Locations — different locations in the operation
- Dust Monitoring — Area and personal dust measurements
- Exposure Badges — external employee exposures

This data is all stored in boswellData.mdb. IMPORTANT – Make sure that you regularly backup the boswellData.mdb file and keep copies in a safe place in another location. Note: BOSWELL is not designed to store data for the DMP CONTAM database although it has facilities to export the dust monitoring data into a format that CONTAM will accept.

2.8. Boswell user licence

Boswell is supplied to users under the following conditions of use:

2.9. Boswell files

In addition to Microsoft Access, Boswell consists of the following files:

1. boswellData.mdb — Back-end data file containing tables of data;
2. BoswellFrontend2000.mdb — Boswell Program Front-end;
3. BOSWELLHELP.HLP — Boswell Help File;
4. BoswellImage.EMF — Boswell Radiation Symbol on forms;
5. BoswellLogo.ico — Radiation Icon for desktop;
6. FactorySunset.bmp — Sunset Picture File that appears on menu;
7. TIPOFDAY.txt — Text file containing tips on using Boswell for 'Tip of the Day' feature;
8. Unzip32.dll — Library file containing Unzip for decompressing compressed backup data files; and
9. zip32.dll — Library file containing Zip for compressing backup data files.

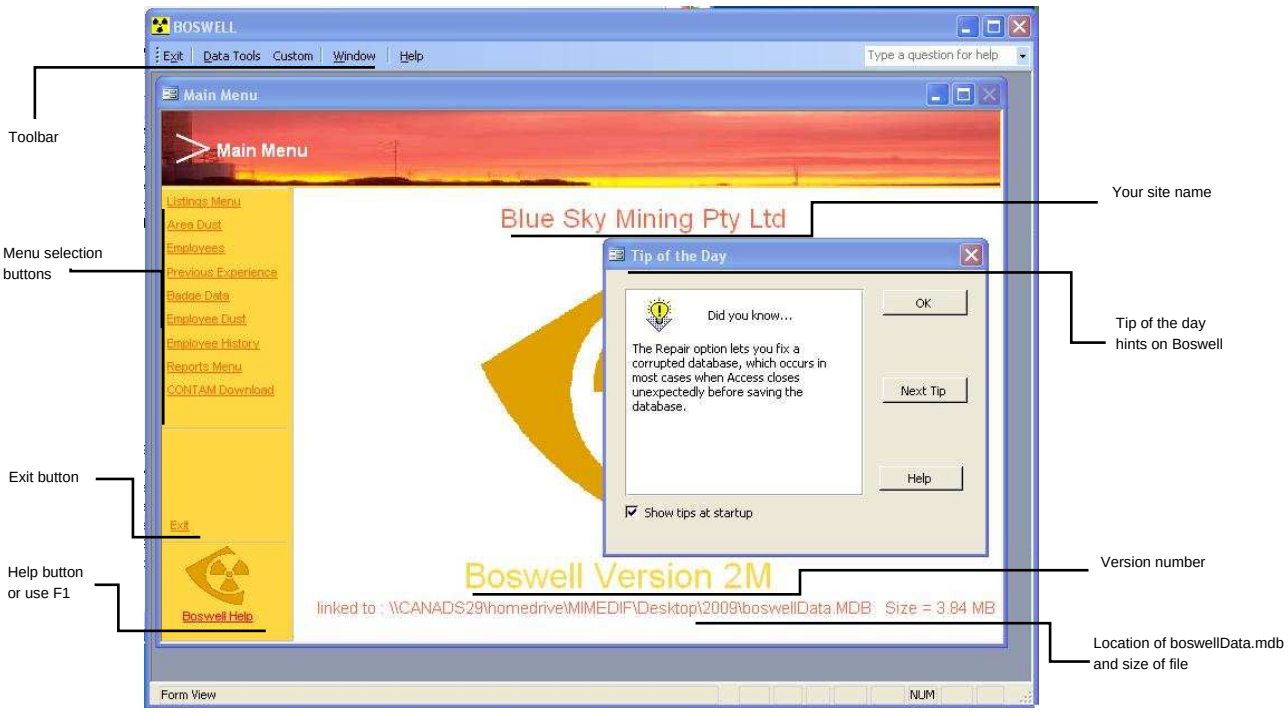
2.10. Boswell installation

The Boswell files listed above just need to be copied to a directory in the path of the computer it will be used on. The boswellData.mdb file may placed be in a different directory or even another machine or server while the other eight files must be located together in the same directory. If the Boswell installation is to be multi-user, all files can be located on a fast server.

2.11. Screen layout

Figure 2.2 shows the screen layout. There is a Toolbar along the top and menus down the left-hand side.

Figure 2.2.: Boswell Screen Layout



3. Data storage

3.1. Rules for entering data

1. Data must not be deleted, especially employees.
2. 'Work History' must be entered fresh each year.
3. You may enter more than one 'Work Category' in the Employee History for the same work time. However, the *hours must be added manually.*
4. To be classified as a 'Monitored Person', a person must have had at least one radiation badge or one dust sample for the time period (radiation year).
5. 'Work Categories' – 'Annual Reports' only include *routine dust measurements.*
6. For newly entered records, some fields will have data automatically entered from the previous record. This can be typed over if the data is different. Note that records in most tables can be entered in any order, however, it is best to enter data in order of left to right.
7. Take care not to duplicate data, e.g. there must be only one 'EmpId' number per worker.
8. Select the correct options from the drop down lists.
9. Make sure the data you enter makes sense.

3.2. Order for data entry

Table 3.1 on the facing page shows the order in which data must be entered into Boswell. Data should be entered in this order as some data is used in subsequent tables and forms. e.g. The 'Entity Site Code' (code for company name) is used in most records.

3.3. Data entry forms

3.3.1. Entity name

Entity Name is used to associate all data with your mine site. The only fields that you should change are possibly 'Selected' and 'EntityName'. If your company or site has a change of name, this table can only be accessed by opening boswellData.mdb in Access. Open 'Entity Name' in the 'Table view' and *only change the name in 'EntityName'.* Do not change 'Sitename' as this is from the DMP CONTAM database. Table 3.2 on the next page lists each field on this form and gives its purpose.

Table 3.1.: Boswell Forms

Order of use	Data entry form	Initial and occasional use	Frequently used
Listings Menu			
1	Entity Name	✓	
2	Conversion Factors	✓	
3	Work Categories	✓	
4	Radiation Counters	✓	
5	Air Sampler Holders	✓	
6	Air Sampler Pumps	✓	
7	Area / Location Code	✓	
8	Respiratory Protection	✓	
9	Radiation Calibration		✓
Main Menu			
10	Employees	✓	
11	Previous Experience	✓	
12	Employee History		✓
13	Badge Data		✓
14	Employee Dust		✓
15	Area Dust		✓
Reports Menu			
16			✓
CONTAM Download			
17			

Table 3.2.: Entity Name fields

Field Name	Purpose
Selected	Selects the company name record from the list — do not change.
EntityName	This is the company name used by Boswell to place on the screen and print in reports — you may change this.
CompanyCode	CONTAM code — do not change.
SiteCode	CONTAM code — do not change.
Sitename	CONTAM code — do not change.

3.3.2. Conversion factor

The form lists the 'Dose Conversion Factor' used in the calculation of 'Internal EDE' for your site. The dose conversion factors can be found in the tables of NORM–5 Radiation dose assessment.

The 'Internal EDE' equation that Boswell uses is as follows:

(Total Hours*Dose Conversion Factor*1.2*(Average Of Alpha Activity/1000))+(Dose Conversion Factor*1.2*(Sum of hours by Activity/1000)).

Table 3.3 on the facing page lists each field on this form and gives its purpose.

3.3.3. Work category

This form lists all the work categories used on your site and whether they are active or not. A unique value is used to represent each 'Work Category', e.g '00' is always 'Terminated'. *Do not delete any work categories as it will affect old records that have used it in the past.* Table 3.4 on the next page lists each field on this form and gives its purpose.

3.3.4. Radiation counter

This form lists all the Radiation Counters used on your site and whether they are active or not. If a counter is withdrawn from service for any reason, uncheck it's status. *Do not delete a counter from the database as this will affect old records.* Table 3.5 on the facing page lists each field on this form and gives its purpose.

3.3.5. Air sampler holder

This form lists all the air sampler holders commonly used in industry and their CONTAM codes. *Do not delete any air sampler holders from the database as this will affect old records.* This form should never need to be changed unless a new holder is introduced to the industry. Table 3.6 on page 13 lists each field on this form and gives its purpose.

3.3.6. Air sampler pump

This form lists all the air sampler pumps on your site. *Do not delete any air sampler pumps from the database as this will affect old records.* This form should never need to be changed unless a new holder is introduced to the industry. Table 3.7 on page 13 lists each field on this form and gives its purpose.

Table 3.3.: Conversion Factors

Field Name	Purpose
DCFi	Dose conversion factor from NORM–5 Radiation dose assessment.
AMAD (μm)	Particle size calculated from NORM–3.5 Measurement of particle size, typically 5 μm or 10 μm.
Entity	Code from 'Entity Name' table.

Table 3.4.: Work Categories

Field Name	Purpose
Work Category	Unique code for each Work category. Some sites use different codes.
Work Category Description	Unique name for each Work category. Some sites use different names.
Status	Determines if this work category is listed.
Hours/Day	Usually 8 or 12 hours worked per day.
DaysOn	Default value 5 days on for working week.
Daysoff	Default value 2 days off for weekend.
Holidays/Year	Default value 4 weeks per year.
Public Holidays/Year	Default value 10 days.
Nominal Hours Worked	Usually around 2,000 hours.
DCFi	AMAD size and Radionuclides determine this. See 'Conversion Factors'.
Annual Limit (mSv)	Default value is 20 mSv per year.
Occupation Code	Information on the CONTAM Occupation Codes is available from COMTAM documentation located on the DMP web site. To save space, the drop down list has only the common codes. Others can be added on request.
Entity	Code from 'Entity Name' table.

Table 3.5.: Radiation Counters

Field Name	Purpose
Equipment Code	Unique code for each counter such as' Canb01', 'Ten01'.
Counter Description	Name of Counter such as 'Canberra 7401', 'Tennelec TC257'.
Radiation Counter Status	Check box if counter is being used, uncheck if no longer being used.
Entity	Code from 'Entity Name' table.

3.3.7. Area/location code

Mines sites, treatment plants and offices are usually grouped in radiation monitoring program into areas in which the likely radiation levels (dust and or gamma) are relatively constant. It would be unusual, and probably wrong, to group an office area together with the product handlers. If you did this, people working in the offices would be assigned the same radiation measurements as people working in handling products. *Do not delete any area or location codes from the database as this will affect old records.* Uncheck their status.

Table 3.8 on the next page lists each field on this form and gives its purpose.

The Area/Locations form links up to two other forms, Area Codes and Location Codes.

3.3.7.1. Area code

This is the code for the area that the sample is taken at. Table 3.9 on the facing page lists each field on this form and gives its purpose.

3.3.7.2. Location code

In some radiation monitoring programs, personal monitoring is supplemented by area monitoring. Under these circumstances, it is often desirable to identify the exact location of the area sampler. An area may contain many different location codes, but remember that Boswell treats any sample taken at a location within a radiation area as part of a set of data relating to the area.

Table 3.10 on page 14 lists each field on this form and gives its purpose.

3.3.8. Respiratory protection

This form lists the Respiratory Protection commonly used in industry and their CONTAM codes. *Do not delete any respiratory codes from the database as this will affect old records.* This form should never need to be changed unless there is a change in CONTAM. Table 3.11 on page 14 lists each field on this form and gives its purpose. The default value is always 'No Protection'.

3.3.9. Radiation calibration

This form lists the 'Radiation Calibrations' undertaken on the 'Radiation Counters'. The information of how to calibrate the counters can be found in Guideline NORM–3.4 Airborne radioactivity sampling. *Do not delete any calibrations from the database as this will affect old records.* Table 3.12 on page 14 lists each field on this form and gives its purpose. The default value is always 'No Protection'.

Table 3.6.: Air Sample Holders

Field Name	Purpose
Holder Code	Unique code for each holder such as 0,1,2,3,4...
Holder Description	Name of Holder Type such as 'Closed Face 7 hole 25mm'.
Sampling Equipment Code	CONTAM Code for Holder Type such as '7H'.
Entity	Code from 'Entity Name' table.

Table 3.7.: Air Sample Pumps

Field Name	Purpose
Pump Code	Unique code for each pump such as P1, P2, P3, P4...
Pump Description	Make/Model of pump
Pump serial Number	Serial numbers should be added to comply with Australian Standards
Pump Flow Rate (l/min)	Default flow rate, typically 2.00 l/min
Pump Status	Check box if pump is being used, uncheck if no longer being used.
Entity	Code from 'Entity Name' table.

Table 3.8.: Area/location Codes

Field Name	Purpose
Area Code	Unique code from Area Code form
Location Code	Unique code from Location Code form
Location Description	Description for Location Code from Location Code form
Location Status	Check box if location is being used, uncheck if no longer being used.
Entity	Code from 'Entity Name' table.

Table 3.9.: Area Codes

Field Name	Purpose
Area Code	Unique code for area such as 'PL1'.
ACDescription	Description of area such as 'Dry Separation Plant 1'.
Area Code Active	Check box if area is being used, uncheck if no longer being used.
Entity	Code from 'Entity Name' table.

Table 3.10.: Location Codes

Field Name	Purpose
Location Code	Unique code for each location such as '11A'.
Location Description	Description of location such as '11A Zircon b/ween AT205 & 207'
Entity	Code from 'Entity Name' table.

Table 3.11.: Respiratory Protection

Field Name	Purpose
Respiratory Protection Code	Unique code for each code such as 0,1,2,3,4...
Respiratory Protection Description	Description from CONTAM such as 'No Protection'.
Entity	Code from 'Entity Name' table.

Table 3.12.: Radiation Calibration

Field Name	Purpose
Equipment Code	Unique code for each Radiation Counter used in the Radiation Counters form. See Section 3.3.4 on page 10.
Calibration Date	Date the calibration was made.
Efficiency	From Excel Spreadsheet in Guideline NORM–3.4 Airborne radioactivity sampling.
Background Counts	Counts from the Radiation Counter
Background Count Time (min)	Overnight or 900 minutes.
Default Sample Count Time (min)	Usually 60 minutes.
Entity	Code from 'Entity Name' table.

3.3.10. Employees

This form lists all the employees who are exposed to radiation on your site and whether they are active or not. A unique value is used to represent each employee. *Do not delete any employees as it will affect old records.* Table 3.13 on page 17 lists each field on this form and gives its purpose.

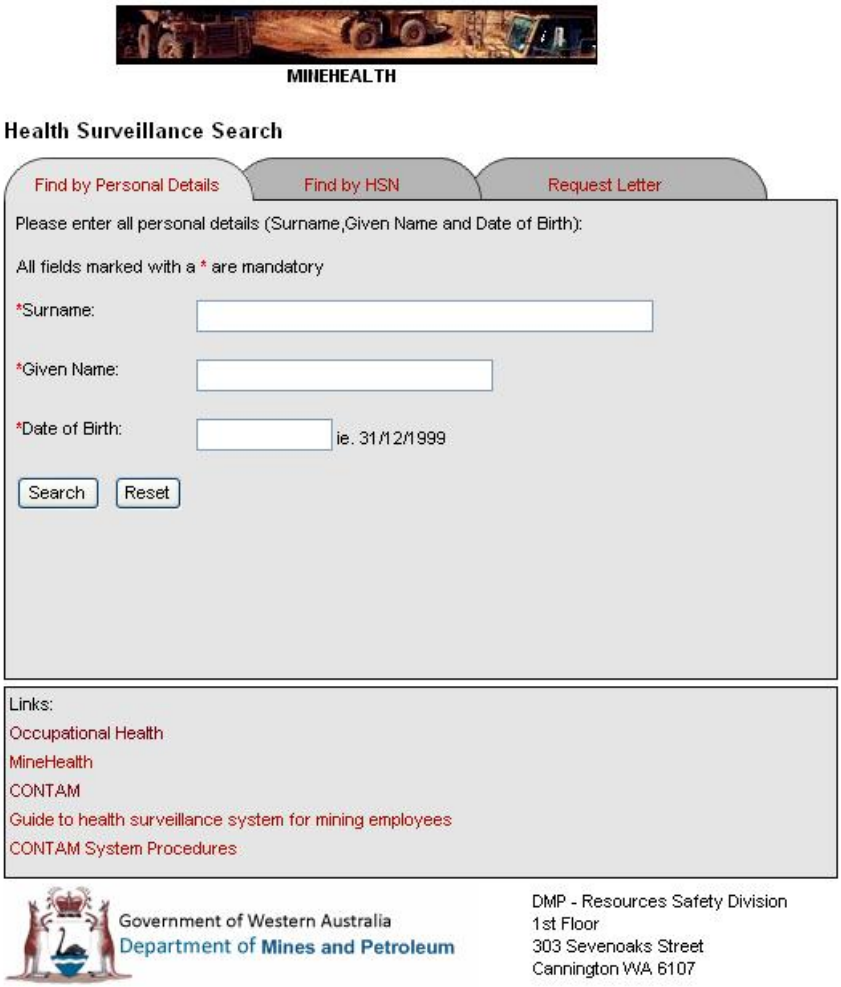
There are several methods of utilising operational procedures to optimise radiation protection in the mining industry. One of these methods is with the recognition of those work conditions in which some individuals could be expected to receive a relatively higher radiation exposure than most other work conditions within that operation. If as a result of those work conditions there is potential for an individual to receive a dose in excess of 5 mSv per year, then that individual is to be classified as a designated employee according to the MSIR [1]. The number of designated employees should be kept to a minimum.

3.3.10.1. MineHealth

MINEHEALTH numbers are available from the DMP web site and can be located if you have a person's details and birthdate.

www.dmp.wa.gov.au/minehealth/

Figure 3.1.: MINEHEALTH web site – surveillance number search



The 'Health Surveillance Program for Mine Employees' (MINEHEALTH) replaced the 'Mines Workers Health Certificate System', with the introduction of the *Mines Safety and Inspection Act* (1994) and Regulations (1995).

MINEHEALTH is focused primarily on monitoring respiratory symptoms. Audiometric testing is also undertaken as mine employees are typically exposed to very high noise levels.

3.3.11. Previous experience

The 'Previous Radiation History' holds information on the previous employment of individuals in positions where they were subject to radiation exposure.

Previous employers are required by law to prepare a dose report for employees that can be forwarded to their new employer. Table 3.14 on the facing page lists each field on this form and gives its purpose.

3.3.12. Employee history

This form shows the movements of employees between work categories and it is absolutely imperative that this is maintained accurately if the dose calculations are to be correct. They should be updated at the very minimum once every 'Radiation Year'. These records are used to allocate work categories to the radiation badges.

Important points to remember:

1. Any one employee can have numerous entries.
2. The dates must not overlap and, if required, you may manually split work times if an employee works in two work categories at the one time. You must calculate and adjust the hours manually.
3. Any gaps outside date ranges are assumed to be time-off.
4. For the current work category for that employee, the record should show a start date and no end date. If you add the end date, the system will automatically mark that employee as 'Terminated' in the employees screen.
5. Boswell will remove the 'Terminated' once you open up a new record with an open ended 'Date Started'.
6. If this form contains erroneous data, you will get erroneous dose reports.

Table 3.15 on page 18 lists each field on this form and gives its purpose.

3.3.13. Badge data

The badge data form contains data on samples taken from individuals wearing radiation badges. Table 3.16 on page 18 lists each field on this form and gives its purpose.

Table 3.13.: Employees

Field Name	Purpose
EmpId	Unique number for each Employee. Employees must not have duplicate EmpId numbers.
Surname	Surname — can be changed if surname changes because EmpId is unchanged.
Firstname	Determines if this work category is listed.
Initial	To differentiate between those people with the same Surnames.
DOB	Date of Birth — required for MINEHEALTH
Sex	M/F
Payroll Number	Number for company use — sometimes useful for tracking hours worked
MWHSH	MineHealth Surveillance number — see below.
Designated	Designated Status is *manually* placed by the RSO to indicate the employee should be monitored more closely. Employees with their designated status ticked will appear in reports specifically written for designated employees.
Employment Ceased	When an employee leaves the company, the date should be added here.
Entity	Code from 'Entity Name' table.

Table 3.14.: Previous Radiation History

Field Name	Purpose
Employee	Drop down list from Employees form
Company	Previous employer
Country	Country
State	State
Radiation Id	Previous ID number
Inclusive Date From	Start date with previous employer
Inclusive date To	End date with previous employer
Previous History Cited	Check box if exposure data is being used, unchecked if not being used.
Entity	Code from 'Entity Name' table.

Table 3.15.: Employee Work History

Field Name	Purpose
Employee Name	Names from the Employee form, Section 3.3.10 on page 15
WorkCategory	Work Category drop down list from the Work Category form, Section 3.3.3 on page 10.
DateFrom	Start date — pop up calendar.
DateTo	End date — pop up calendar.
Hours†	Hours are calculated using work hours recorded in the Work Categories form.
Employee#	EmpId from Employee form.
Entity	Code from 'Entity Name' table.

†The number of hours worked in a work category over the period indicated. The hours will be calculated automatically once the two dates are entered, but this can then be overridden by the user. The hours will be based on the nominal hours per year figure from the Work Categories table in the listing section. This will be broken up *pro rata* for the number of days actually worked. This is an important mandatory field and there are traps in place so that you can't exit this field until a valid entry is made. To cancel an entire line you are working on or revert back to the values as they were when you started editing the record, press the 'Esc' key.
Data Filtering – the data is filtered by default to show the only last two years of data. There is a button on the toolbar to turn off filtering to show all data.

Table 3.16.: Badge Data

Field Name	Purpose
Batch	A batch number supplied by the badge supplier
BadgeNumber	A badge number supplied by the badge supplier
EmpId	EmpId from the Employee form, Section 3.3.10 on page 15
IssuedDate	Start date of use — pop up calendar.
ReurnedDate	End date of use — pop up calendar.
μSv	Exposure recorded on badge.
Comments	A place to note unusual events — sometimes an estimate must be entered into μSv if the badge was lost and it is noted here.
Entity	Code from 'Entity Name' table.

3.3.14. Employee dust

You should enter your 'Radiation Calibration' data prior to entering the associated dust data!

Some fields are calculated by an 'update query' that looks up the radiation calibration table for the last calibration date and uses that data.

'Data filtering' – the data is filtered by default to show the last two years data. There is a button on the toolbar to turn off filtering and show all data. Table 3.17 on the following page lists each field on this form and gives its purpose.

3.3.15. Area dust

You should enter your 'Radiation Calibration' data prior to entering the associated area dust data!

Some fields are calculated by an 'Update Query' that looks up the radiation calibration table for the last calibration date and uses that data.

'Data Filtering' – the data is filtered by default to show the last two years data. There is a button on the toolbar to turn off filtering and show all data. Table 3.21 on page 23 lists each field on this form and gives its purpose.

Table 3.17.: Employee Dust

Field Name	Purpose
Id	A text identifier that goes with the filter number to uniquely identify that sample.
Filter No.	A number that goes with the filter id to uniquely identify a sample.
Pre-wt (mg)	Weight of clean filter paper when it is loaded.
Final wt (mg)	The weight of filter after sample has been taken, i.e. with the dust on the paper.
Sample wt (mg)	Net weight of contaminants on the filter. This is automatically calculated once the initial and final weights have been entered.
Employee	EmpId from the Employee form, Section 3.3.10 on page 15
Work Category	This refers to the Work Category the employee was working in when the sampling took place.
Location Code	Location Code as required in downloads for the DMP's CONTAM database. This field must be filled in if your submissions to the CONTAM database are to be processed successfully.
Confined Space	Was the sample collected in a confined space? As required in downloads for the DMP's CONTAM database. This field must be filled in if your submissions to the COMTAM database are to be processed successfully.
Respiratory Protection	The default value is 'N' as there is no guarantee that respiratory protected is correctly used or fitted.
ASH Code	Defaults to 2 — Closed Face 7 hole 25mm which is used by the mining industry.
Pump Code	This identifies the actual pump being used to take the sample. The values in the list come from the Air Sampler Pumps form.
Pump Flow Rate (l/min)	The default value is automatically entered, however the real value can be manually entered in its place.
Pump Start Date/Time	Date and time pump was started.
Pump End Date/Time	Date and time pump was stopped.
Pump Sampling Time (min)	Net time in minutes the pump ran for. This is automatically calculated once the Start Date and End Date fields have been entered.
Pump Sample Vol (m^3)	Volume of air passing through the pump in cubic metres (cm^3). This is automatically calculated once the pump code is selected and the start and end date are entered. The pump code will have an associated flow rate that will be multiplied by the sample time.

Table 3.19.: Employee Dust continued

Field Name	Purpose
Analysis Date	Date sample was counted. This will be different to the sampling date as six or seven days are allowed for decay products to decay off the filter paper. It is the date used in returning the counting equipment calibration figures for a particular sample.
RC Code	Drop down list of unique codes for each Radiation Counter used in the Radiation Counters form. See Section 3.3.4 on page 10.
Efficiency	This is the counter efficiency figure stored in the Radiation Calibration table in the Listings section. This is automatically returned once Count Date RC Code have been selected. Note: This is not entered as a % value.
Sample Counts	The number of counts returned by the counting equipment for that sample.
Sample Count Time (min)	Time in minutes the sample was counted — usually 60 minutes.
Background Counts	The number of background sample counts present for that counter for the calibration current at that time. This is automatically returned once the RC Code and the Count Date have been selected. The calibration values are stored in the Radiation Calibration form in the Listing section.
Background Count Time (min)	Usually over night or as long as possible.
Dust Conc (mg/m^3)	This field is calculated automatically once the weights, dates and pump have been selected. Values over the limit are in 'red'. ([FinalWeight]-[InnitialWeight])/(DateDiff('n',[InnitialDate],[FinalDate])*([flowrate]/1000))
Alpha Activity (mBq/m^3)	Alpha Activity is calculated using the following equation: (Sample Counts/50-Background Counts/50)*(1/60/Counter Efficiency/Sample time*Pump flow)
MDL (mBq/m^3)	Minimum Detectable Level measured in mBq/m^3 This value is substituted in the calculations if the counts are too low. This value is calculated using the following equation: (3 + (3.29 x (SQR((BC x SCT) x (1+(SCT/BCT)))))) / (Eff x SCT) Square Root = SQR , Background Counts = BC , Sample Count Time = SCT , Background Count Time = BCT , Counter efficiency = Eff [1]
Specific Activity (Bq/g)	This is calculated using the following equation: ((Sample counts/50-(Background Counts)/50)*(1/60/(Counter Efficiency)/((sample time)*(Pump flow]/1000))))*1000/(Sample Weight*1000/(Sample Time*Pump flowrate))

Table 3.20.: Employee Dust continued

Field Name	Purpose
Work Activity	It is important to change the default 'Routine Operations' should an employee receive an unusual exposure.
Sample Purpose	CONTAM Code — 'Q' for Quota is the default value
Comments	A place to note unusual events.
Entity	Code from 'Entity Name' table.

Table 3.21.: Area Dust

Field Name	Purpose
Id	A text identifier that goes with the filter number to uniquely identify that sample.
Filter No.	A number that goes with the filter id to uniquely identify a sample.
Pre-wt (mg)	Weight of clean filter paper when it is loaded.
Final wt (mg)	The weight of filter after sample has been taken, ie, with the dust on the paper.
Sample wt (mg)	Net weight of contaminants on the filter. This is automatically calculated once the initial and final weights have been entered.
Area	This is the code for the area tha sample is taken. This list of area codes is made up from the Area Codes form in the Listings section.
Location	In some radiation monitoring programs, personal monitoring is supplemented by area monitoring. Under these circumstances, it is often desirable to identify the exact location of the area sampler. An area may contain many different location codes, but remember that Boswell treats any sample taken at a location within a radiation area as part of a set of data relating to the area.
Pump Code	This identifies the actual pump being used to take the sample. The values in the list come from the Air Sampler Pumps form.
Pump Flow Rate (l/min)	The default value is automatically entered, however the real value can be manually entered in its place.
Pump Start Date/Time	Date and time pump was started.
Pump End Date/Time	Date and time pump was stopped.
Pump Sampling Time (min)	Net time in minutes the pump ran for. This is automatically calculated once the Start Date and End Date fields have been entered.
Pump Sample Vol (m^3)	Volume of air passing through the pump in cubic metres (cm^3). This is automatically calculated once the pump code is selected and the start and end date are entered. The pump code will have an associated flow rate that will be multiplied by the sample time.
Analysis Date	Date sample was counted. This will be different to the sampling date as six or seven days are allowed for decay products to decay off the filter paper. It is the date used in returning the counting equipment calibration figures for a particular sample.
RC Code	Drop down list of unique codes for each Radiation Counter used in the Radiation Counters form. See Section 3.3.4 on page 10.
Efficiency	This is the counter efficiency figure stored in the Radiation Calibration table in the Listings section. This is automatically returned once Count Date RC Code have been selected. Note: This is not entered as a % value.
Sample Counts	The number of counts returned by the counting equipment for that sample.
Sample Count Time (min)	Time in minutes the sample was counted — usually 60 minutes.

Table 3.22.: Area Dust continued

Field Name	Purpose
Background Counts	The number of background sample counts present for that counter for the calibration current at that time. This is automatically returned once the RC Code and the Count Date have been selected. The calibration values are stored in the Radiation Calibration form in the Listing section.
Background Count Time (min)	Usually over night or as long as possible.
Dust Conc (mg/m^3)	This field is calculated automatically once the weights, dates and pump have been selected. Values over the limit are in 'red'. ([FinalWeight]-[InnitialWeight])/(DateDiff('n',[InnitialDate],[FinalDate])*([flowrate]/1000))
Alpha Activity (mBq/m^3)	Alpha Activity is calculated using the following equation: (Sample Counts/50-Background Counts/50)*(1/60/Counter Efficiency/Sample time*Pump flow)
MDL (mBq/m^3)	Minimum Detectable Level measured in mBq/m^3 This value is substituted in the calculations if the counts are too low. This value is calculated using the following equation: (3 + (3.29 x (SQR((BC x SCT) x (1+(SCT/BCT)))))) / (Eff x SCT) Square Root = SQR , Background Counts = BC , Sample Count Time = SCT , Background Count Time = BCT , Counter efficiency = Eff [1]
Specific Activity (Bq/g)	This is calculated using the following equation: ((Sample counts/50-(Background Counts)/50)*(1/60/(Counter Efficiency)/((sample time)*(Pump flow]/1000))))*1000/(Sample Weight*1000/(Sample Time*Pump flowrate))
Comments	A place to note unusual events.
Entity	Code from 'Entity Name' table.

4. Data reporting

Boswell uses the last radiation year as the default dates for the 'Reporting Period'. Other time periods may be used with care. There are pop-up calendars to select the required dates.

Figure 4.1.: Boswell Reports Menu

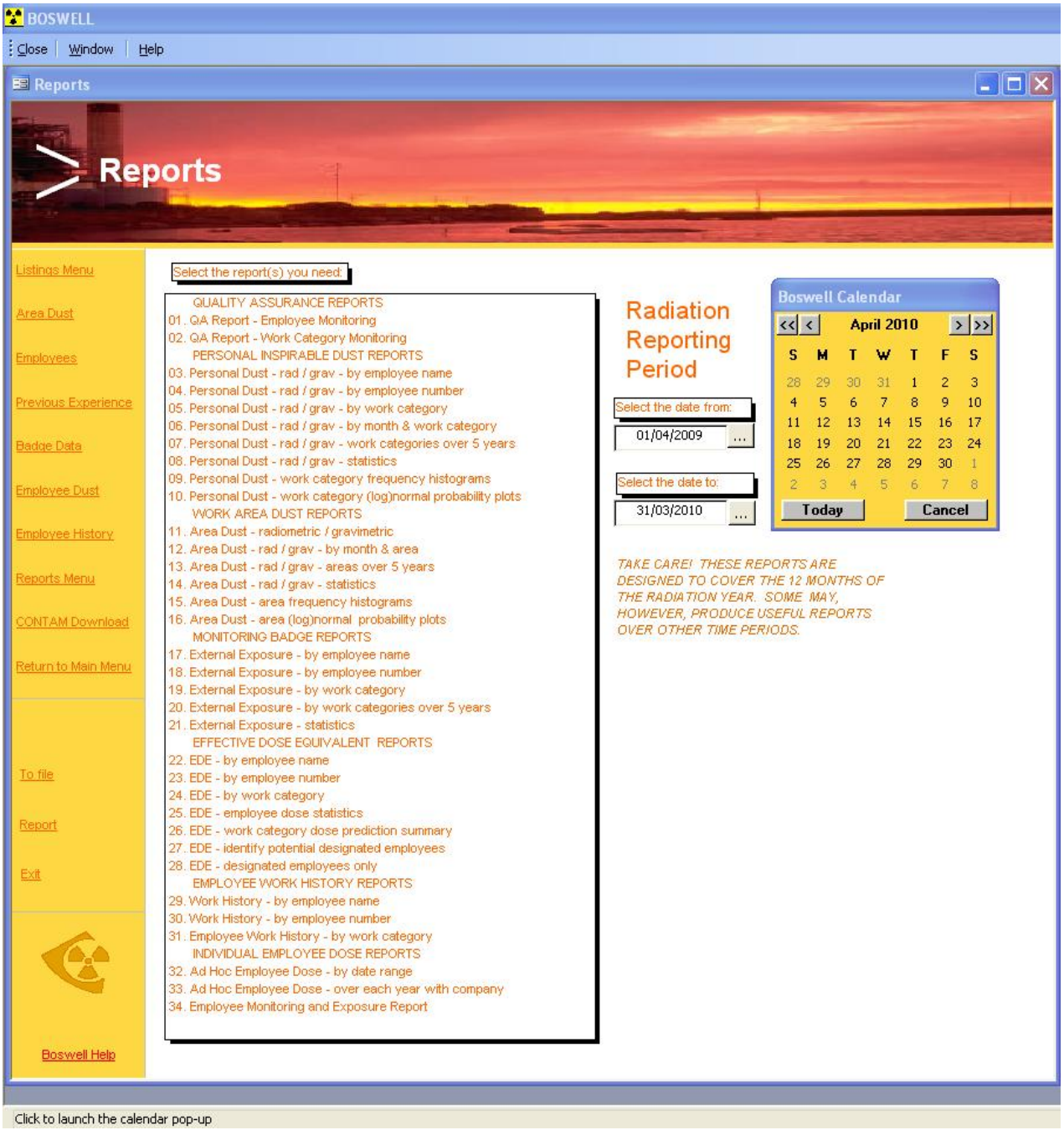


Table 4.1.: Report 01. QA Report – Employee Monitoring

Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	01. QA Report – Employee Monitoring
Reporting Period	Is the period correct?
Number of Pages	
Surname	Is anyone missing?
Firstname	Are the names correct?
No. of Dust Samples	Are all dust samples listed?
No. of Badges	The number badges must equal the number issued. If there are 5 badges for an employee, check your records!
Designatesd	Yes/No – are these correct?
Work History Record	Yes/No– are these correct?
Totals	Are the totals correct?

4.1. Quality assurance reports

Report 01. QA report – employee monitoring

The purpose of this report is for RSOs to check that employee data is entered correctly over the selected period. It should not be included in your annual occupational radiation report.

The report shows:

- the surname and first-name of every employee monitored over the selected dates who have had at least one dust sample or one badge;
- the number of dust samples taken;
- which employees were designated;
- which employees have a work history recorded; and
- if the work history is missing, you must go back to the work history form and add the data before you can create further reports.

Figure 4.2 on the next page shows the first page of this report.

Figure 4.3 on page 28 shows a rear page reporting badges missing Work History

Table 4.1 lists each field on the report and gives its purpose.

Figure 4.2.: Report 01. QA Report – Employee Monitoring

Wednesday, 23 September 2009 Boswell Version 2M Page 1 of 4
Blue Sky Mining Pty Ltd

01. QA Report - Employee Monitoring

Summary for period 01/04/2006 to 31/03/2007

Surname	Firstname	No. Dust Samples	No.of Badges	Designated	Work History Rec
Abbott	Peter	8	4	Yes	Yes
Adams	Fred	3	4	Yes	Yes
Allans	Mary	3		No	No
Anderson	Tobby		4	Yes	Yes
Ashcraft	Ian	3	3	No	Yes
Backshall	Ford	2	2	No	Yes
Backsnail	Mort	3	3	No	Yes
Baker	Peter	12	4	Yes	Yes
Balourd	Ryan	1		No	No
Banks	Cody	3	4	No	Yes
Barker	Barry	7	4	Yes	Yes
Barker	Mervin		4	No	Yes
Baron	Red	1		No	No
Bickill	Barbie	1		No	No
Bollard	Tina		2	No	Yes
Bood	Dale	5	4	No	Yes
Boucherd	Frenchy	1		No	No
Boysly	Ian	8	4	No	Yes
Brandy	John	3	4	Yes	Yes
Brandyhan	Harry	1	4	Yes	Yes
Brendan	Nick	1		No	No
Browne	Russell		4	Yes	Yes
Buggy	Brian	2	4	No	Yes
Bunter	Billy		2	Yes	Yes
Campbell	Donald	4	4	No	No
Carpent	Jacob		3	Yes	Yes
Castle	King	3	4	Yes	Yes
Chadnick	Yirrie	3	4	Yes	Yes
Chapel	Robin	10	2	Yes	Yes
Ciddle	Peta	1		No	No
Ciddle	Steve	1		No	No
Clinchy	Kevin	8	4	Yes	Yes
Collar	Whitey	3		No	No
Collett	Tony	1		No	No
Comb	Ruth	2		No	No
Cookie	Mon	1		No	No
Cooper	Jason		3	Yes	Yes
Copper	Mike		4	No	Yes
Craighorn	Mickie	2		No	No
Croswell	Travis	4	4	Yes	Yes
Cullens	Craig	1		No	No
Davis	Peter	2		No	No
Dewell	Andrew	4	4	No	Yes
Donstand	Cameron	1	4	Yes	Yes
Down	Brendan		4	Yes	Yes
Dunddie	Mike	1	1	No	Yes

Figure 4.3.: Report 01. QA Report – report showing badges missing Work History

Surname	Firstname	No. Dust Samples	No.of Badges	Designated	Work History Rec
Total	148	349	141	60	121

Employees who have badges without a Work History

Surname	Firstname	Badge serial No	Date Issued	Date Returned
Abbott	Peter	40936813	02-Apr-08	01-Jul-08
Abbott	Peter	79155826	02-Jul-08	30-Sep-08
Adams	Frank	79156826	02-Jul-08	30-Sep-08
Anderson	Tobby	79207826	02-Jul-08	30-Sep-08
Atmos	Simon	40938813	02-Apr-08	01-Jul-08
Baker	Peter	40940813	02-Apr-08	01-Jul-08
Baker	Peter	79158826	02-Jul-08	30-Sep-08
Barker	Barry	79159826	02-Jul-08	30-Sep-08
Barker	Barry	40941813	02-Apr-08	01-Jul-08
Brandy	John	40943813	02-Apr-08	01-Jul-08
Brandy	John	79161826	02-Jul-08	30-Sep-08
Brandyhan	Harry	40944813	02-Apr-08	01-Jul-08
Brandyhan	Harry	79162826	02-Jul-08	30-Sep-08
Browne	Russell	40945813	02-Apr-08	01-Jul-08
Browne	Russell	79163826	02-Jul-08	30-Sep-08
Bunter	Billy	79164826	02-Jul-08	30-Sep-08
Bunter	Billy	40946813	02-Apr-08	01-Jul-08
Campbell	Donald	79165826	02-Jul-08	30-Sep-08
Campbell	Donald	40947813	02-Apr-08	01-Jul-08
Carpent	Jacob	40948813	02-Apr-08	01-Jul-08
Carpent	Jacob	79166826	02-Jul-08	30-Sep-08
Castle	King	79167826	02-Jul-08	30-Sep-08
Castle	King	40949813	02-Apr-08	01-Jul-08
Chadnick	Yirrie	40950813	02-Apr-08	01-Jul-08
Chadnick	Yirrie	79168826	02-Jul-08	30-Sep-08
Chapel	Robin	79169826	02-Jul-08	30-Sep-08
Chapel	Robin	40951813	02-Apr-08	01-Jul-08
Clinchy	Kevin	79170826	02-Jul-08	30-Sep-08
Clinchy	Kevin	40952813	02-Apr-08	01-Jul-08
Cooper	Jason	40953813	02-Apr-08	01-Jul-08
Cooper	Jason	79171826	02-Jul-08	30-Sep-08
Croswell	Travis	40954813	02-Apr-08	01-Jul-08
Croswell	Travis	79172826	02-Jul-08	30-Sep-08
Debeaux	Megan	79230826	02-Jul-08	30-Sep-08
Dewell	Andrew	79173826	02-Jul-08	02-Aug-08
Dewell	Andrew	40955813	02-Apr-08	01-Jul-08
Donstand	Cameron	79176826	02-Jul-08	30-Sep-08

Table 4.2.: Report 02. QA Report – Work Category Monitoring

Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	02. QA Report – Work Category Monitoring
Reporting Period	Is the period correct?
Number of Pages	
Work Category	Are any Work Categories missing?
Code	Work Category Code
Active	Are any Work categories inactive that should be marked as active?
No. of Employees	Are the number of employees correct?
No. of Badges	The number badges must equal the number issued.
No. of Dust Samples	Are all dust samples listed?
Total	Are the totals correct?

Report 02. QA report – work category monitoring

The purpose of this report is for RSOs to check if the 'Work Category' data is entered correctly over the selected period. It should not be included in your annual occupational radiation report.

The report shows:

- the 'Work Category' of every employee monitored over the selected dates with at least one dust sample or one radiation badge;
- which work categories are 'Active'; and
- the number of employees in each and the badges/dust samples taken.

This report is useful for checking if enough sampling has been undertaken in each active 'Work Category'.

Figure 4.4 on the following page shows the first page of this report.

Figure 4.5 on page 31 shows a rear page reporting employee dust samples missing Work History.

Table 4.2 lists each field on the report and gives its purpose.

4.2. Personal inspirable dust reports

Report 03. Personal Dust - rad/grav – by employee name

The purpose of this report is to list all personal dust sampling undertaken on employees data over the selected period. It shows the airborne radioactivity and dust concentrations that monitored

Figure 4.4.: Report 02. QA Report – Work Category Monitoring

Work Category: Engineering Maintenance - Dry Plant	Code: 4 Active: Yes	No. Dust Samples:	No. of Badges:
Adams	Frank	3	4
Anderson	Tobby	0	4
Banks	Cody	3	4
Baron	Red	1	0
Buggy	Brian	2	4
Bunter	Billy	0	2
Carpent	Jacob	0	3
Cooper	Jason	0	3
Copper	Mike	0	4
Dewell	Andrew	4	4
Down	Brendan	0	4
Edwards	Brad	2	4
Flynn	Ronald	0	4
Foster	Adam	2	0
Gibson	Ben	0	2
Greenlees	Jim	2	4
Hankin	Bruce (Gary)	2	4
Kerley	Dennis	0	4
Kimptin	Joel	1	4
Lloyd	Damian	0	1
Matthews	Howard	2	0
McKenzie	R	0	1
Morrison	Noel	2	4
Nears	Mick	1	4
Newman	Richard	0	3
Nuska	Ibrahim	1	0
O'Neill	B	3	0
Panaia	Vince	3	3
Penny	Mohommad	1	4
Perks	G	1	4
Reynolds	Nathan	2	4
Taylor	Philip	1	4
Trotter	Peter	1	3
Tuffley	Rob	3	4
Watts	Steve	2	4
Williams	P	1	2
Williams	peter	2	0
Wilson	P	0	3
Windsor	Peter	1	4
Yurisich	Barry	0	4
Work Category Total	**40**	**49**	**118**

02. QA Report - Work Category Monitoring — Summary for period 01/04/2006 to 31/03/2007

Monday, 12 October 2009 — Page 4 of 14

Figure 4.5.: Report 02. QA Report – report showing dust samples missing Work History

Grand Total:	No. of Work Categories	No. of Employees:	No. of Dust Samples:	No. of Badges:
	8	307 *	441	**790 ***

** note : if employees work in more than one Work Category at one time, their badges may be counted in those categories.*

Dust Samples without a Work History for this Work Category

Surname	Firstname	Work Category	Sample Date	Filter Number
Allans	Mara	8A	20/12/06	NM 4917
Allans	Mara	8A	06/02/07	NM 5064
Allans	Mara	8A	04/05/06	NM 4667
Balourd	Ryan	7A	21/02/07	NM 5123
Baron	Red	4	12/07/06	NM 4816
Bickill	Barbie	8A	15/03/07	NM 5226
Boucherd	Frenchy	2	29/12/06	NM 4935
Boysly	Ian	8A	16/01/07	NM 5004
Boysly	Ian	8A	17/07/06	NM 4826
Brendans	Nick	2	14/06/06	NM 4765
Campbell	Donald	7D	30/11/06	NM 4849
Campbell	Donald	7D	01/06/06	NM 4710
Campbell	Donald	7D	08/01/07	NM 4961
Campbell	Donald	7D	04/04/06	NM 4593
Ciddle	Steve	8A	12/12/06	NM 4890
Ciddle	Peta	8A	13/03/07	NM 5206
Collar	Whitey	2	09/08/06	NM 4827
Collar	Whitey	2	10/08/06	NM 4828
Collar	Whitey	2	08/08/06	NM 4830
Collett	Tony	2	09/01/07	NM 4968
Comb	Ruth	8A	03/01/07	NM 4947
Comb	Ruth	8A	12/02/07	NM 5089
Cookie	Mon	2	16/05/06	NM 4697
Craighorn	Mickie	2	09/01/07	NM 4967
Craighorn	Mickie	2	02/02/07	NM 5051
Cullens	Craig	8A	10/01/07	NM 4977
Davis	Peter	2	19/12/06	NM 4910
Davis	Peter	2	06/02/07	NM 5063
Dutton	Jason	2	09/05/06	NM 4683
Findlay	Glyn	7C	01/03/07	NM 5146
Findlay	Glyn	7C	09/03/07	NM 5180

Table 4.3.: Report 03. Personal Dust – rad/grav — by employee name

Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	03. Personal Dust – rad/grav — by employee name
Reporting Period	Is the period correct?
Number of Pages	
Employee	Surname, First-name, Initials
Designated	Y/N
No. of Samples	Numbers of dust samples for each employee
Airborne Radioactivity (mBq/m^3)	
Min	Minimum value recorded for each employee
Max	Maximum value recorded for each employee
Mean	Mean value recorded for each employee
SDev	Standard Deviation of values recorded for each employee
UCL	95% Upper Confidence Level for radioactivity for each employee
Dust Concentration in Air (mg/m^3)	
Min	Minimum dust value recorded for each employee
Max	Maximum dust value recorded for each employee
Mean	Mean dust value recorded for each employee
SDev	Standard Deviation of dust values recorded for each employee
UCL	95% Upper Confidence Level for dust level of each employee

employees were exposed to. The report also lists the minimum, maximum mean standard deviation and 95% upper confidence statistics for the employee's measurements. For privacy reasons, it should not be included in your annual occupational radiation report.

Figure 4.6 on the next page shows the first page of this report.

Table 4.3 lists each field on the report and gives its purpose.

Report 04. Personal Dust - rad/grav – by employee number

The purpose of this report is to list all personal dust sampling undertaken on employees data over the selected period. It shows the airborne radioactivity and dust concentrations that monitored employees were exposed to. The report lists 'Employee Id Code', 'Minimum', 'Maximum', 'Mean', 'Standard Deviation' and the '95% Upper Confidence Level' statistics for each employee's measurements. For employee privacy, this is the report to include in your 'Annual Occupational Radiation Report'.

Figure 4.6.: Report 03. Personal Dust – rad/grav — by employee name

Wednesday, 23 September 2009 Boswell Version 2M Page 1 of 4
Blue Sky Mining Pty Ltd

03. Personal Dust - rad / grav - by employee name

Summary for period 01/04/2006 to 31/03/2007

Employee	Ds.	No. of Samples	Airborne Radioactivity (mBq/m³)					Dust Concentration in Air (mg/m³)				
			Min	Max	Mean	SDev	UCL	Min	Max	Mean	SDev	UCL
Abbott, Peter R	D	8	27	1245	409	361	651	0.3	11.3	3.8	3.3	6.0
Adams, Fred	D	3	42	459	218	216	583	0.5	4.4	2.1	2.0	5.5
Allans, Mary		3	12	15	14	2	16	0.5	1.2	0.9	0.4	1.6
Ashcraft, Ian		3	32	133	67	57	164	0.1	2.2	0.9	1.2	2.9
Backshall, Ford J		2	367	712	540	244		2.2	10.6	6.4	5.9	
Backsnail, Mort R		3	29	384	167	190	488	0.6	4.4	2.1	2.1	5.5
Baker, Peter	D	12	81	705	279	187	376	1.1	7.0	2.9	2.0	3.9
Balourd, Ryan		1	144	144	144			1.0	1.0	1.0		
Banks, Cody		3	13	112	66	50	151	1.0	1.5	1.3	0.3	1.9
Barker, Barry C	D	7	40	336	175	96	245	0.3	4.1	1.8	1.2	2.7
Baron, Red		1	763	763	763			6.0	6.0	6.0		
Bickill, Barbie		1	13	13	13			1.0	1.0	1.0		
Bood, Dale D		5	44	1216	299	514	789	0.9	12.2	4.2	4.8	8.7
Boucherd, Frenchy E		1	14	14	14			0.3	0.3	0.3		
Boysly, Ian		8	12	755	319	325	536	0.2	9.3	3.7	3.6	6.1
Brandy, John	D	3	13	486	174	270	629	0.3	8.2	3.0	4.6	10.6
Brandyhan, Harry W	D	1	363	363	363			6.0	6.0	6.0		
Brendan, Nick L		1	16	16	16			0.3	0.3	0.3		
Buggy, Brian		2	140	1143	641	709		3.5	3.8	3.7	0.2	
Campbell, Donald L	D	4	12	60	25	23	53	0.2	0.6	0.4	0.1	0.5
Castle, King	D	3	94	146	117	27	162	1.0	1.9	1.5	0.4	2.2
Chadnick, Yirrie A	D	3	12	536	327	278	795	0.6	5.4	3.0	2.4	7.0
Chapel, Robin	D	10	55	711	374	220	502	0.4	7.5	3.2	2.6	4.7
Ciddle, Steve F		1	11	11	11			0.3	0.3	0.3		
Ciddle, Peta		1	13	13	13			0.3	0.3	0.3		
Clinchy, Kevin D	D	8	67	834	467	314	678	1.0	11.7	5.0	3.2	7.2
Collar, Whitey		3	13	16	14	2	17	5.2	7.5	6.4	1.1	8.3
Collett, Tony P		1	11	11	11			0.4	0.4	0.4		
Comb, Ruth		2	29	40	34	8		0.4	2.6	1.5	1.6	
Cookie, Mon B		1	15	15	15			1.3	1.3	1.3		
Craighorn, Mickie		2	16	20	18	3		0.7	4.5	2.6	2.7	
Croswell, Travis A	D	4	12	232	69	108	197	0.1	2.0	0.8	0.8	1.7
Cullens, Craig		1	12	12	12			1.2	1.2	1.2		
Davis, Peter M		2	13	19	16	4		0.5	0.8	0.7	0.2	
Dewell, Andrew J		4	13	134	53	55	118	0.3	2.5	0.9	1.0	2.1
Donstand, Cameron B	D	1	318	318	318			4.0	4.0	4.0		
Dunddie, Mike		1	434	434	434			4.3	4.3	4.3		
Dutton, Jason		1	15	15	15			0.4	0.4	0.4		
Edwards, Brad	D	2	17	2058	1037	1443		0.7	3.8	2.2	2.2	
Findlay, Glyn		2	49	182	115	94		1.5	2.0	1.8	0.4	
Foster, Adam	D	2	22	31	27	6		0.5	0.6	0.5	0.1	
Freeman, Tony T		12	13	499	166	152	244	0.1	4.7	1.8	1.5	2.5
George, John		5	128	644	354	238	580	1.2	6.1	3.3	2.2	5.4
Gibson, Bernard K		2	231	403	317	122		4.1	6.4	5.2	1.6	
Giles, Michael J		4	12	13	12	1	13	0.1	0.9	0.5	0.4	0.9

Table 4.4.: Report 04. Personal Dust – rad/grav — by employee number

Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	04. Personal Dust – rad/grav — by employee number
Reporting Period	Is the period correct?
Number of Pages	
Employee Id Code	Used for privacy purposes
Designated	Y/N
No. of Samples	Numbers of dust samples for each employee
Airborne Radioactivity (mBq/m^3)	
Min	Minimum value recorded for each employee
Max	Maximum value recorded for each employee
Mean	Mean value recorded for each employee
SDev	Standard Deviation of values recorded for each employee
UCL	95% Upper Confidence Level for radioactivity for each employee
Dust Concentration in Air (mg/m^3)	
Min	Minimum dust value recorded for each employee
Max	Maximum dust value recorded for each employee
Mean	Mean dust value recorded for each employee
SDev	Standard Deviation of dust values recorded for each employee
UCL	95% Upper Confidence Level for dust level of each employee

Table 4.4 lists each field on the report and gives its purpose.

Report 05. Personal Dust - rad/grav – by work category

The purpose of this report is to list total personal dust sampling undertaken in the different 'Work Categories' for the selected period. It shows the number of samples, the airborne radioactivity and the dust concentrations that monitored employees were exposed to. The report lists the 'Minimum', 'Maximum', 'Mean', 'Standard Deviation' and the '95% Upper Confidence Level' statistics for the measurements. This report is useful for checking if enough sampling has been undertaken in each active 'Work Category' and this report is not required to be included in your annual occupational radiation report.

Figure 4.7 on the facing page shows the first page of this report.

Table 4.5 on page 36 lists each field on the report and gives its purpose.

Figure 4.7.: Report 05. Personal Dust – rad/grav — by work category

Wednesday, 23 September 2009 Boswell Version 2M Page 1 of 2
Blue Sky Mining Pty Ltd

05. Personal Dust - rad / grav - by work category

Summary for period 01/04/2006 to 31/03/2007

	Work Category	No. of Samples	Airborne Radioactivity (mBq/m³) Min	Max	Mean	SDev	UCL	Dust Concentration in Air (mg/m³) Min	Max	Mean	SDev	UCL
2	Synthetic Rutile Plant	68	10	80	16	9	18	0.1	17.8	1.5	2.6	2.1
4	Engineering Maintenance - Dry Plant	49	12	2058	272	482	387	0.1	6.0	1.8	1.8	2.2
7A	Dry Plant Operator	188	13	3084	389	333	429	0.1	23.2	4.1	3.4	4.5
7B	Shift Coordinator	36	12	510	59	97	86	0.1	5.4	0.6	1.0	0.9
7C	Shift Services Operator	28	14	384	104	80	130	0.1	7.0	1.8	1.6	2.3
7D	Wet Plant Operator	25	12	834	90	182	152	0.1	2.9	0.7	0.8	1.0
8A	Laboratory	47	11	40	15	5	16	0.1	9.4	1.6	2.3	2.2
Total	7	441										

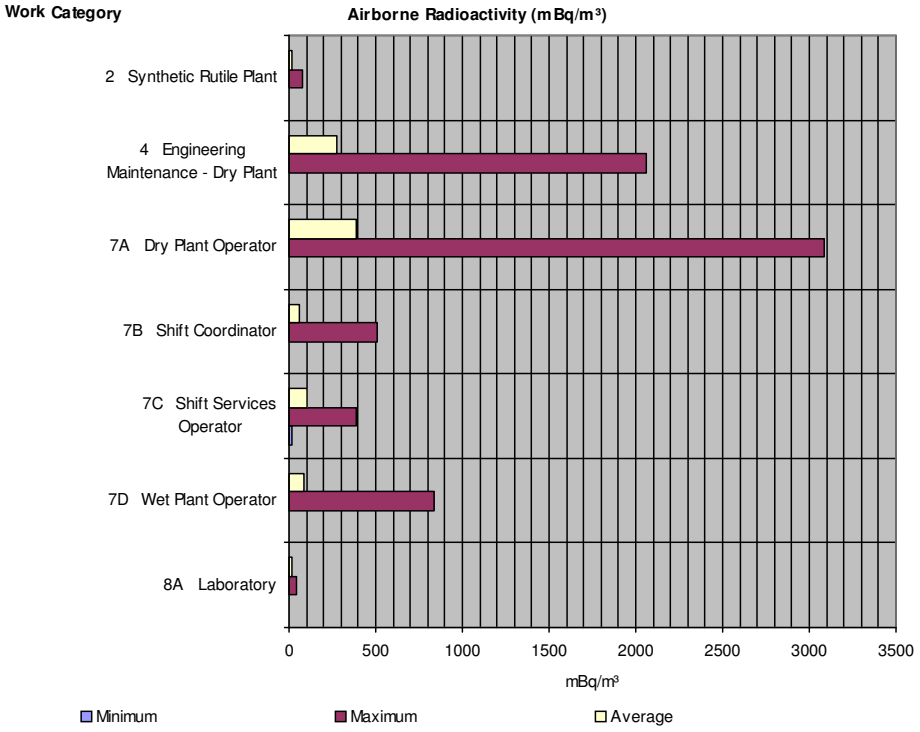


Table 4.5.: Report 05. Personal Dust – rad/grav — by work category

Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	05. Personal Dust – rad/grav — by work category
Reporting Period	Is the period correct?
Number of Pages	
Work Category Code	Code
Work Category Description	Description
No. of Samples	Numbers of dust samples for each work category
Airborne Radioactivity (mBq/m^3)	
Min	Minimum value recorded for each work category
Max	Maximum value recorded for each work category
Mean	Mean value recorded for each work category
SDev	Standard Deviation of values recorded for each work category
UCL	95% Upper Confidence Level for radioactivity for each work category
Dust Concentration in Air (mg/m^3)	
Min	Minimum dust value recorded for each work category
Max	Maximum dust value recorded for each work category
Mean	Mean dust value recorded for each work category
SDev	Standard Deviation of dust values recorded for each work category
UCL	95% Upper Confidence Level for dust level of each work category

Report 06. Personal Dust - rad/grav – by month & work category

The purpose of this report is to list all personal dust sampling undertaken in the different 'Work Categories' for each month of the selected period. It shows the number of samples taken each month, the airborne radioactivity and the dust concentrations that monitored employees were exposed to. The report lists the 'Minimum', 'Maximum', 'Mean', 'Standard Deviation' and the '95% Upper Confidence Level' statistics for each month's measurements. These statistics are also plotted on the report. This report should be included in your annual occupational radiation report.

Figure 4.9 on page 40 shows the two types of plots associated with this report.

Table 4.6 on page 39 lists each field on the report and gives its purpose.

Report 07. Personal Dust - rad/grav – 5 years & work category

The purpose of this report is to list all personal dust sampling undertaken in the different 'Work Categories' for the last five years in relation to the selected period. It shows the number of samples taken each year, the airborne radioactivity and the dust concentrations that monitored employees were exposed to. The report lists the 'Minimum', 'Maximum', 'Mean', 'Standard Deviation' and the '95% Upper Confidence Level' statistics for each year's measurements. These statistics are also plotted on the report. This report should be included in your annual occupational radiation report.

Figure 4.9 on page 40 shows the two types of plots associated with this report.

Table 4.7 on page 41 lists each field on the report and gives its purpose.

Report 08. Personal Dust - rad/grav – statistics

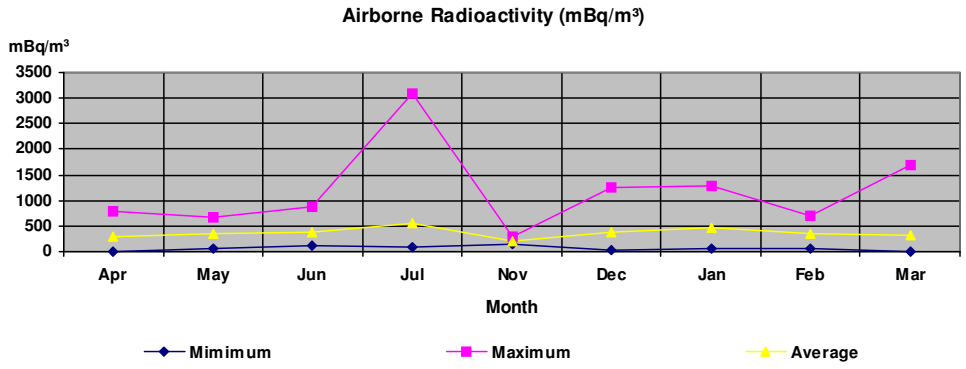
The purpose of this report is to list the total personal dust sampling undertaken over the selected period. It shows the number of samples taken, the number of samples excluded such as 'Special Exposures', the airborne radioactivity and the dust concentrations that monitored employees that were exposed to. The report lists the 'Minimum', 'Maximum', 'Mean', 'Standard Deviation', the '95% Upper Confidence Level' statistics and average minimum detectable level. This report should be included in your 'Annual Occupational Radiation Report'.

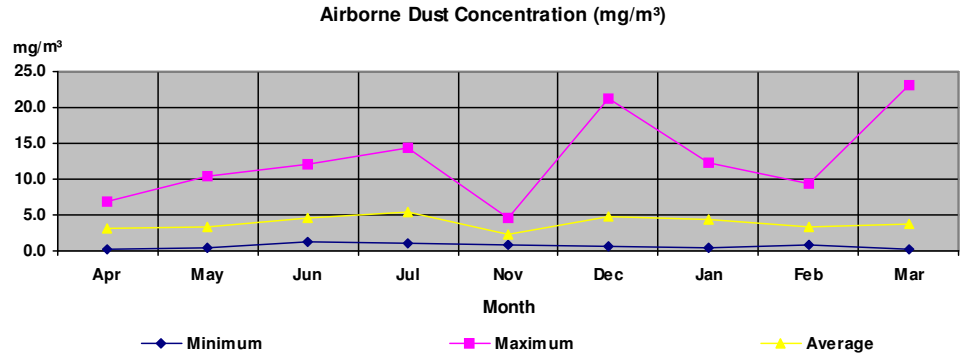
Table 4.8 on page 42 lists each field on the report and gives its purpose.

Figure 4.8.: Report 06. Personal Dust – rad/grav — by month & work category

Work Category **7A Dry Plant Operator**

		Airborne Radioactivity (mBq/m³)					Dust Concentration in Air (mg/m³)				
Month	No. of Samples	Min	Max	Mean	SDev	UCL	Min	Max	Mean	SDev	UCL
April 2006	15	13	787	292	227	396	0.1	6.9	3.1	2.0	4.0
May 2006	15	54	683	359	209	454	0.4	10.4	3.4	2.8	4.7
June 2006	15	124	886	377	224	479	1.3	12.1	4.6	3.4	6.2
July 2006	15	81	3084	541	733	874	1.1	14.4	5.4	3.9	7.2
November 2006	4	135	285	211	80	305	0.9	4.7	2.4	1.6	4.3
December 2006	27	43	1245	387	293	483	0.7	21.2	4.8	4.4	6.2
January 2007	34	44	1275	479	332	576	0.5	12.2	4.4	3.0	5.3
February 2007	32	69	711	363	178	416	0.9	9.3	3.4	1.9	4.0
March 2007	31	13	1701	335	328	435	0.1	23.2	3.8	4.4	5.1
Total	188										





06. Personal Dust - rad / grav - by month & work category — Summary for period 01/04/2006 to 31/03/2007

Friday, 11 September 2009 — Page 3 of 8

Table 4.6.: Report 06. Personal Dust – rad/grav — by month & work category

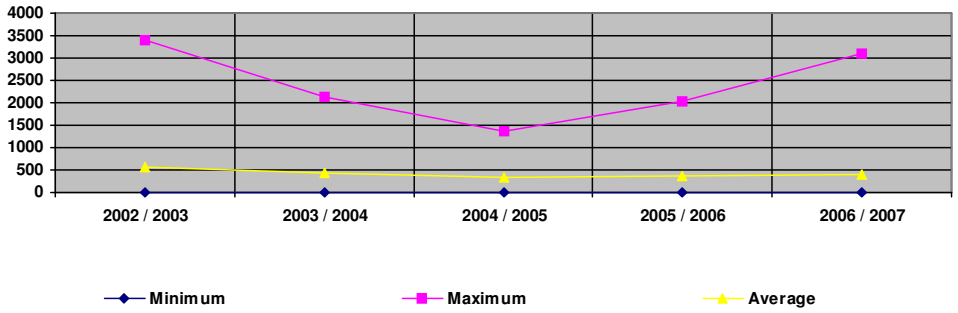
Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	06. Personal Dust – rad/grav — by month & work category
Reporting Period	Is the period correct?
Number of Pages	
Work Category	One page per category
Month	Month where samples were collected
No. of Samples	Numbers of dust samples for each employee during each month
Airborne Radioactivity (mBq/m^3)	
Min	Minimum value recorded for each work category
Max	Maximum value recorded for each work category
Mean	Mean value recorded for each work category
SDev	Standard Deviation of values recorded for each work category
UCL	95% Upper Confidence Level for radioactivity for each work category
Dust Concentration in Air (mg/m^3)	
Min	Minimum dust value recorded for each work category
Max	Maximum dust value recorded for each work category
Mean	Mean dust value recorded for each work category
SDev	Standard Deviation of dust values recorded for each work category
UCL	95% Upper Confidence Level for dust level of each work category

Figure 4.9.: Report 07. Personal Dust – rad/grav — 5 years & work category

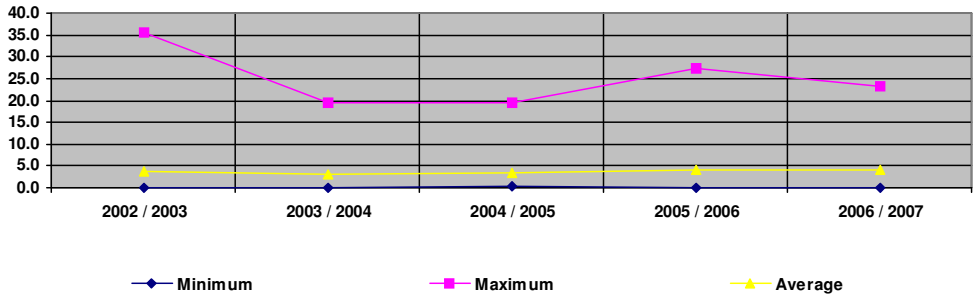
Work Category 7A Dry Plant Operator

Period	No. of Samples	Airborne Radioactivity (mBq/m³) Min	Max	Mean	SDev	UCL	Dust Concentration in Air (mg/m³) Min	Max	Mean	SDev	UCL
2002 / 2003	145	10	3391	580	503	649	0.1	35.7	3.7	3.9	4.3
2003 / 2004	178	12	2139	419	348	462	0.1	19.4	3.1	2.8	3.4
2004 / 2005	193	10	1368	324	245	353	0.2	19.6	3.3	2.8	3.6
2005 / 2006	190	10	2021	353	302	389	0.1	27.5	4.2	4.2	4.7
2006 / 2007	188	13	3084	389	333	429	0.1	23.2	4.1	3.4	4.5

Airborne Radioactivity (mBq/m³)



Airborne Dust Concentration (mBq/m³)



07. Personal Dust - rad / grav - work categories over 5 years — Summary for period 01/04/2006 to 31/03/2007

Friday, 11 September 2009 — Page 3 of 7

Table 4.7.: Report 07. Personal Dust – rad/grav — 5 years & work category

Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	07. Personal Dust – rad/grav — 5 years & work category
Reporting Period	Is the period correct?
Number of Pages	
Work Category	One page per category
Year	Year where samples were collected
No. of Samples	Numbers of dust samples for each work category during each year
Airborne Radioactivity (mBq/m^3)	
Min	Minimum value recorded for each work category
Max	Maximum value recorded for each work category
Mean	Mean value recorded for each work category
SDev	Standard Deviation of values recorded for each work category
UCL	95% Upper Confidence Level for radioactivity for each work category
Dust Concentration in Air (mg/m^3)	
Min	Minimum dust value recorded for each work category
Max	Maximum dust value recorded for each work category
Mean	Mean dust value recorded for each work category
SDev	Standard Deviation of dust values recorded for each work category
UCL	95% Upper Confidence Level for dust level of each work category

Table 4.8.: Report 08. Personal Dust – rad/grav — statistics

Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	08. Personal Dust – rad/grav — statistics
Reporting Period	Is the period correct?
Number of Pages	
Number of Special Exposures	Number of exposures excluded from the statistics
Number of other activity samples	Number of other exposures excluded from the statistics
No. of Samples	Number of dust samples during selected period
Airborne Radioactivity (mBq/m^3) and Dust Concentration in Air (mg/m^3)	
Minimum concentration	Minimum value recorded for each sample
Maximum concentration	Maximum value recorded for each sample
Mean concentration	Mean value recorded for each sample
Standard deviation	Standard Deviation of values recorded for each sample
Upper confidence level	95% Upper Confidence Level for radioactivity for each sample
Average minimum detectable level	

Table 4.9.: Report 09. Personal Dust – work category frequency histograms

Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	09. Personal Dust – work category frequency histograms
Reporting Period	Is the period correct?
Number of Pages	
Work Category	One page per category
Number of samples analysed	Sample size
Airborne Radioactivity (mBq/m^3) and Dust Concentration in Air (mg/m^3)	
Arithmetic mean	Normal distribution
Arithmetic standard deviation	Normal distribution
Arithmetic 95% upper confidence level	Normal distribution
Geometric mean	Lognormal distribution
Geometric standard deviation	Lognormal distribution
Geometric 95% upper confidence level	Lognormal distribution

Report 09. Personal Dust – work category frequency histograms

The purpose of this report is to show the variation in airborne radioactivity and the dust concentrations over each 'Work Category' for the selected period as a histogram plot. It shows the number of samples analysed, the arithmetic/geometric mean, the arithmetic/geometric standard deviation, and the arithmetic/geometric 95% confidence levels in airborne radioactivity and the dust concentrations over each 'Work Category' for the selected period. This report should not be included in your annual occupational radiation report.

Figure 4.10 on the next page shows the two types of plots associated with this report.

Table 4.9 lists each field on the report and gives its purpose.

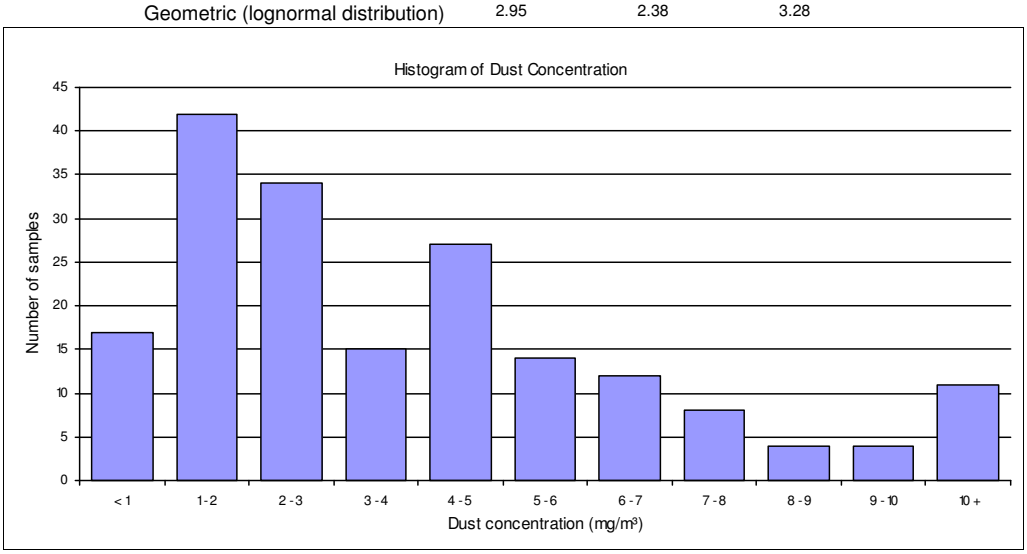
Report 10. Personal Dust – work category (log)normal probability plots

The purpose of this report is to show the variation in airborne radioactivity and the dust concentrations over each Work Category for the selected period as 'Normal' and 'Lognormal' distribution plots. It shows the number of samples analysed, the arithmetic/geometric mean, the arithmetic/geometric standard deviation, and the arithmetic/geometric 95% confidence levels in airborne radioactivity and the dust concentrations over each 'Work Category' for the selected period. The plots are designed to

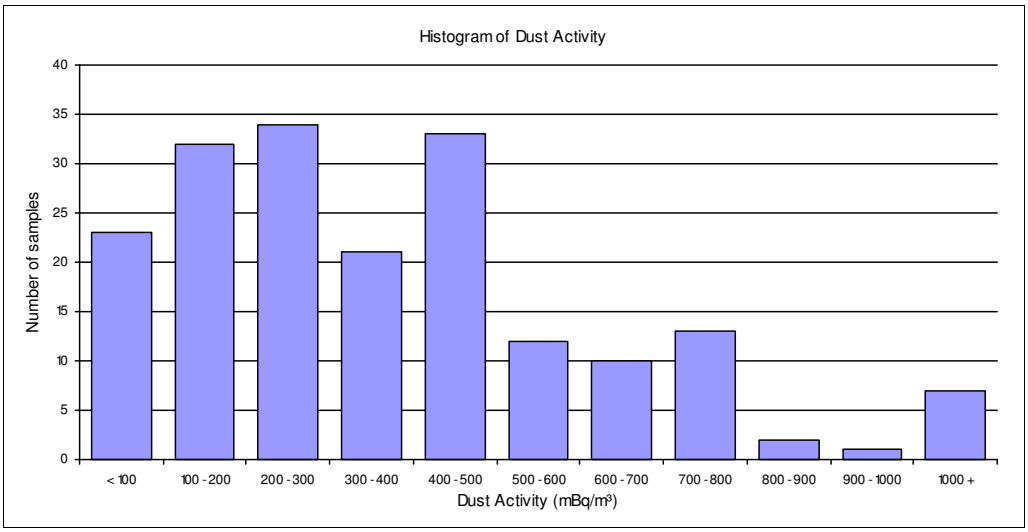
Figure 4.10.: Report 09. Personal Dust – work category frequency histograms

Work Category 7A Dry Plant Operator **188 Samples analysed**

Dust Activity in Air (mg/m³)	Mean	Standard Deviation	95% Upper Confidence Level
Arithmetic (normal distribution)	4.06	3.38	4.47
Geometric (lognormal distribution)	2.95	2.38	3.28



Dust Activity in Air (mBq/m³)	Mean	Standard Deviation	95% Upper Confidence Level
Arithmetic (normal distribution)	388.97	332.61	429.07
Geometric (lognormal distribution)	286.36	2.33	317.10



09. Personal Dust - work category frequency histograms — Summary for period 01/04/2006 to 31/03/2007

Friday, 11 September 2009 — Page 3 of 7

Table 4.10.: Report 10. Personal Dust – work category (log)normal probability plots

Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	10. Personal Dust – work category (log)normal probability plots
Reporting Period	Is the period correct?
Number of Pages	
Work Category	One page per category
Number of samples analysed	Sample size
Airborne Radioactivity (mBq/m^3) and Dust Concentration in Air (mg/m^3)	
Arithmetic mean	Normal distribution
Arithmetic standard deviation	Normal distribution
Arithmetic 95% upper confidence level	Normal distribution
Geometric mean	Lognormal distribution
Geometric standard deviation	Lognormal distribution
Geometric 95% upper confidence level	Lognormal distribution

demonstrate whether statistically there has been enough sampling undertaken. This report should not be included in your annual occupational radiation report.

Figure 4.19 on page 60 shows the two types of plots associated with this report.

Table 4.10 lists each field on the report and gives its purpose.

4.3. Work area dust reports

Report 11. Area Dust - rad/grav – by area

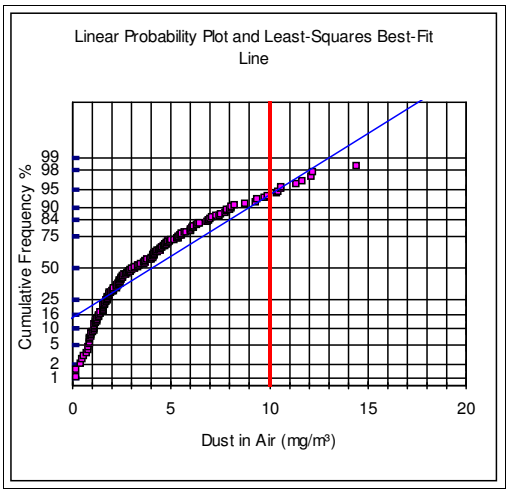
The purpose of this report is to list total positional dust sampling undertaken in the different areas for the selected period. It shows the number of samples, the airborne radioactivity and the dust concentrations. The report lists the 'Minimum', 'Maximum', 'Mean', 'Standard Deviation' and the '95% Upper Confidence Level' statistics for the measurements. These statistics are also plotted on the report. This report is useful for checking if enough sampling has been undertaken in each 'Area' and the report should be included in your annual occupational radiation report.

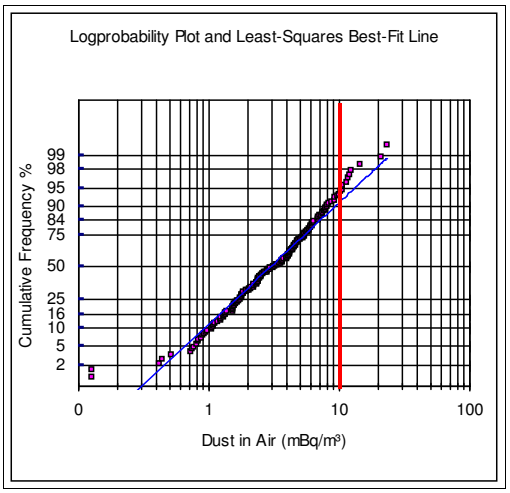
Figure 4.12 on page 47 shows the two types of plots associated with this report.

Figure 4.11.: Report 10. Personal Dust – work category (log)normal probability plots

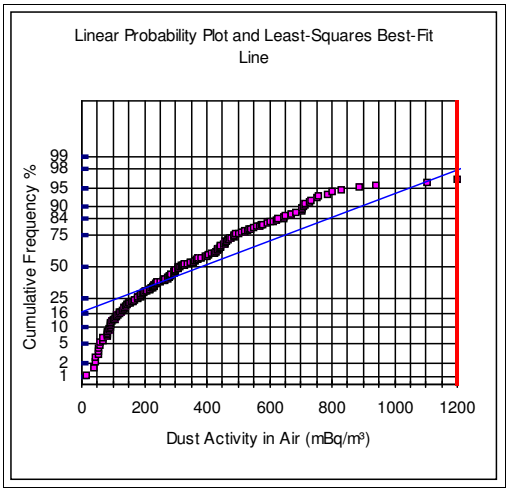
Work Category **7A** **Dry Plant Operator** **188 Samples analysed**

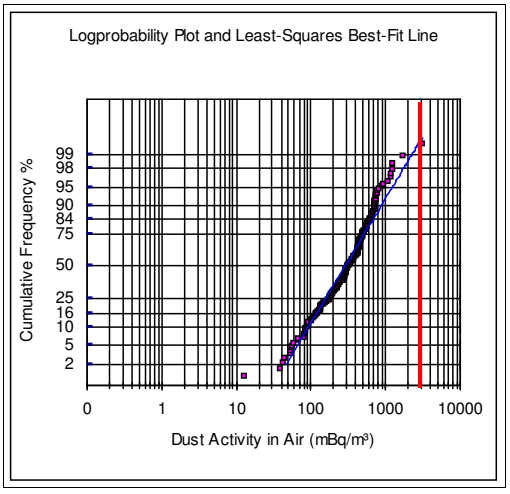
Dust in Air (mg/m³)	Mean	Standard Deviation	95% Upper Confidence Level
Arithmetic (normal distribution)	4.06	3.38	4.47
Geometric (lognormal distribution)	2.95	2.38	3.28





Dust Activity in Air (mBq/m³)	Mean	Standard Deviation	95% Upper Confidence Level	Number of MDL Substitutes used
Arithmetic (normal distribution)	388.97	332.61	429.07	0
Geometric (lognormal distribution)	286.36	2.33	317.10	





10. Personal Dust - work category (log)normal probability plots — Summary for period 01/04/2006 to 31/03/2007

Friday, 11 September 2009 — Page 3 of 7

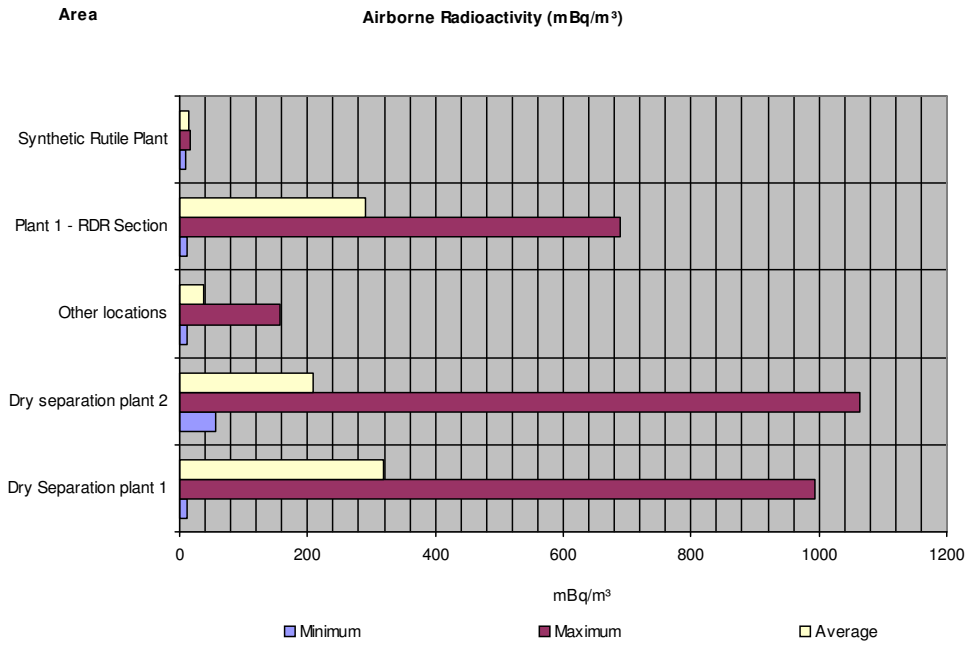
Figure 4.12.: Report 11. Area Dust – rad/grav — by area, page 1

11. Area Dust - radiometric / gravimetric

Summary for period 01/04/2006 to 31/03/2007

Area	No. of Samples	Airborne Radioactivity (mBq/m³)					Dust Concentration in Air (mg/m³)				
		Min	Max	Mean	SDev	UCL	Min	Max	Mean	SDev	UCL
Dry Separation plant 1	57	13	994	318	251	374	0.1	6.9	2.2	1.8	2.6
Dry separation plant 2	47	56	1065	209	167	250	0.6	10.2	3.5	2.2	4.0
Other locations	24	11	157	37	35	49	0.1	2.3	0.4	0.5	0.6
Plant 1 - RDR Section	41	12	690	291	162	334	0.7	13.2	4.3	3.3	5.1
Synthetic Rutile Plant	27	10	17	13	2	14	0.1	13.9	1.2	2.6	2.0

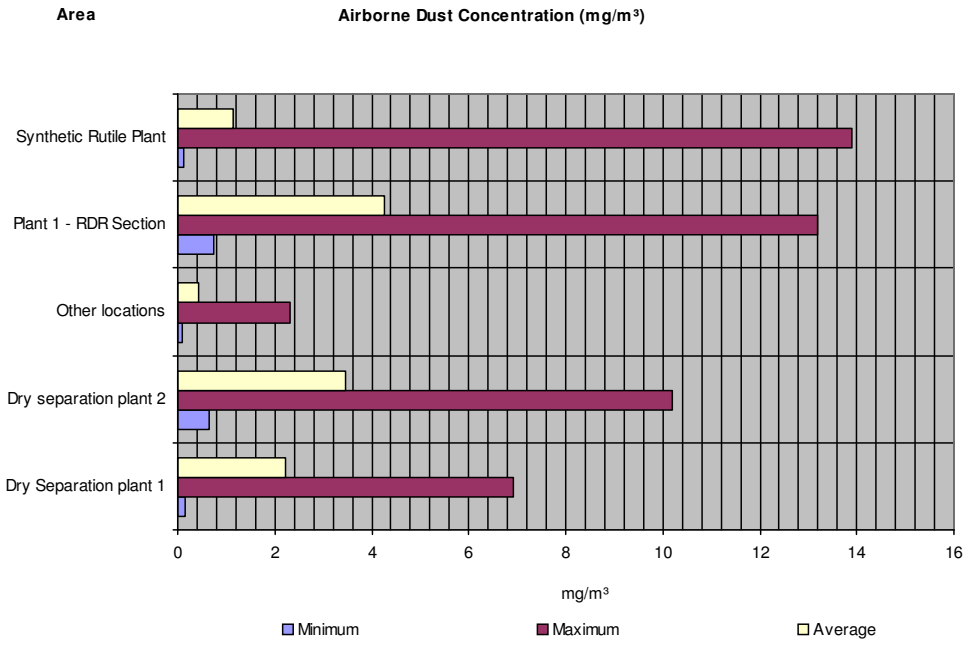
Figure 4.13.: Report 11. Area Dust – rad/grav — by area, page 2



11. Area Dust - radiometric / gravimetric — Summary for period 01/04/2006 to 31/03/2007

Tuesday, 15 September 2009 — Page 2 of 3

Figure 4.14.: Report 11. Area Dust – rad/grav — by area, page 3



11. Area Dust - radiometric / gravimetric — Summary for period 01/04/2006 to 31/03/2007

Tuesday, 15 September 2009 — Page 3 of 3

Table 4.11.: Report 11. Area Dust – rad/grav — by area

Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	11. Area Dust – rad/grav — by area
Reporting Period	Is the period correct?
Number of Pages	
Area	Location of positional sample
No. of Samples	Numbers of dust samples for each area
Airborne Radioactivity (mBq/m^3)	
Min	Minimum value recorded for each area
Max	Maximum value recorded for each area
Mean	Mean value recorded for each area
SDev	Standard Deviation of values recorded for each area
UCL	95% Upper Confidence Level for radioactivity for each area
Dust Concentration in Air (mg/m^3)	
Min	Minimum dust value recorded for each area
Max	Maximum dust value recorded for each area
Mean	Mean dust value recorded for each area
SDev	Standard Deviation of dust values recorded for each area
UCL	95% Upper Confidence Level for dust level of each area

This report plots bar graphs of the maximum, minimum and average values for the dust concentration and dust activity of each area.

Table 4.11 lists each field on the report and gives its purpose.

Report 12. Area Dust - rad/grav – by month & area

The purpose of this report is to list all personal dust sampling undertaken in Areas for each month of the selected period. It shows the number of samples taken each month, the airborne radioactivity and the dust concentrations in the 'Area'. The report lists the 'Minimum', 'Maximum', 'Mean', 'Standard Deviation' and the '95% Upper Confidence Level' statistics for each month's measurements. These statistics are also plotted on the report. This report should be included in your 'Annual Occupational Radiation Report'.

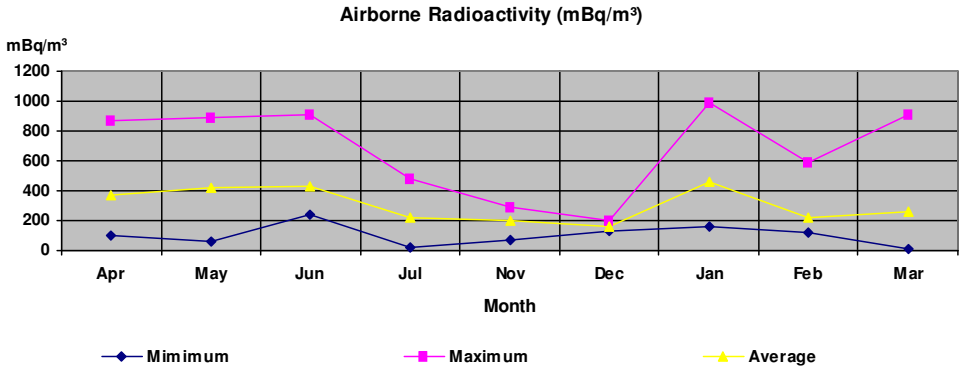
Figure 4.15 on the next page shows the two types of plots associated with this report.

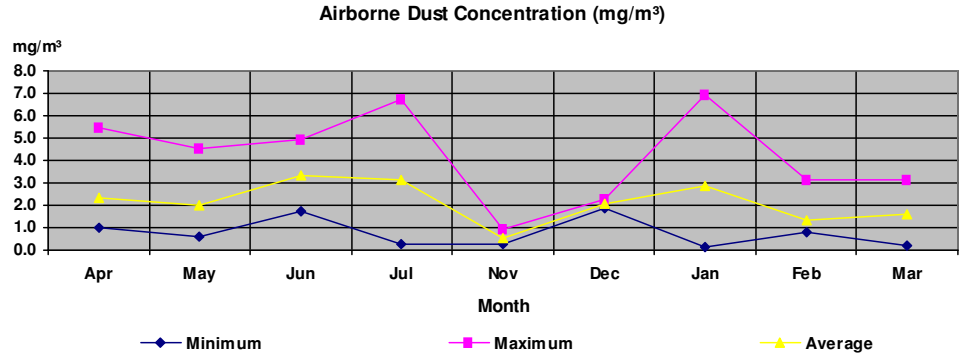
Table 4.12 on page 52 lists each field on the report and gives its purpose.

Figure 4.15.: Report 12. Area Dust – rad/grav — by month & area

Area **PL. Dry Separation plant 1**

Month	No. of Samples	Airborne Radioactivity (mBq/m³) Min	Max	Mean	SDev	UCL	Dust Concentration in Air (mg/m³) Min	Max	Mean	SDev	UCL
April 2006	7	101	875	369	274	570	1.0	5.5	2.3	1.6	3.5
May 2006	7	64	892	421	276	623	0.6	4.5	2.0	1.3	2.9
June 2006	7	243	908	431	227	597	1.7	4.9	3.3	1.1	4.1
July 2006	8	16	481	215	158	321	0.2	6.7	3.1	2.7	4.9
November 2006	5	73	294	200	89	285	0.2	1.0	0.6	0.3	0.9
December 2006	2	128	200	164	51		1.9	2.3	2.1	0.3	
January 2007	7	161	994	462	357	725	0.1	6.9	2.9	2.6	4.8
February 2007	7	119	592	217	167	340	0.8	3.1	1.3	0.8	1.9
March 2007	7	13	906	259	297	477	0.2	3.1	1.6	1.0	2.3





12. Area Dust - rad / grav - by month & area — Summary for period 01/04/2006 to 31/03/2007

Friday, 11 September 2009 — Page 3 of 5

Table 4.12.: Report 12. Area Dust – rad/grav — by month & area

Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	12. Area Dust – rad/grav — by month & area
Reporting Period	Is the period correct?
Number of Pages	
Area	One page per area
Month	Month where samples were collected
No. of Samples	Numbers of dust samples for each area during each month
Airborne Radioactivity (mBq/m^3)	
Min	Minimum value recorded for each area
Max	Maximum value recorded for each area
Mean	Mean value recorded for each area
SDev	Standard Deviation of values recorded for each area
UCL	95% Upper Confidence Level for radioactivity for each area
Dust Concentration in Air (mg/m^3)	
Min	Minimum dust value recorded for each area
Max	Maximum dust value recorded for each area
Mean	Mean dust value recorded for each area
SDev	Standard Deviation of dust values recorded for each area
UCL	95% Upper Confidence Level for dust level of each area

Table 4.13.: Report 13. Area Dust – rad/grav — areas over 5 years

Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	13. Area Dust – rad/grav — areas over 5 years
Reporting Period	Is the period correct?
Number of Pages	
Work Category	One page per category
Year	Year where samples were collected
No. of Samples	Numbers of dust samples for each area during each year
Airborne Radioactivity (mBq/m^3)	
Min	Minimum value recorded for each area
Max	Maximum value recorded for each area
Mean	Mean value recorded for each area
SDev	Standard Deviation of values recorded for each area
UCL	95% Upper Confidence Level for radioactivity for each area
Dust Concentration in Air (mg/m^3)	
Min	Minimum dust value recorded for each area
Max	Maximum dust value recorded for each area
Mean	Mean dust value recorded for each area
SDev	Standard Deviation of dust values recorded for each area
UCL	95% Upper Confidence Level for dust level of each area

Report 13. Area Dust - rad/grav – areas over 5 years

The purpose of this report is to list all positional sampling undertaken in the different Areas for the last five years in relation to the selected period. It shows the number of samples taken each year, the airborne radioactivity and the dust concentrations in each 'Area'. The report lists the 'Minimum', 'Maximum', 'Mean', 'Standard Deviation' and the '95% Upper Confidence Level' statistics for each year's measurements. These statistics are also plotted on the report. This report should be included in your annual occupational radiation report. This report is useful to see the last five year's trends — if exposures are static, varying or decreasing.

Figure 4.15 on page 51 shows the two types of plots associated with this report.

Table 4.13 lists each field on the report and gives its purpose.

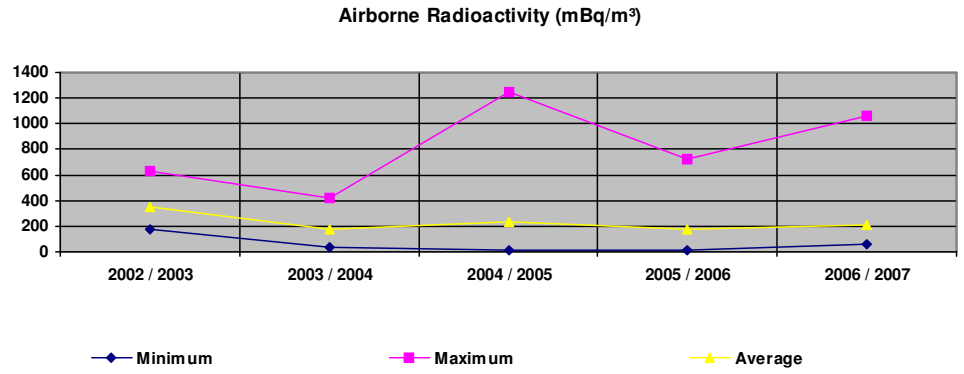
Report 14. Area Dust - rad/grav – statistics

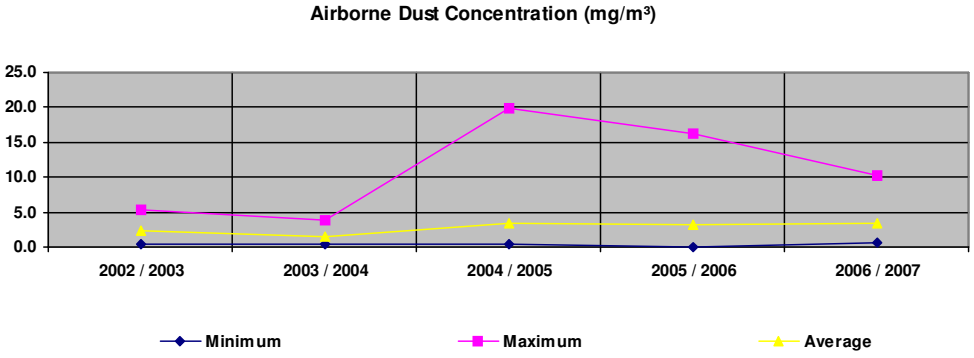
The purpose of this report is to list the total positional sampling undertaken over the selected period. It shows the number of samples taken, the airborne radioactivity and the dust concentrations. The

Figure 4.16.: Report 13. Area Dust – rad/grav — areas over 5 years

Area **PL. Dry separation plant 2**

Period	No. of Samples	Airborne Radioactivity (mBq/m³) Min	Max	Mean	SDev	UCL	Dust Concentration in Air (mg/m³) Min	Max	Mean	SDev	UCL
2006 / 2007	47	56	1065	209	167	250	0.6	10.2	3.5	2.2	4.0
2005 / 2006	129	10	719	170	123	188	0.1	16.3	3.1	3.1	3.6
2004 / 2005	123	13	1247	235	194	264	0.5	19.9	3.4	3.4	4.0
2003 / 2004	56	40	421	176	97	198	0.5	4.0	1.5	0.7	1.6
2002 / 2003	24	174	628	351	145	401	0.5	5.4	2.3	1.4	2.8





13. Area Dust - rad / grav - areas over 5 years — Summary for period 01/04/2006 to 31/03/2007

Friday, 11 September 2009 — Page 2 of 7

Table 4.14.: Report 14. Area Dust – rad/grav — statistics

Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	14. Area Dust – rad/grav — statistics
Reporting Period	Is the period correct?
Number of Pages	
No. of Samples	Number of dust samples during selected period
Airborne Radioactivity (mBq/m^3) and Dust Concentration in Air (mg/m^3)	
Minimum concentration	Minimum value recorded for each sample
Maximum concentration	Maximum value recorded for each sample
Mean concentration	Mean value recorded for each sample
Standard deviation	Standard Deviation of values recorded for each sample
Upper confidence level	95% Upper Confidence Level for radioactivity for each sample
Average minimum detectable level	

report lists the 'Minimum', 'Maximum', 'Mean', 'Standard Deviation', the '95% Upper Confidence Level' statistics and average minimum detectable level. This report should be included in your 'Annual Occupational Radiation Report'.

Figure 4.17 on the next page shows a typical statistical report.

Table 4.14 lists each field on the report and gives its purpose.

Report 15. Area Dust – area frequency histograms

The purpose of this report is to show the variation in airborne radioactivity and the dust concentrations over each Area for the selected period as a histogram plot. It shows the number of samples analysed, the arithmetic/geometric mean, the arithmetic/geometric standard deviation, and the arithmetic/geometric 95% confidence levels in airborne radioactivity and the dust concentrations over each Area for the selected period. This report should not be included in your annual occupational radiation report.

Figure 4.18 on page 57 shows the two types of plots associated with this report.

This report plots histograms of the dust concentration and dust activity.

Table 4.15 on page 58 lists each field on the report and gives its purpose.

Figure 4.17.: Report 14. Area Dust – rad/grav — statistics

Monday, 12 October 2009 Boswell Version 2M Page 1 of 1
Blue Sky Mining Pty Ltd

14. Area Dust - rad / grav - statistics

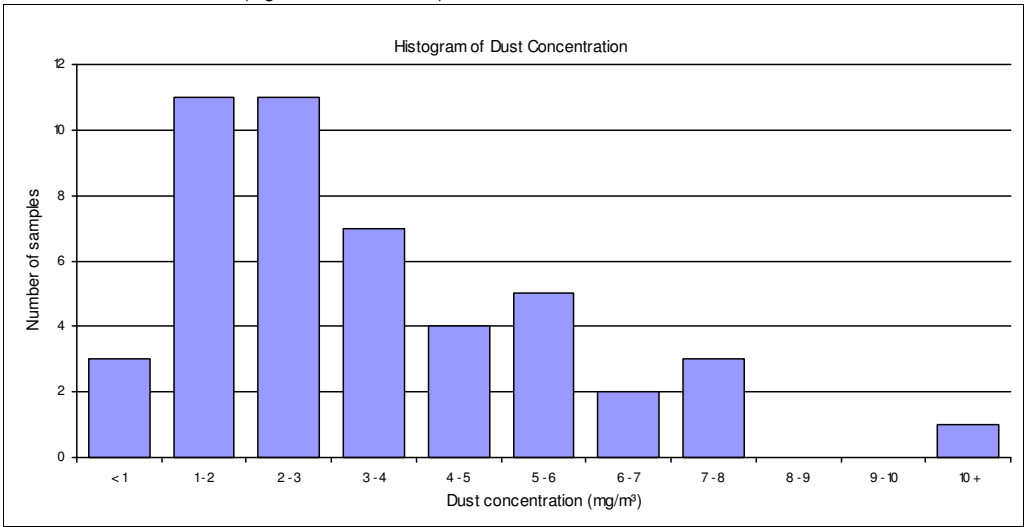
Summary for period 01/04/2006 to 31/03/2007

	Airborne Radioactivity (mBq/m³)	Dust Concentration in Air (mg/m³)
Number of Samples:	196	196
Minimum concentration:	10	0.1
Maximum concentration:	1065	13.9
Mean concentration:	210	2.6
Standard deviation:	210	2.6
Upper confidence level	235	2.9
Average minimum detectable level:	14	13.9

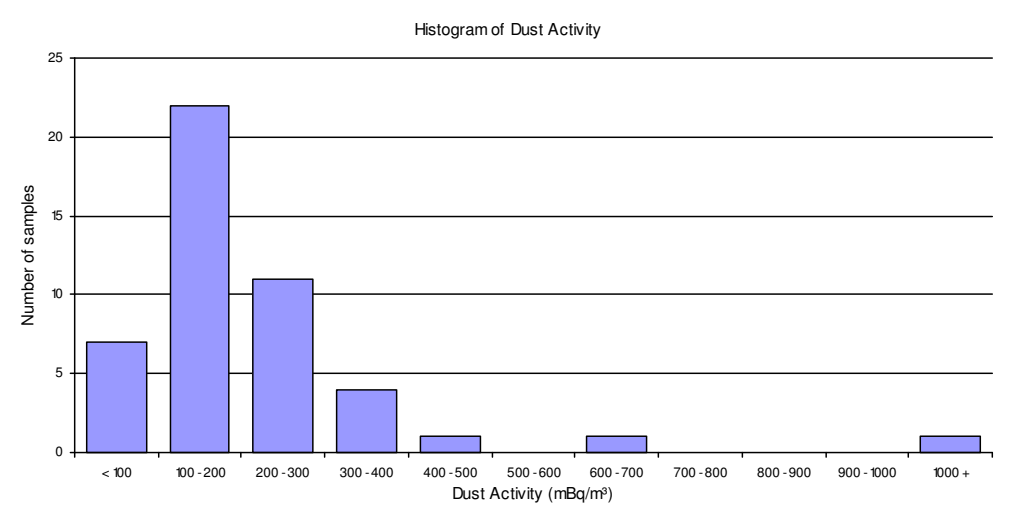
Figure 4.18.: Report 15. Area Dust – area frequency histograms

Area **PL.2** **Dry separation plant 2** **47 Samples analysed**

Dust Activity in Air (mg/m³)	Mean	Standard Deviation	95% Upper Confidence Level
Arithmetic (normal distribution)	3.46	2.21	4.01
Geometric (lognormal distribution)	2.82	1.95	3.32



Dust Activity in Air (mBq/m³)	Mean	Standard Deviation	95% Upper Confidence Level
Arithmetic (normal distribution)	208.96	166.60	249.75
Geometric (lognormal distribution)	174.24	1.76	200.04



15. Area Dust - area frequency histograms — Summary for period 01/04/2006 to 31/03/2007

Friday, 11 September 2009 — Page 4 of 5

Table 4.15.: Report 15. Area Dust – area frequency histograms

Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	15. Area Dust – area frequency histograms
Reporting Period	Is the period correct?
Number of Pages	
Area	One page per area
Number of samples analysed	Sample size
Airborne Radioactivity (mBq/m^3) and Dust Concentration in Air (mg/m^3)	
Arithmetic mean	Normal distribution
Arithmetic standard deviation	Normal distribution
Arithmetic 95% upper confidence level	Normal distribution
Geometric mean	Lognormal distribution
Geometric standard deviation	Lognormal distribution
Geometric 95% upper confidence level	Lognormal distribution

Table 4.16.: Report 16. Area Dust – area (log)normal probability plots

Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	16. Area Dust – area (log)normal probability plots
Reporting Period	Is the period correct?
Number of Pages	
Area	One page per area
Number of samples analysed	Sample size
Airborne Radioactivity (mBq/m^3) and Dust Concentration in Air (mg/m^3)	
Arithmetic mean	Normal distribution
Arithmetic standard deviation	Normal distribution
Arithmetic 95% upper confidence level	Normal distribution
Geometric mean	Lognormal distribution
Geometric standard deviation	Lognormal distribution
Geometric 95% upper confidence level	Lognormal distribution

Report 16. Area Dust – area (log)normal probability plots

The purpose of this report is to show the variation in airborne radioactivity and the dust concentrations over each Area for the selected period as Normal and Lognormal distribution plots. It shows the number of samples analysed, the arithmetic/geometric mean, the arithmetic/geometric standard deviation, and the arithmetic/geometric 95% confidence levels in airborne radioactivity and the dust concentrations over each Area for the selected period. The plots are designed to demonstrate whether statistically there has been enough sampling undertaken. This report should not be included in your annual occupational radiation report.

Figure 4.19 on the next page shows the two types of plots associated with this report.

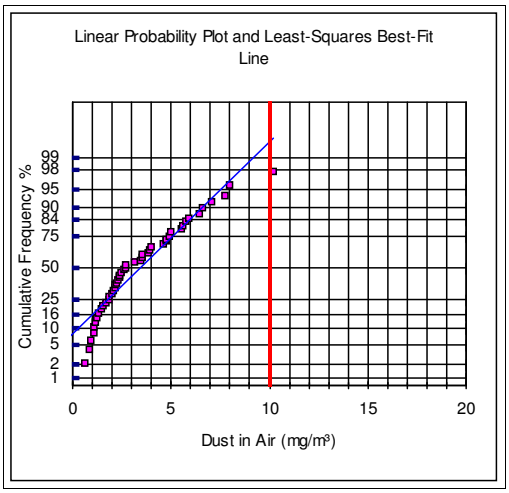
Table 4.16 lists each field on the report and gives its purpose.

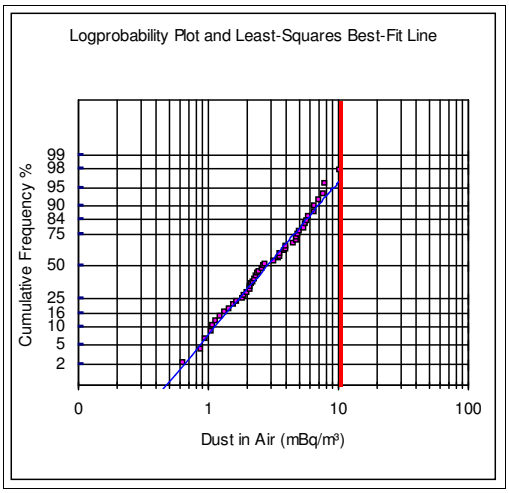
This report plots 'Normal/LogNormal' distributions of the dust concentration and dust activity.

Figure 4.19.: Report 16. Area Dust – area (log)normal probability plots

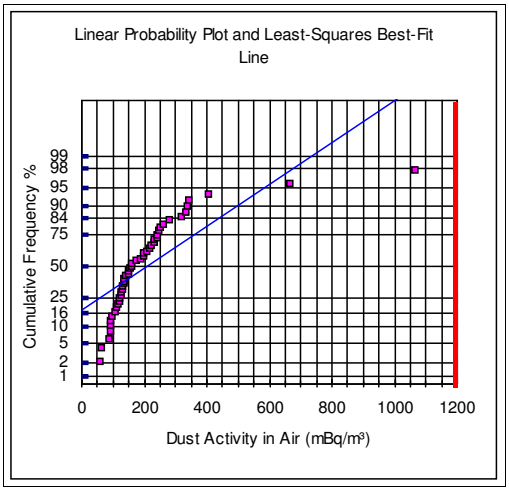
Area **PL.2** **Dry separation plant 2** **47 Samples analysed**

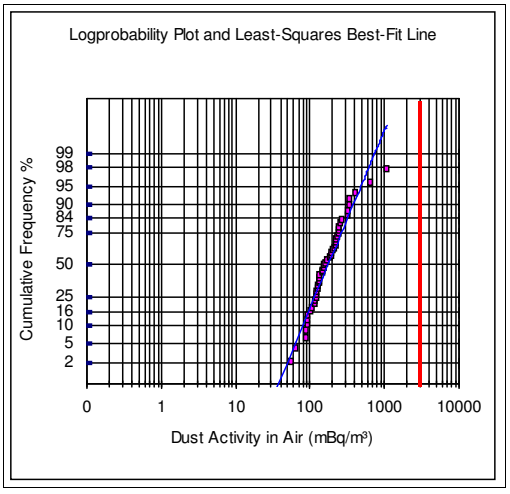
Dust Activity in Air (mg/m³)	Mean	Standard Deviation	95% Upper Confidence Level
Arithmetic (normal distribution)	3.46	2.21	4.01
Geometric (lognormal distribution)	2.82	1.95	3.32





Dust Activity in Air (mBq/m³)	Mean	Standard Deviation	95% Upper Confidence Level	Number of MDL Substitutes used
Arithmetic (normal distribution)	208.96	166.60	249.75	0
Geometric (lognormal distribution)	174.24	1.76	200.04	





16. Area Dust - area (log)normal probability plots — Summary for period 01/04/2006 to 31/03/2007

Friday, 11 September 2009 — Page 4 of 5

Table 4.17.: Report 17. External Exposure – by employee name

Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	17. External Exposure – by employee name
Reporting Period	Is the period correct?
Number of Pages	
Employee Name	Are there any incorrect spellings, duplicates or missing names?
No. of Badges	Number of badges
Min	Minimum badge dose in μSv
Max	Maximum badge dose in μSv
Mean	Mean badge dose in μSv
SDev	Standard Deviation of badge dose in μSv
UCL	95% Upper Confidence Level of badge dose in μSv
Total	Total badge dose for period in μSv

4.4. Monitoring badge reports

Report 17. External Exposure – by employee name

The purpose of this report is to list all employee external radiation badge exposures undertaken over the selected period. It shows the employee's name, number of badges, 'Minimum', 'Maximum', 'Mean', 'Standard Deviation' and '95% Upper Confidence Level' statistics for the employee's radiation badge. For privacy reasons, it should not be included in your 'Annual Occupational Radiation Report'.

Figure 4.20 on the next page shows a summary of employee external exposures (badges).

Table 4.17 lists each field on this form and gives its purpose.

Report 18. External Exposure – by employee number

The purpose of this report is to list all employee external radiation badge exposures undertaken over the selected period. It shows the employee's Id Code, number of badges, 'Minimum', 'Maximum', 'Mean', 'Standard Deviation' and '95% Upper Confidence Level' statistics for the employee's radiation badge. For employee privacy, this is the report to include in your 'Annual Occupational Radiation Report'.

Table 4.18 on page 63 lists each field on this form and gives its purpose.

Figure 4.20.: Report 17. External Exposure – by employee name

Thursday, 15 October 2009 Boswell Version 2M Page 1 of 3
Blue Sky Mining Pty Ltd

17. External Exposure - by employee name

Summary for period 01/04/2006 to 31/03/2007

		External Radiation (µSv)					
Employee	No. of Badges	Min	Max	Mean	SDev	UCL	Total
Abbott, Peter R	4	280	650	465	133	622	1860
Adams, Frank	4	40	760	463	267	776	1850
Anderson, Tobby	4	330	640	488	119	628	1950
Ashcraft, Ivan	3	30	690	403	284	883	1210
Backshall, Ford J	2	380	790	585	214		1170
Backsnail, Mort R	3	10	650	390	291	881	1170
Baker, Peter	4	370	730	573	135	732	2290
Banks, Cody	4	430	650	558	93	668	2230
Barker, Barry C	4	330	660	495	148	669	1980
Barker, Mervin L	4	430	650	558	93	668	2230
Bollard, Tina	2	800	880	840	43		1680
Bood, Dale D	4	500	790	680	110	810	2720
Boysly, Ian	4	350	800	563	203	801	2250
Brandy, John	4	440	650	535	85	635	2140
Brandyhan, Harry W	4	470	650	558	64	633	2230
Browne, Russell	4	210	820	485	228	753	1940
Buggy, Brian	4	10	350	130	142	297	520
Bunter, Billy D	2	10	1070	540	567		1080
Carpent, Jacob	3	460	810	683	163	958	2050
Castle, King	4	10	830	493	304	850	1970
Chadnick, Yirrie A	4	200	760	510	202	748	2040
Chapel, Robin	2	530	650	590	69		1180
Clinchy, Kevin D	4	310	1100	680	293	1025	2720
Cooper, Jason	3	10	510	317	226	697	950
Copper, Mike	4	430	650	558	93	668	2230
Croswell, Travis A	4	610	820	733	78	825	2930
Dewell, Andrew J	4	70	600	353	213	603	1410
Donstand, Cameron B	4	270	640	470	161	660	1880
Down, Brendan	4	510	780	610	113	743	2440
Dunddie, Mike	1	440	440	440			440
Edwards, Brad	4	430	650	558	93	668	2230
Flynn, Ronald	4	560	940	710	145	881	2840
Free, Ted T	4	530	840	720	123	864	2880
George, Boy	4	480	930	655	170	855	2620
Gibson, Ben	2	80	990	535	486		1070
Gibson, Mel K	4	290	1070	503	331	892	2010
Greenlees, Jim	4	10	520	328	209	574	1310
Hall, Ben A	4	510	1000	753	182	966	3010
Hankin, Brian	4	130	530	345	153	525	1380
Hay, Make	1	430	430	430	0		430
Hearne, Paul F	4	500	970	668	193	895	2670
Hellboy, Sam	4	480	770	623	104	745	2490
Hollinham, Daemon J	4	580	800	700	98	816	2800
Holtfritter, Adolf	1	430	430	430	0		430
Hudderson, Russell W	4	480	900	668	154	849	2670

Table 4.18.: Report 18. External Exposure – by employee number

Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	18. External Exposure – by employee number
Reporting Period	Is the period correct?
Number of Pages	
Employee Id Code	Used for privacy purposes
No. of Badges	Number of badges
Min	Minimum badge dose in μSv
Max	Maximum badge dose in μSv
Mean	Mean badge dose in μSv
SDev	Standard Deviation of badge dose in μSv
UCL	95% Upper Confidence Level of badge dose in μSv
Total	Total badge dose for period in μSv

Report 19. External Exposure – by work category

The purpose of this report is to list total external exposure monitoring undertaken in the different Work Categories for the selected period. It shows the number of badges, 'Minimum', 'Maximum', 'Mean', 'Standard Deviation' and the '95% Upper Confidence Level' statistics for the dose results. This report is useful for checking if enough monitoring has been undertaken in each active 'Work Category'. Report 19 is required to be included in your 'Annual Occupational Radiation Report'.

Figure 4.21 on the following page shows the two types of plots associated with this report.

Table 4.19 on page 65 lists each field on the report and gives its purpose.

Report 20. External Exposure – work category over 5 years

The purpose of this report is to list all badge monitoring undertaken in the different Areas for the last five years in relation to the selected period. It shows the number of badges used each year and the doses in μSv/month recorded in each Area. The report lists the 'Minimum', 'Maximum', 'Mean', 'Standard Deviation' and the '95% Upper Confidence Level' statistics of the dose (in μSv/month) for each year's measurements. These statistics are also plotted on the report. This report should be included in your 'Annual Occupational Radiation Report'. This report is useful to see the last five year's trends — if exposures are static, varying or decreasing.

Figure 4.22 on page 66 shows the two types of plots associated with this report.

Table 4.20 on page 65 lists each field on the report and gives its purpose.

Figure 4.21.: Report 19. External Exposure – by work category

Tuesday, 15 September 2009 Boswell Version 2M Page 1 of 1
Blue Sky Mining Pty Ltd

19. External Exposure - by work category

Summary for period 01/04/2006 to 31/03/2007

			External Radiation (µSv/year)				
	Work Category	No. of Badges	Min	Max	Mean	SDev	UCL
2	Synthetic Rutile Plant	122	40	4245	1930	74	1941
3	Administrative Services	31	568	4212	2785	76	2808
4	Engineering Maintenance - Dry Plant	118	40	4245	1918	74	1930
7A	Dry Plant Operator	167	40	4364	2346	68	2355
7B	Shift Coordinator	157	40	4364	2423	73	2432
7C	Shift Services Operator	59	40	4292	2389	69	2405
7D	Wet Plant Operator	136	40	4364	2345	70	2355
Total	7	790 *					

** note : if employees work in more than one Work Category at one time, their badges may be counted in those categories.*

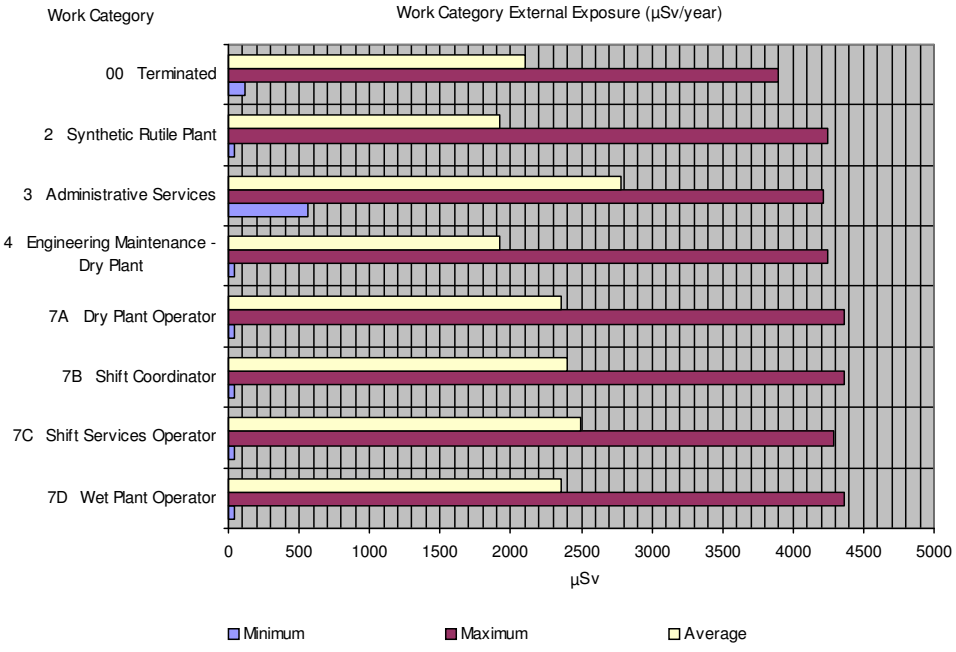


Table 4.19.: Report 19. External Exposure – by work category

Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	19. External Exposure – by work category
Reporting Period	Is the period correct?
Number of Pages	
Work Category Code	Code
Work Category Description	Description
No. of Badges	Number of badges used in work category for period
Min	Minimum external exposure in work category for period
Max	Maximum external exposure in work category for period
Mean	Mean external exposure in work category for period
SDev	Standard Deviation of external exposure for each work category
UCL	95% Upper Confidence Level for external exposure of each work category

Table 4.20.: Report 20. External Exposure – work category over 5 years

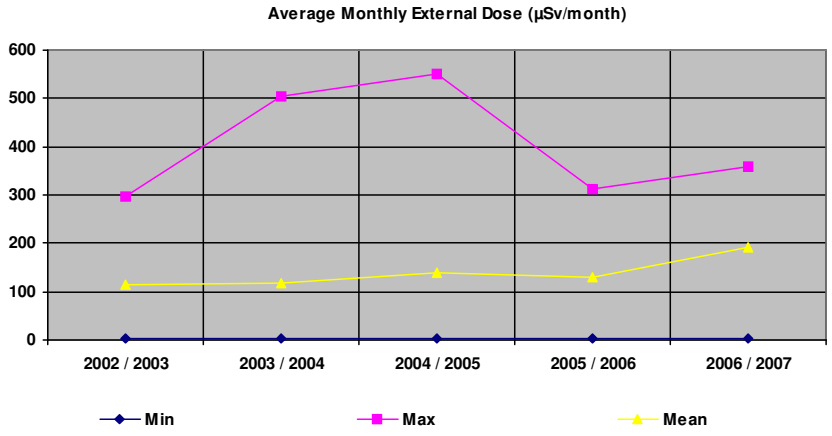
Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	20. External Exposure – work category over 5 years
Reporting Period	Is the period correct?
Number of Pages	
Work Category	One page per category
Year	Year where samples were collected
No. of Badges	Numbers of Badges for each area during each year
Min	Minimum external dose for each area
Max	Maximum external dose for each area
Mean	Mean external dose for each area
SDev	Standard Deviation of external dose for each area
UCL	95% Upper Confidence Level of external dose for each area

Figure 4.22.: Report 20. External Exposure – work category over 5 years

Work Category 7A Dry Plant Operator

	No. of Badges *		External Radiation (µSv / month) Min	Max	Mean	SDev	UCL
2002 / 2003	129		3	297	113	61	122
2003 / 2004	146		3	504	117	92	130
2004 / 2005	143		3	551	138	75	149
2005 / 2006	154		3	313	130	65	139
2006 / 2007	167		3	359	193	68	202

** note : if employees work in more than one Work Category at one time, their badges may be counted in those categories.*



20. External Exposure - by work categories over 5 years — Summary for period 01/04/2006 to 31/03/2007

Friday, 11 September 2009 — Page 5 of 9

Table 4.21.: Report 21. External Exposure – statistics

Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	21. External Exposure – statistics
Reporting Period	Is the period correct?
Number of Pages	
No. of Badges used over period	Total number of badges during selected period
Minimum dose equivalent	Minimum value recorded for each badge
Maximum dose equivalent	Maximum value recorded for each badge
Mean dose equivalent	Mean value recorded for each badge
Standard deviation	Standard Deviation of values recorded for each badge
Upper confidence level	95% Upper Confidence Level for radioactivity for each badge

Report 21. External Exposure – statistics

The purpose of this report is to list the total badge monitoring undertaken over the selected period. It shows the number of badges used, 'Minimum', 'Maximum', 'Mean', 'Standard Deviation' and '95% Upper Confidence Level' statistics for each reading. This report should be included in your 'Annual Occupational Radiation Report'.

Figure 4.23 on the following page shows a typical statistical report.

Table 4.21 lists each field on the report and gives its purpose.

4.5. Effective dose equivalent reports

Report 22. EDE – by employee name

The purpose of this report is to list all employee internal/external radiation exposures undertaken over the selected period. It shows the employee's name, if they are 'Designated', each 'Work Category' they worked in, hours worked, total radioactivity breathed in, and internal, external and total exposure in millisieverts. For privacy reasons, this report should not be included in your 'Annual Occupational Radiation Report'.

Figure 4.24 on page 69 shows a typical EDE report.

Table 4.22 on page 70 lists each field on the report and gives its purpose.

Figure 4.23.: Report 21. External Exposure – statistics

Monday, 12 October 2009 Boswell Version 2M Page 1 of 1
Blue Sky Mining Pty Ltd

21. External Exposure - statistics

Summary for period 01/04/2006 to 31/03/2007

Number of Badges used over period : 358

	External Radiation (µSv)
Minimum dose equivalent:	10
Maximum dose equivalent:	1100
Mean dose equivalent:	558
Standard Deviation:	222
Upper Confidence Level:	577

Figure 4.24.: Report 22. EDE – by employee name

Monday, 12 October 2009 | Boswell Version 2M | Page 1 of 10

Blue Sky Mining Pty Ltd

22. EDE - by employee name

Summary for period 01/04/2006 to 31/03/2007

Employee	Designated	Work Category	Hours Worked	Badge Days	Tot Bq Intake	Assessed EDE (mSv) Int.	Ext.	Total
Abbott, Peter R	Yes	7D Wet Plant Operator	240		8	0.3		
		7A Dry Plant Operator	1,368		761	3.6		
		Total	**1,608**	**365**	**769**	**3.9**	**1.9**	**5.8**
Adams, Frank	Yes	2 Synthetic Rutile Plant	768		0	0.1		
		4 Engineering Maintenance - Dry Plant	1,152		301	2.1		
		Total	**1,920**	**365**	**301**	**2.3**	**1.9**	**4.1**
Anderson, Tobby	Yes	2 Synthetic Rutile Plant	768		0	0.1		
		4 Engineering Maintenance - Dry Plant	1,152		0	2.1		
		Total	**1,920**	**365**	**0**	**2.3**	**2.0**	**4.2**
Ashcraft, Ivan	No	7A Dry Plant Operator	12		2	0.0		
		7B Shift Coordinator	420		17	0.3		
		Total	**432**	**275**	**19**	**0.3**	**1.2**	**1.5**
Backshall, Ford J	No	7A Dry Plant Operator	300		194	0.8		
		7B Shift Coordinator	12		0	0.0		
		7D Wet Plant Operator	204		0	0.2		
		Total	**516**	**183**	**194**	**1.0**	**1.2**	**2.2**
Backsnail, Mort R	No	7C Shift Services Operator	1,900		381	2.3		
		Total	**1,900**	**275**	**381**	**2.3**	**1.2**	**3.5**
Baker, Peter	Yes	7C Shift Services Operator	12		0	0.0		
		7A Dry Plant Operator	204		68	0.5		
		Total	**216**	**365**	**68**	**0.6**	**2.3**	**2.8**
Banks, Cody	No	2 Synthetic Rutile Plant	1,350		0	0.2		
		4 Engineering Maintenance - Dry Plant	570		45	1.1		
		Total	**1,920**	**365**	**45**	**1.3**	**2.2**	**3.5**
Barker, Mervin L	No	7A Dry Plant Operator	876		0	2.3		
		7C Shift Services Operator	1,452		0	1.8		
		Total	**2,328**	**365**	**0**	**4.1**	**2.2**	**6.3**
Barker, Barry C	Yes	7A Dry Plant Operator	672		159	1.8		
		7B Shift Coordinator	84		0	0.1		
		7D Wet Plant Operator	974		47	1.0		
		Total	**1,730**	**365**	**206**	**2.9**	**2.0**	**4.8**
Bollard, Tina	No	3 Administrative Services	700		0	0.0		
		7B Shift Coordinator	250		0	0.2		

Table 4.22.: Report 22. EDE – by employee name

Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	22. EDE – by employee name
Reporting Period	Is the period correct?
Number of Pages	
Employee Name	Are there any incorrect spellings, duplicates or missing names?
Designated	Yes or No
Work Category	Lists each Work Category the employee was assigned to during period
Hours Worked ‡	Hours worked in each Work Category
Badge Days ‡	Not available for each Work Category
Tot Bq Intake ‡	Total calculated activity of dust breathed in for each Work Category
Int Assessed EDE‡	Calculated internal dose for each Work Category
Ext Assessed EDE‡	Not available for each Work Category
Total Assessed EDE‡	Not available for each Work Category
Total	Totals for all items marked ‡

Table 4.23.: Report 23. EDE – by employee number

Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	23. EDE – by employee number
Reporting Period	Is the period correct?
Number of Pages	
Employee Id Code	Used for privacy purposes
Designated	Yes or No
Work Category	Lists each Work Category the employee was assigned to during period
Hours Worked ‡	Hours worked in each Work Category
Badge Days ‡	Not available for each Work Category
Tot Bq Intake ‡	Total calculated activity of dust breathed in for each Work Category
Int Assessed EDE‡	Calculated internal dose for each Work Category
Ext Assessed EDE‡	Not available for each Work Category
Total Assessed EDE‡	Not available for each Work Category
Total	Totals for all items marked ‡

Report 23. EDE – by employee number

The purpose of this report is to list all employee internal/external radiation exposures undertaken over the selected period. It shows the employee's 'Id Code', if they are 'Designated', each 'Work Category' they worked in, hours worked, total radioactivity breathed in, and internal, external and total exposure in millisieverts. For privacy reasons, this report this is the report to include in your 'Annual Occupational Radiation Report'.

Table 4.23 lists each field on the report and gives its purpose.

Report 24. EDE – by work category

The purpose of this report is to list all employee internal/external radiation exposures in the different 'Work Categories' for the selected period. It shows for the period, the work category details, the average hours worked, number of dust samples, number of badges used, total radioactivity breathed in, and internal, external and total exposure in millisieverts. This report is useful for comparing doses received in each active 'Work Category'. Report 24 is required to be included in your 'Annual Occupational Radiation Report'.

Figure 4.25 on the next page shows the two types of plots associated with this report.

Table 4.24 on page 73 lists each field on the report and gives its purpose.

Figure 4.25.: Report 24. EDE – by work category

Tuesday, 15 September 2009 Boswell Version 2M Page 1 of 1

Blue Sky Mining Pty Ltd

24. EDE - by work category

Summary for period 01/04/2006 to 31/03/2007

Work Category		Avg Hours Worked	No of Dust Samples	No. of Badges	Avg Bq Intake	Assessed EDE (mSv) Int.	Ext.	Total
2	Synthetic Rutile Plant	837	68	122	16	0.2	0.5	0.6
3	Administrative Services	994	0	31	0	0.0	0.6	0.6
4	Engineering Maintenance - Dry Plant	857	49	118	272	1.6	0.5	2.1
7A	Dry Plant Operator	614	188	167	389	1.6	0.6	2.2
7B	Shift Coordinator	655	36	157	59	0.4	0.6	1.0
7C	Shift Services Operator	774	28	59	104	0.9	0.6	1.5
7D	Wet Plant Operator	479	25	136	90	0.5	0.6	1.1
Total:	7		394	790 *				

** note : if employees work in more than one Work Category at one time, their badges may be counted in those categories.*

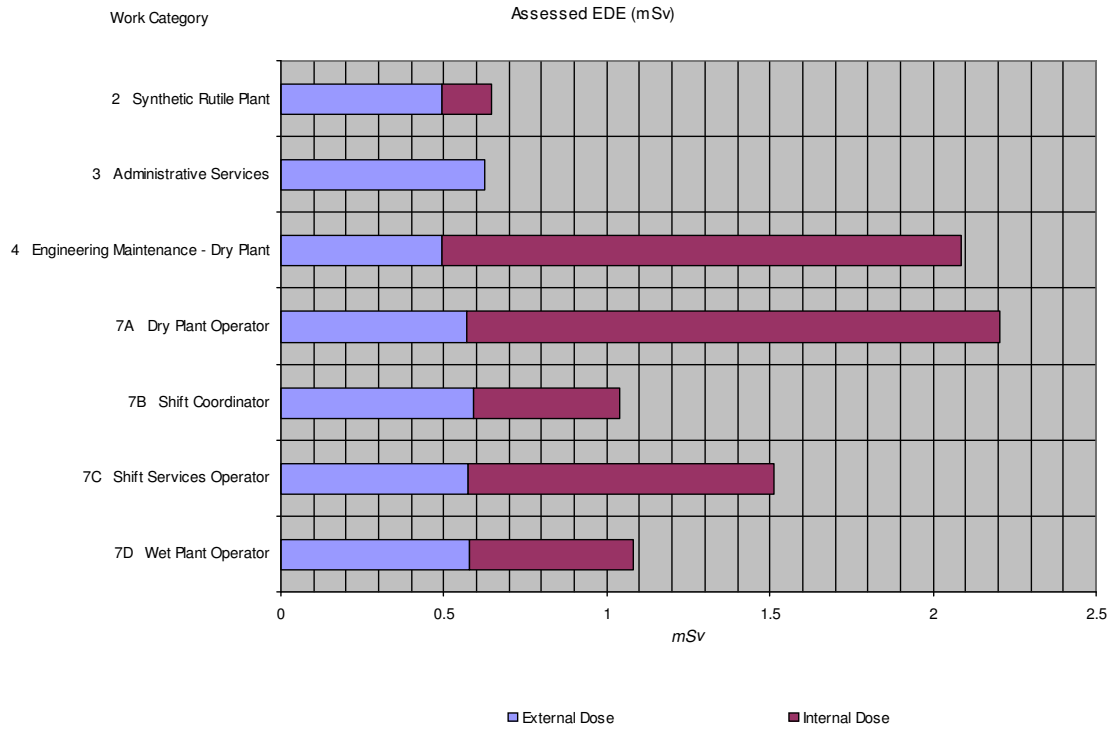


Table 4.24.: Report 24. EDE – by work category

Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	24. EDE – by work category
Reporting Period	Is the period correct?
Number of Pages	
Work Category Code	Code
Work Category Description	Description
Avg hours Worked	Number of badges used in work category for period
No of Dust Samples	Minimum external exposure in work category for period
No of Badges	Estimated number of badges used for each work category
Avg Bq Intake	Estimated dust activity for an average person in each work category
Int Assessed EDE	Estimated internal dose for an average person in each work category
Ext Assessed EDE	Estimated external dose for an average person in each work category
Total Assessed EDE	Total estimated dose for an average person in each work category

Table 4.25.: Report 25. EDE – statistics — by personnel dose

Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	25. EDE – statistics — by personnel dose
Reporting Period	Is the period correct?
Number of Pages	
Total Number of Employees and Total Number of Designated Employees	
0 to 50+	Number of employees within 12 dose ranges
Average Internal Dose	Dose for all Employees/ Designated Employees
Maximum Internal Dose	Dose for all Employees/ Designated Employees
Average External Dose	Dose for all Employees/ Designated Employees
Maximum External Dose	Dose for all Employees/ Designated Employees

Report 25. EDE – statistics — by personnel dose

The purpose of this report is to rank the combined internal/external radiation exposures for the selected period and compare employees in general with the Designated employees. It shows for the period, the total number of employees and designated employees. The doses between 0 and 50+ millisivert are grouped and the 'Average Internal/External' and 'Maximum Internal/External' can be compared between groups. Report 25 is required to be included in your 'Annual Occupational Radiation Report'.

Figure 4.26 on the next page shows the summary and layout of this report.

Table 4.25 lists each field on the report and gives its purpose.

Report 26. EDE – work category dose prediction summary

The purpose of this report is for the RSO to be able to compare the average hours worked in each 'Work Category', the 'Average EDE', how close that is the the annual limit and the number of hours it would take working to reach the annual limit. Report 26 is not required to be included in your 'Annual Occupational Radiation Report'.

Figure 4.28 on page 77 shows the summary and layout of this report.

Figure 4.28 on page 77 shows the two types of plots associated with this report.

Figure 4.26.: Report 25. EDE – statistics — by personnel dose

Monday, 12 October 2009 Boswell Version 2M Page 1 of 1
Blue Sky Mining Pty Ltd

25. EDE - employee dose statistics

Summary for period 01/04/2006 to 31/03/2007

Total Number of Employees:	104
Number of Employees in Dose Range: (total effective dose)	
0 to < 1 mSv:	4
1 to < 5 mSv:	81
5 to < 10 mSv:	19
10 to < 15 mSv:	0
15 to < 20 mSv:	0
20 to < 25 mSv:	0
25 to < 30 mSv:	0
30 to < 35 mSv:	0
35 to < 40 mSv:	0
40 to < 45 mSv:	0
45 to < 50 mSv:	0
50 + mSv:	0
Average Internal Dose:	0.9
Maximum Internal Dose:	5.2
Average External Dose:	2.0
Maximum External Dose:	3.5
Total Number of Designated Employees:	68
Number of Designated Employees in Dose Range: (total effective dose)	
0 to < 1 mSv:	1
1 to < 5 mSv:	45
5 to < 10 mSv:	11
10 to < 15 mSv:	0
15 to < 20 mSv:	0
20 to < 25 mSv:	0
25 to < 30 mSv:	0
30 to < 35 mSv:	0
35 to < 40 mSv:	0
40 to < 45 mSv:	0
45 to < 50 mSv:	0
50 + mSv:	0
Average Internal Dose:	0.8
Maximum Internal Dose:	5.2
Average External Dose:	2.1
Maximum External Dose:	3.2

Figure 4.27.: Report 26. EDE – work category dose prediction summary

Tuesday, 15 September 2009 Boswell Version 2M Page 1 of 1
Blue Sky Mining Pty Ltd

26. EDE - work category dose prediction summary

Summary for period 01/04/2006 to 31/03/2007

Work Category		Avg Hours Worked	Assessed EDE (mSv)	% Annual Limit	Required Hours to reach annual Limit
3	Administrative Services	994	0.6	3	30,818
7A	Dry Plant Operator	614	2.2	11	4,956
4	Engineering Maintenance - Dry Plant	857	2.1	10	7,357
7B	Shift Coordinator	655	1.0	5	11,956
7C	Shift Services Operator	774	1.5	8	9,464
2	Synthetic Rutile Plant	837	0.6	3	24,980
7D	Wet Plant Operator	479	1.1	5	8,376

Figure 4.28.: Report 26. EDE – work category dose prediction summary

Tuesday, 15 September 2009 Boswell Version 2M Page 1 of 1
Blue Sky Mining Pty Ltd

26. EDE - work category dose prediction summary

Summary for period 01/04/2006 to 31/03/2007

Work Category		Avg Hours Worked	Assessed EDE (mSv)	% Annual Limit	Required Hours to reach annual Limit
3	Administrative Services	994	0.6	3	30,818
7A	Dry Plant Operator	614	2.2	11	4,956
4	Engineering Maintenance - Dry Plant	857	2.1	10	7,357
7B	Shift Coordinator	655	1.0	5	11,956
7C	Shift Services Operator	774	1.5	8	9,464
2	Synthetic Rutile Plant	837	0.6	3	24,980
7D	Wet Plant Operator	479	1.1	5	8,376

Report 27. EDE – identify potential designated employee

The purpose of this report is for the RSO to be able to identify employees who should be 'Designated Employees'. Report 27 is not required to be included in your annual occupational radiation report.

This report is the same as '22. EDE – by employee name' except the data is sorted from the highest to the lowest doses with a cut-off point of 1mSv. it shows currently designated and non-designated employees.

Figure 4.29 on the next page shows the layout of this report.

Report 28. EDE – designated employees

The purpose of this report is for the RSO to be able to compare doses of 'Designated Employees'. Report 28 is not required to be included in your annual occupational radiation report.

This report is the same as '22. EDE – by employee name' except it only lists doses for currently designated employees. It also shows additional work category information.

Figure 4.30 on page 80 shows the layout of this report.

4.6. Employee work history reports

Report 29. Work History – by employee name

The purpose of this report is for the RSO to be able to check employee work histories/ work hours are entered correctly. It lists 'Employee Name', 'Work Category Code/Description', hours worked in each category and total hours worked. Report 29 is not required to be included in your 'Annual Occupational Radiation Report'.

Figure 4.31 on page 81 shows the layout of this report.

Table 4.26 on page 82 lists each field on the report and gives its purpose.

Report 30. Work History – by employee number

The purpose of this report is for the RSO to be able to check employee work histories/ work hours are entered correctly. It lists employee ID Code, Work Category Code/Description, hours worked in each category and total hours worked. Report 30 is not required to be included in your annual occupational radiation report. This report is used when employee names need to be kept private.

Table 4.27 on page 82 lists each field on the report and gives its purpose.

Report 31. Work History – by work category

The purpose of this report is for the RSO to be able to check the number of employees Boswell has placed in each Work Category and the average hours they work. Report 31 is not required to be included in your annual occupational radiation report.

Figure 4.32 on page 83 shows the information listed in this report.

Figure 4.29.: Report 27. EDE – identify potential designated employee

Monday, 12 October 2009 Boswell Version 2M Page 1 of 11

Blue Sky Mining Pty Ltd

27. EDE - identify potential designated employees

Summary for period 01/04/2006 to 31/03/2007

Employee	Currently Designated	Work Category	Hours Worked	Badge Days	Tot Bq Intake	Assessed EDE (mSv) Int.	Ext.	Total
Nasher, Ivan K	Yes	7A Dry Plant Operator	1,944		1,381	5.2		
	Yes	7C Shift Services Operator	204		0	0.2		
	Yes	7D Wet Plant Operator	36		0	0.0		
		Total	**2,184**	**365**		**5.5**	**3.2**	**8.7**
Hollinham, Daemon J	No	7A Dry Plant Operator	1,836		753	4.9		
	No	7D Wet Plant Operator	48		0	0.1		
		Total	**1,884**	**365**		**4.9**	**2.8**	**7.7**
Free, Ted T	No	7A Dry Plant Operator	1,572		368	4.2		
	No	7C Shift Services Operator	72		2	0.1		
	No	7D Wet Plant Operator	396		8	0.4		
		Total	**2,040**	**365**		**4.7**	**2.9**	**7.6**
Bood, Dale D	No	7A Dry Plant Operator	1,428		513	3.8		
	No	7D Wet Plant Operator	432		0	0.5		
		Total	**1,860**	**365**		**4.3**	**2.7**	**7.0**
Woods, Steve W	Yes	7A Dry Plant Operator	1,404		728	3.7		
	Yes	7D Wet Plant Operator	480		9	0.5		
		Total	**1,884**	**365**		**4.2**	**2.6**	**6.8**
Barker, Mervin L	No	7A Dry Plant Operator	876		0	2.3		
	No	7C Shift Services Operator	1,452		0	1.8		
		Total	**2,328**	**365**		**4.1**	**2.2**	**6.3**
Thomas, Raymond P	No	7A Dry Plant Operator	1,092		967	2.9		
	No	7C Shift Services Operator	1,080		147	1.3		
		Total	**2,172**	**274**		**4.2**	**2.0**	**6.2**
Tomlinson, Rodney G	Yes	7A Dry Plant Operator	1,128		571	3.0		
	Yes	7B Shift Coordinator	96		0	0.1		
	Yes	7C Shift Services Operator	24		0	0.0		
	Yes	7D Wet Plant Operator	540		14	0.6		
		Total	**1,788**	**365**		**3.7**	**2.6**	**6.2**
Middler, Bett R	Yes	7A Dry Plant Operator	1,212		514	3.2		
	Yes	7B Shift Coordinator	288		0	0.2		
	Yes	7D Wet Plant Operator	264		0	0.3		
		Total	**1,764**	**365**		**3.7**	**2.4**	**6.1**

Figure 4.30.: Report 28. EDE – identify potential designated employee

Tuesday, 15 September 2009 Boswell Version 2M Page 1 of 1
Blue Sky Mining Pty Ltd

26. EDE - work category dose prediction summary

Summary for period 01/04/2006 to 31/03/2007

Work Category		Avg Hours Worked	Assessed EDE (mSv)	% Annual Limit	Required Hours to reach annual Limit
3	Administrative Services	994	0.6	3	30,818
7A	Dry Plant Operator	614	2.2	11	4,956
4	Engineering Maintenance - Dry Plant	857	2.1	10	7,357
7B	Shift Coordinator	655	1.0	5	11,956
7C	Shift Services Operator	774	1.5	8	9,464
2	Synthetic Rutile Plant	837	0.6	3	24,980
7D	Wet Plant Operator	479	1.1	5	8,376

Figure 4.31.: Report 29. Work History – by employee name

Monday, 12 October 2009 — Boswell Version 2M — Page 1 of 11

Blue Sky Mining Pty Ltd

29. Work History - by employee name

Summary for period 01/04/2006 to 31/03/2007

Employee		Work Category		Hours Worked	Total Hours
Abbott, Peter R		7A	Dry Plant Operator	1,368	
		7D	Wet Plant Operator	240	
01-Apr-06	31-Mar-07	7D	Wet Plant Operator		1,608
01-Apr-06	31-Mar-07	7A	Dry Plant Operator		
Adams, Frank		2	Synthetic Rutile Plant	768	
		4	Engineering Maintenance - Dry Plant	1,152	
01-Apr-06	31-Mar-07	4	Engineering Maintenance - Dry Plant		1,920
01-Apr-06	31-Mar-07	2	Synthetic Rutile Plant		
Anderson, Tobby		2	Synthetic Rutile Plant	768	
		4	Engineering Maintenance - Dry Plant	1,152	
01-Apr-06	31-Mar-07	4	Engineering Maintenance - Dry Plant		1,920
01-Apr-06	31-Mar-07	2	Synthetic Rutile Plant		
Ashcraft, Ivan		7A	Dry Plant Operator	12	
		7B	Shift Coordinator	420	
01-Apr-06	31-Mar-07	7B	Shift Coordinator		432
01-Apr-06	31-Mar-07	7A	Dry Plant Operator		
01-Apr-06	31-Mar-07	00	Terminated		
Backshall, Ford J		7A	Dry Plant Operator	300	
		7B	Shift Coordinator	12	
		7D	Wet Plant Operator	204	
01-Apr-06	31-Mar-07	7D	Wet Plant Operator		516
01-Apr-06	31-Mar-07	7B	Shift Coordinator		
01-Apr-06	31-Mar-07	7A	Dry Plant Operator		
Backsnail, Mort R		7C	Shift Services Operator	1,900	
01-Apr-06	31-Mar-07	7C	Shift Services Operator		1,900
Baker, Peter		7A	Dry Plant Operator	204	
		7C	Shift Services Operator	12	
01-Apr-06	31-Mar-07	7C	Shift Services Operator		216
01-Apr-06	31-Mar-07	7A	Dry Plant Operator		
Banks, Cody		2	Synthetic Rutile Plant	1,350	
		4	Engineering Maintenance - Dry Plant	570	
01-Apr-06	31-Mar-07	4	Engineering Maintenance - Dry Plant		1,920
01-Apr-06	31-Mar-07	2	Synthetic Rutile Plant		
Barker, Mervin L		7A	Dry Plant Operator	876	
		7C	Shift Services Operator	1,452	
01-Apr-06	31-Mar-07	7C	Shift Services Operator		2,328
01-Apr-06	31-Mar-07	7A	Dry Plant Operator		

Table 4.26.: Report 29. Work History – by employee name

Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	29. Work History – by employee name
Reporting Period	Is the period correct?
Number of Pages	
Employee Name	Are there any incorrect spellings, duplicates or missing names?
Work Category Code	Code of Work Categories worked in
Work Category	Description of Work Categories worked in
Hours Worked	Hours worked in Work Categories
Total Hours	total hours worked

Table 4.27.: Report 30. Work History – by employee number

Items on Report	Comment
Date Report Printed	
Boswell Version	
Company and Site Name	
Report Name	30. Work History – by employee number
Reporting Period	Is the period correct?
Number of Pages	
Employee Id Code	Used for privacy purposes
Work Category Code	Code of Work Categories worked in
Work Category	Description of Work Categories worked in
Hours Worked	Hours worked in Work Categories
Total Hours	total hours worked

Figure 4.32.: Report 31. Work History – by work category

Tuesday, 15 September 2009 Boswell Version 2M Page 1 of 1
Blue Sky Mining Pty Ltd

31. Employee Work History - by work category

Summary for period 01/04/2006 to 31/03/2007

	Work Category	Avg Hours Worked	No of Employees Work Category
2	Synthetic Rutile Plant	837	36
3	Administrative Services	994	11
4	Engineering Maintenance - Dry Plant	857	35
7A	Dry Plant Operator	614	48
7B	Shift Coordinator	655	44
7C	Shift Services Operator	774	18
7D	Wet Plant Operator	479	36
			228

4.7. Individual employee dose reports

Report 32. Ad Hoc Employee Dose – by date range

The purpose of this report is for the RSO to be able to give an employee on request his dust and radiation exposures for the selected period. Report 32 is not required to be included in your annual occupational radiation report.

Figure 4.33 on the next page shows the layout of this report.

Report 33. Ad Hoc Employee Dose – over each year with company

The purpose of this report is for the RSO to be able to give an employee on request his dust and radiation exposures for their term with the company. Report 33 is not required to be included in your annual occupational radiation report.

Figure 4.34 on page 86 shows the layout of this report.

Report 34. Employee Monitoring and Exposure Report

The purpose of this report is for the RSO to be able to print out as a batch, the annual exposure reports for all employees detailing their dust and radiation exposures for the year. A copy of the relevant page should be forwarded to employees annually.

Figure 4.35 on page 87 shows the layout of this report.

Figure 4.33.: Report 32. Ad Hoc Employee Dose – by date range

Monday, 12 October 2009 Boswell Version 2M Page 1 of 1
Blue Sky Mining Pty Ltd

32. Ad Hoc Employee Dose - by date range

Summary for period 01/04/2006 to 31/03/2007

Employee Name: Abbott, Peter R

Work Category	Hours	Bq Intake	Internal Dose (msv)
Dry Plant Operator	1368	639	3.6
Wet Plant Operator	240	26	0.3

External Exposure:

No. of Days Badges Worn: 365

Assessed EDE (mSv):

Internal: 3.9 ext EDE: 1.9 Total: 5.8

Figure 4.34.: Report 33. Ad Hoc Employee Dose – over each year with company

Monday, 12 October 2009 Boswell Version 2M Page 1 of 1
Blue Sky Mining Pty Ltd

33. Ad Hoc Employee Dose - over each year with company

Summary for period 01/04/2006 to 31/03/2007

Employee Name: Ashcraft, Ivan

Work Category	Hours	Bq Intake	Internal Dose (msv)
Terminated	0	0	0.0
Dry Plant Operator	12	6	0.0
Shift Coordinator	420	30	0.3
Shift Services Operator	0	0	0.0

External Exposure:

No. of Days Badges Worn: 275

Assessed EDE (mSv):

Internal: 0.3 extEDE: 0.3 Total: 0.6

Previous Effective Dose Equivalent History

			Assessed EDE (mSv)		
YearEnd	Hours Worked	Bq Intake	IntEDE	extEDE	Total
31-Mar-06	1,488	0	7.7	2.8	10.5
31-Mar-05	1,440	123	7.5	4.8	12.3
31-Mar-04	1,632	256	8.3	3.4	11.7
31-Mar-03	1,500	208	13.9	3.6	17.5
31-Mar-02	1,926	249	14.7	4.9	19.5
31-Mar-01	1,795	120	6.8	3.3	10.1
31-Mar-00	1,851	172	12.5	4.1	16.5
31-Mar-99	0	42	0.0	0.0	0.0
31-Mar-98	1,972	38	0.9	1.8	2.7
31-Mar-97	323	0	0.4	0.0	0.4
31-Mar-96	0	0	0.0	0.0	0.0
31-Mar-95	0	0	0.0	0.0	0.0
31-Mar-94	0	0	0.0	0.0	0.0
31-Mar-93	0	0	0.0	0.0	0.0
31-Mar-92	0	0	0.0	0.0	0.0

Figure 4.35.: Report 34. Employee Monitoring and Exposure Report

Tuesday, 15 September 2009 Boswell Version 2M Page 1 of 182

Blue Sky Mining Pty Ltd

34. Employee Monitoring and Exposure Report

Summary for period 01/04/2006 to 31/03/2007

Radiation Exposure Results for Peter Abbott

Dust Sampling Results

Filter	Start Date	End Date	mg/m³	mBq/m³	MDL	WC	Comments
NM-4779	05-Jul-06	05-Jul-06	4.44	279.12	16.40	7A	
NM-4888	12-Dec-06	12-Dec-06	11.33	1,245.31	12.65	7A	investigated - Loss Control card EMW77795
NM-4909	19-Dec-06	19-Dec-06	2.53	278.51	12.60	7A	
NM-4920	27-Dec-06	27-Dec-06	1.96	274.25	13.79	7A	
NM-5037	29-Jan-07	29-Jan-07	2.45	313.75	16.65	7A	
NM-5056	05-Feb-07	05-Feb-07	3.40	370.20	16.77	7A	
NM-5093	13-Feb-07	13-Feb-07	4.02	485.38	12.37	7A	
NM-5142	01-Mar-07	01-Mar-07	0.28	26.84	16.93	7D	

For comparison, over the same monitoring period, site employee's dust readings ranged from 0 mg/m³ to 23 mg/m³ and averaged 3 mg/m³. Dust radioactivity ranged from 10 mBq/m³ to 3084 mBq/m³ and averaged 217 mBq/m³. Dust readings of 10 mg/m³ or more and dust radioactivity above 800 mBq/m³ are investigated and reported to DMP.

Radiation Badge Results

Badge	Date Issued	Date Returned	µSv	Comments
613-83505	01-Apr-06	30-Jun-06	280	
626-30455	01-Jul-06	30-Sep-06	450	
639-68840	01-Oct-06	31-Dec-06	650	
652-9980	01-Jan-07	31-Mar-07	480	

For comparison, over the same monitoring period, site employee's badge results ranged from 10 µSv to 1100 µSv and averaged 558 µSv. Any unusually high results are investigated and reported to DMP.

Estimated Radiation Exposure

Designated Employee	Work Category	Hours Worked	Badge Days	Tot Bq Intake	Assessed EDE (mSv) Int.	Ext.	Total
Yes	7D Wet Plant Operator	240		8	0.3		
	7A Dry Plant Operator	1,368		761	3.6		
	Total	**1,608**	**365**	**769**	**3.9**	**1.9**	**5.8**

For comparison, over the same monitoring period, site employee's internal radiation exposures reached a maximum of 5.2 mSv and averaged 0.9 mSv. Site employee's external radiation exposures reached a maximum of 3.5 mSv and averaged 2.0 mSv. Any unusually high results are investigated and reported to DMP and the Radiological Council.

A. Appendix – Annual Occupational Radiation Report

Printouts of the following Boswell Reports and a copy of boswellData.mdb on CD should be included in the annual occupational radiation report:

04. Personal Dust - rad/grav – by employee number
06. Personal Dust - rad/grav – by month & work category
07. Personal Dust - rad/grav – 5 years & work category
08. Personal Dust - rad/grav – statistics
11. Area Dust - rad/grav – by area
12. Area Dust - rad/grav – by month & area
13. Area Dust - rad/grav – areas over 5 years
14. Area Dust - rad/grav – statistics
18. External Exposure – by employee number
19. External Exposure – by work category
20. External Exposure – work category over 5 years
21. External Exposure – statistics
23. EDE – by employee number
24. EDE – by work category
25. EDE – statistics — by personnel dose

For more information on annual occupational reporting, please refer to the Guideline NORM–6 Reporting and notifying.

B. Appendix – User Instructions

B.1. Quick start

If you are familiar with the old MIDAS program, then you should have a fair idea how to use Boswell.

Boswell is very user friendly and provided you have an understanding of your radiation monitoring program, you should have no difficulty using it.

The important part is to ensure you are entering the correct data and enter it is the correct sequence. If you examine your old MIDAS data in Boswell, as you look through it you are bound to see the odd data entry errors, wrong dates, duplicated records, misspelled names — they are much easier to spot.

To get started,

1. Enter the data in the correct order
2. Make sure the items in the Listings Menu are up to date
3. Complete the Area Dust
4. Complete the Employee Dust
5. Complete Exposure BadgeResults
6. Before running reports, ensure the Employee History is up to date

If the your Reports look strange, check the data. If you have any questions on forms or fields, press F1 for help on the topic.

B.2. Menus

The menus are organised so that each form is listed in the order it should be used

- Listings Menu
  - Entity Name
  - Air Sampler Holders
  - Sampling Equipment Codes
  - Air Sampler Pumps
  - Conversion Factors
  - Area Locations
  - Area Codes
  - Location Codes
  - Work Categories
  - Respiratory Protection

  - Radiation Counters
  - Radiation Calibration

- Main Menu
  - Area Dust
  - Employee
  - Previous Experience
  - Badge Data
  - Employee Dust
  - Employee History
  - Reports
  - CONTAM Download

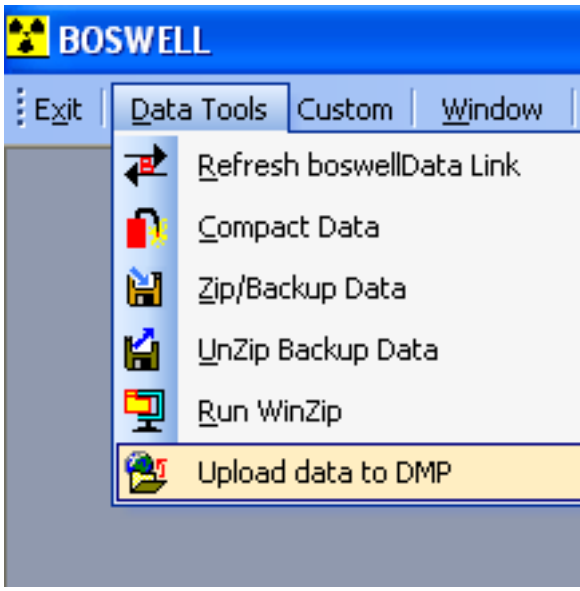
B.3. Toolbars

There are three main types of tool bars used in Boswell forms.

B.3.1. Main Screen

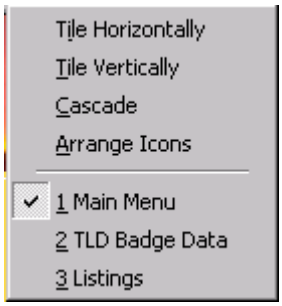
Allows access to tools located on the:

1. Data Tools menu



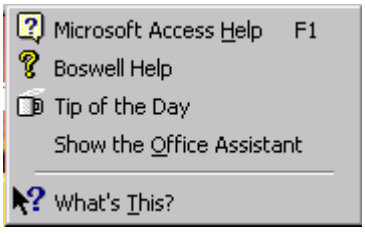
- These tools are used to interact with the backend data file boswellData.mdb
- Refresh or connect to the data tables
- Compact the data - remove any deleted data and recover space
- Zip or backup the mdb file to a safe location or a CD
- Unzip the backup data
- Run the WinZip program (you must install this yourself)
- Upload Data to DMP with the web upload facility

2. Windows menu



Allows viewing of other already opened windows

3. Help Menu



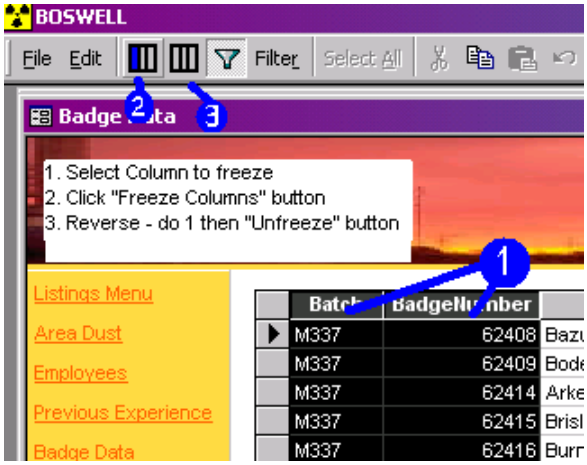
Tip of the day settings

B.3.2. Data Entry Screens

This tool bar contains the most number of tools which includes:-

1. Use data

- Close
- File and Printing Tools
- Edit, Cut, Copy, Paste, Delete, Select, Search
- Freeze
- Unfreeze columns
- Filter on/off
- Change filters



2. Move and paste data

Cut/Copy/Paste/Undo

3. Change the sorting order

Sorting A-Z, Z-A

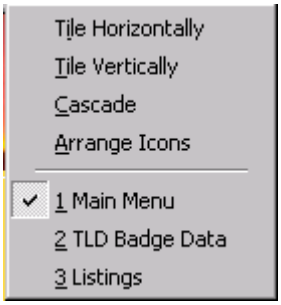
4. Quick Filters

Create special filters to sort data

5. Search

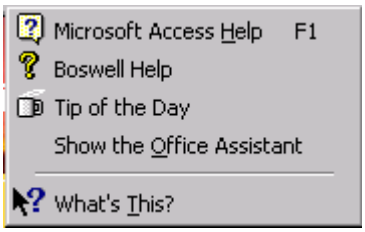
Search for or replace specific data

6. Windows

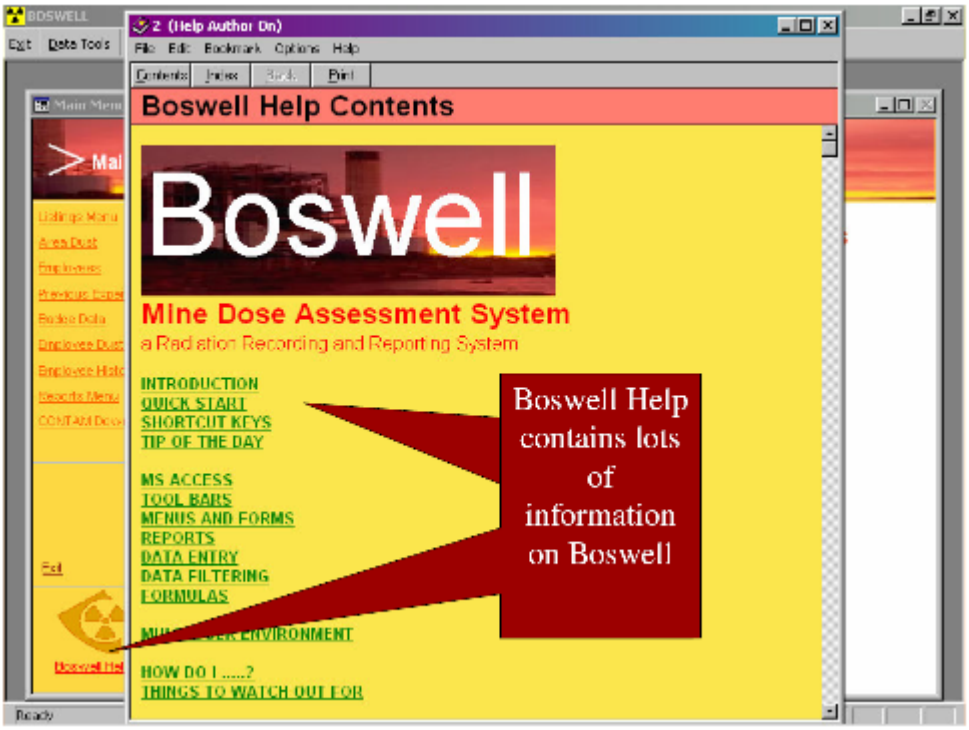


Change to other opened window views

7. Help



Microsoft Access Help
Boswell Help
Tip of the Day



B.3.3. Report Screen

This menu bar contains the printing tools:-

- Print
- Pages
- Magnify
- Layout
- Export
- Export to Word
- Email report
- Help

B.4. Useful Shortcut Keys (All versions of Access)

Note: Plus signs indicate 'and', to press two keys together. You do not want to actually press the + sign on your keyboard. For example, CTRL+P indicates to press the CTRL key and with it still held down, press the P.

B.4.1. Fields

CTRL+ ; – Insert today's date

CTRL+ : – Insert the current time

CTRL+ Enter – Insert a carriage return in a memo or text field

CTRL+ ' – Insert the data from the same field in the previous record

ESC – Undo the changes you have made to the current field

ESC ESC (press ESC twice) – Undo the changes you have made to the current record

CTRL+F – Find and replace

CTRL+C – Copy

CTRL+P – Paste

CTRL+Z – Undo

CTRL+S – Save

CTRL+P – Print

B.4.2. Help

F1- To display the Office Assistant and Microsoft Access Help

SHIFT+F1 – To display ScreenTips;

Find and Replace

CTRL+H – To open the Replace tab in the Find and Replace dialogue box

SHIFT+F4 – To find the next occurrence of the text specified in the Find and Replace dialogue box

B.4.3. Window Operations

F11 or ALT+F1 – To bring the Database window to the front

CTRL+F6 – To cycle between open windows

ENTER – To restore the selected minimised window when all windows are minimised

CTRL+F8 – To turn on Re-size mode for the active window when its not maximised; press the arrow keys to re-size the window

ALT+SPACEBAR – To display the Control menu

SHIFT+F10 – To display the shortcut menu

CTRL+W or CTRL+F4 – To close the active window

B.4.4. Miscellaneous

F7 – To check spelling

SHIFT+F2 – To open the Zoom box to conveniently enter expressions and other text in small input areas

ALT+F4 – To quit Microsoft Access, close a dialogue box, or close a property sheet

B.4.5. Records

With a record selected in the Datasheet view

Select an entire row by pressing Shift+Spacebar

Select the entire datasheet, press Ctrl+Shift+Spacebar.

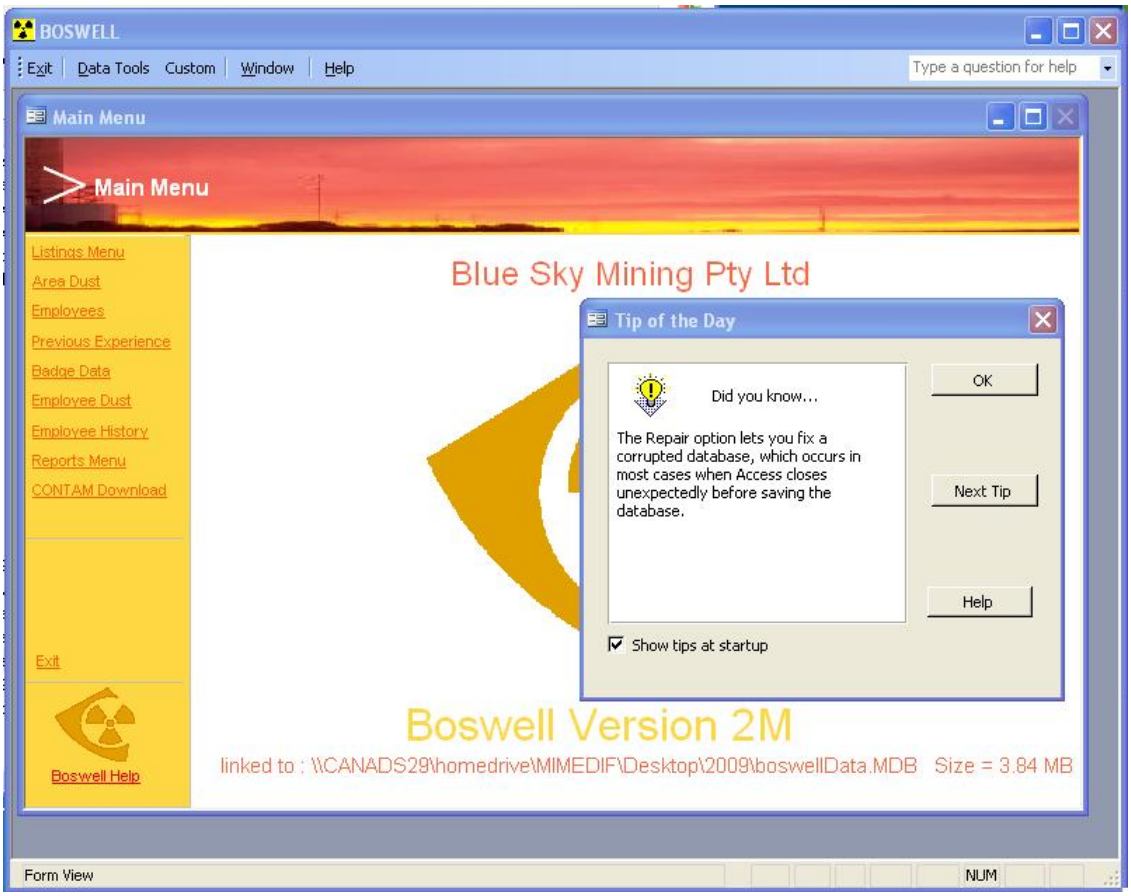
Note: You must have a record selected (highlighted) before using these shortcuts.

B.4.6. Exploding Fields

When you're editing a data field, you can get an exploded view of the field by pressing Shift + F2.

B.5. Tip of the Day

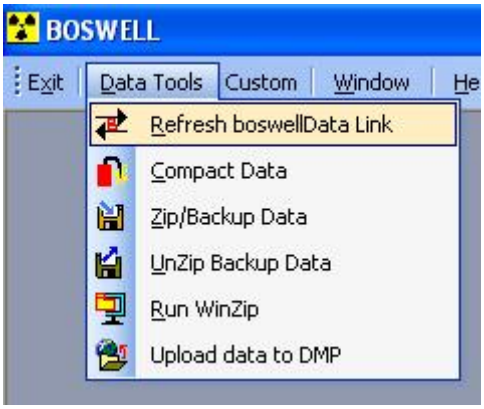
The Tip of the Day provides hints about working in Boswell. By default, the Tip of the Day appears each time you launch Boswell. Deselect Show tips at startup in the Tip of the Day dialogue box if you do not want to see the Tip of the Day every time Boswell launches. You can also choose Tip of the Day in the Help menu to see the Tip of the Day.



B.6. Microsoft Access

B.6.1. Refreshing Links to boswellData.mdb

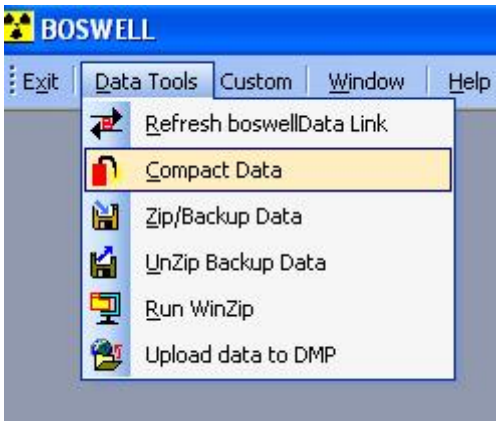
If the tables are not linked automatically for some reason, you must perform this operation manually.



There is a button on the Tool Bar that you can press to run the Link Macro.

Possible Problem Sometimes you may need to refresh each table individually due to something going wrong with the process. There are twenty-one linked tables, so you need to patient and be sure no tables are missed.

B.6.2. Compacting the Database



From time to time, the 'Backend' (Boswell data file) will need to be compacted when the file gets very large, over 10 MB for example. This is due to deleted files and the operations of Access taking up and wasting space. The file can be tidied and the size reduced.
The 'Frontend' (Boswell program file) is automatically compacted on closure.

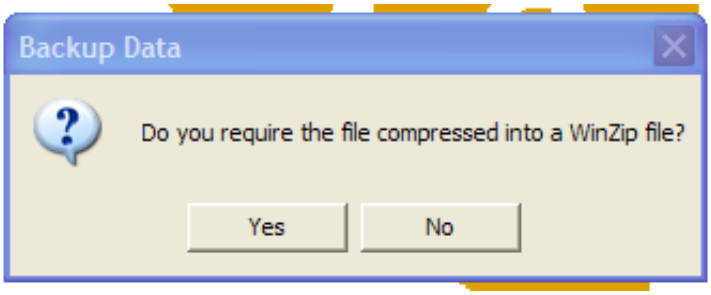
A check of the backend file size before and after will confirm compaction has been accomplished.

Important!

Backup boswellData.mdb before proceeding with the backup facility in the Tools Menu.

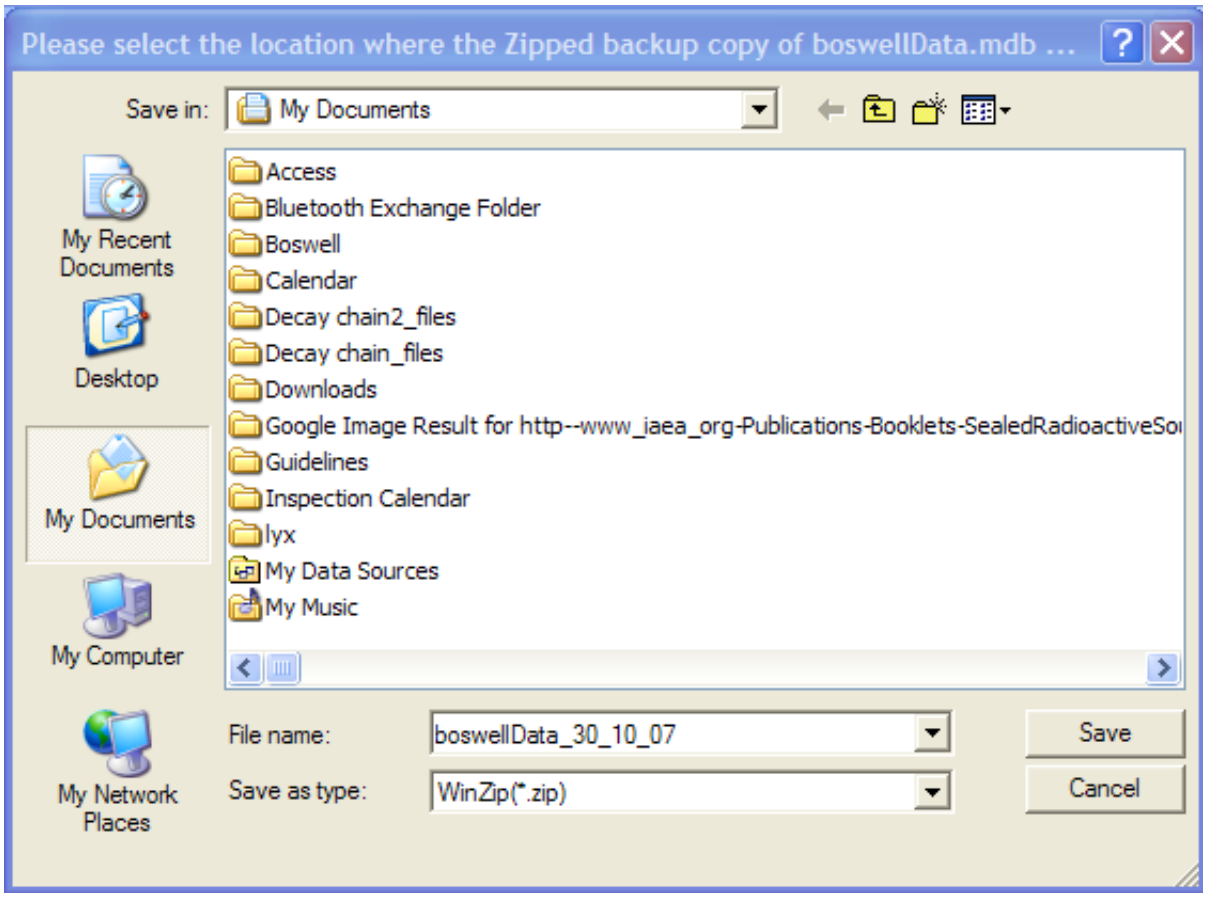
B.6.3. Backup Facility

Boswell has inbuilt tools to compress or uncompress the boswellData.mdb file using "Zip" for backup purposes or for e-mailing the file to DMP.

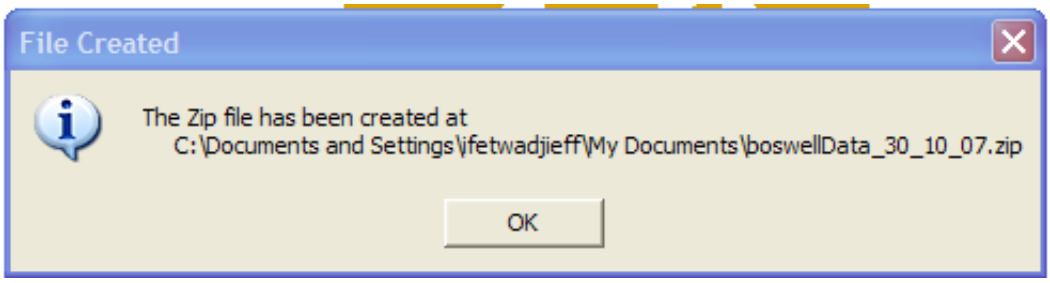


There is a choice for "Zipping" the file or not. Usually, it is best to compress the file to save storage space.

The location for storing the file is selected,



It is just a matter of following the prompts and the file are named automatically using the date for versioning

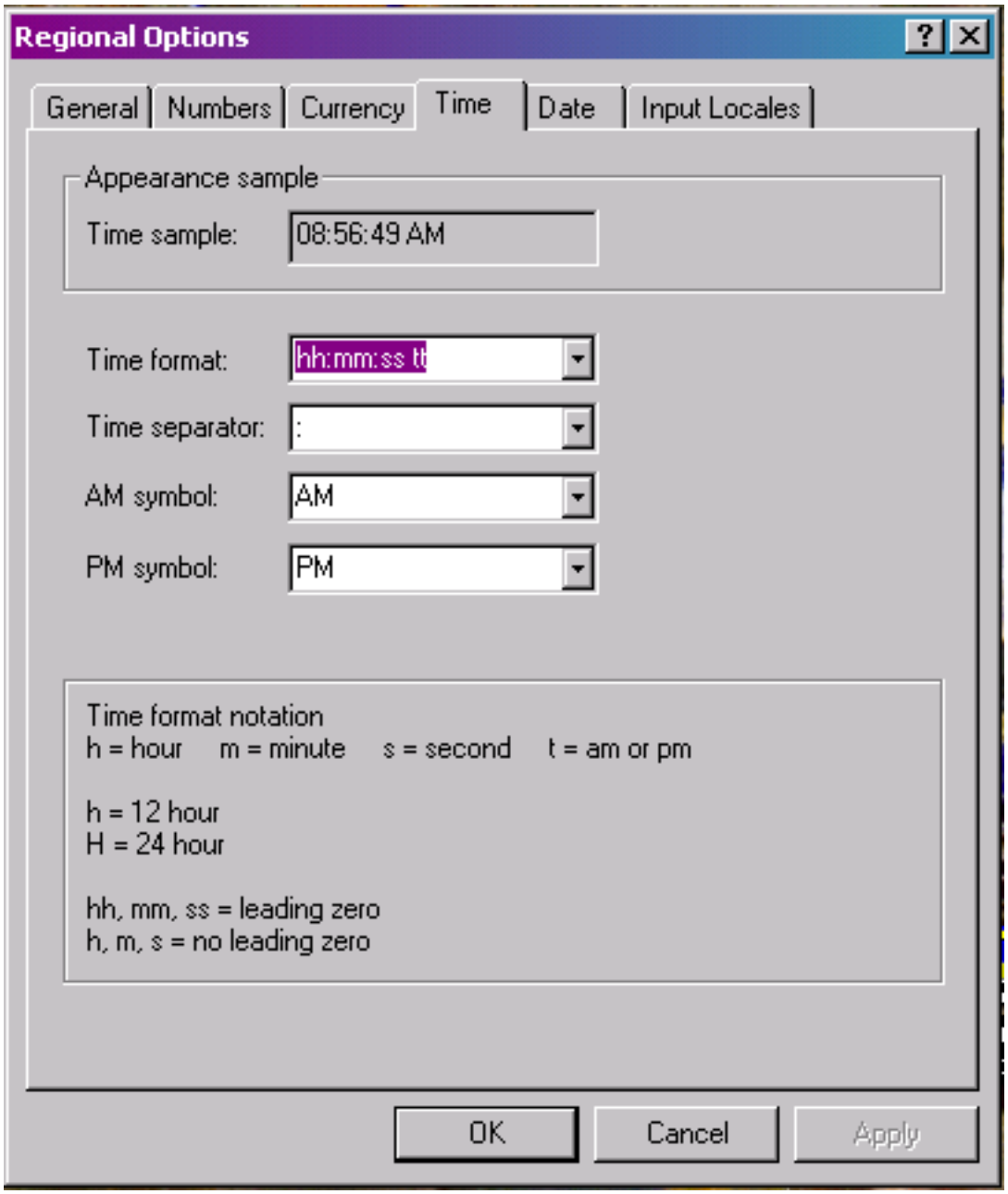


and the file is created in the location selected.

B.6.4. Known issues

B.6.4.1. Windows time format

Boswell stores the date and the time for the dust sampling pumps in date/time fields. If your Windows "time format" setting in Control Panel is different from that shown below, it impossible to enter the correct sampling time in Access. The date/time format cannot be remedied in Access, rather the settings must be changed in Windows.


Regional Options
General
Numbers
Currency
Time
Date
Input Locales
Appearance sample
Time sample:
08:56:49 AM
Time format:
hh:mm:ss tt
Time separator:
:
AM symbol:
AM
PM symbol:
PM
Time format notation
h = hour m = minute s = second t = am or pm
h = 12 hour
H = 24 hour
hh, mm, ss = leading zero
h, m, s = no leading zero
OK
Cancel
Apply

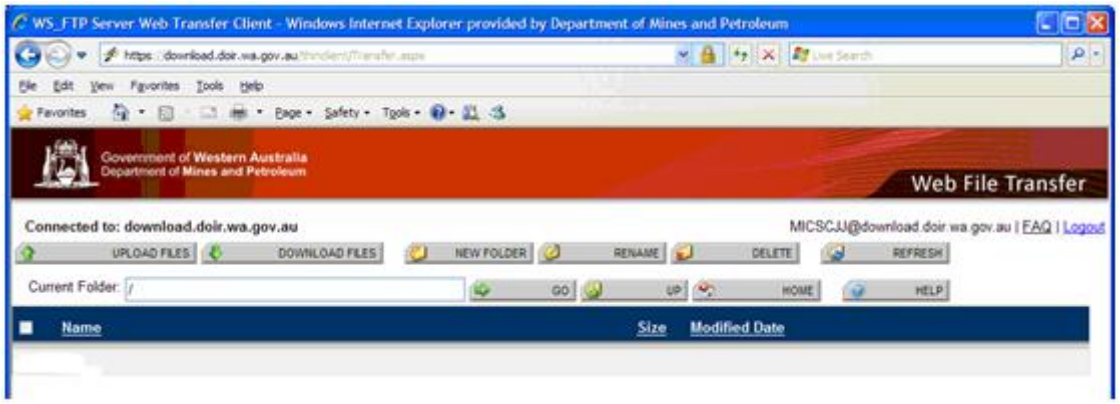
C. Appendix – DMP File Transfer Facility

C.1. How to use download.doir.wa.gov.au

C.1.1. Using a web browser outside the department

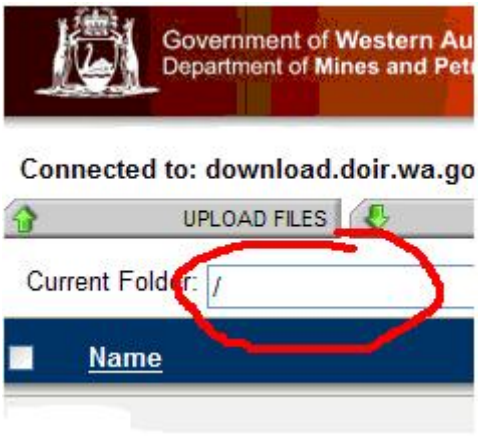
1. Using a web browser, browse to: https://download.doir.wa.gov.au/thinclient.
2. At the login panel, user either an internal user account, or an external user account.

After login, the web client should be presented as below.



3. Using the navigation and upload/download buttons, users can transfer files and out of their MFT home folder. Note that users can only navigate downwards in the folder structure, into shared folders and folders that they create — they cannot navigate upwards from their home

folder, which actually appears as the folder root ("/").



C.1.1.1. Downloading Files

- Files visible for download are simply clicked to initiate the download one at a time

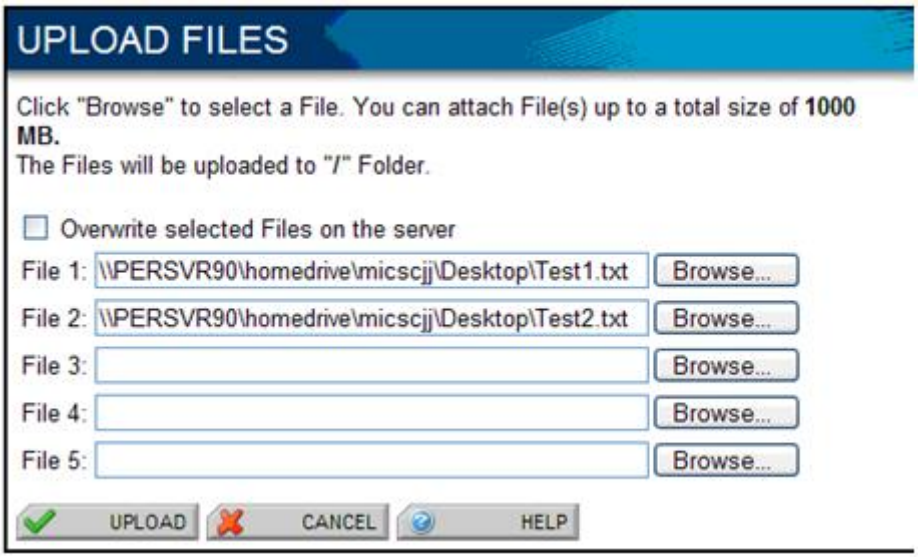
- Alternately, multiple files can be selected for simultaneous download:

NOTE: This functionality isn't supported by default for Internet Explorer (a registry change may allow it), but may work for other non-Microsoft browsers.

C.1.1.2. Uploading Files

- Click the Upload Files button

- Browse to and select one or more files to be uploaded



- Once the upload has complete, a message will be displayed

  Uploaded files will be virus-scanned as soon as they are uploaded. If they are detected as harbouring malware or viruses, they will be immediately and silently removed from view by the user.

C.1.2. Limits and Restrictions

The following limits and restrictions are in place for this facility:

Item	Limit
Storage limit per user	2Gb per user but server storage limits will prevent all users from simultaneously reaching this limit
Upload size limit	1000Mb per session
Download size limit	No limit imposed by this system
Self-created folders per user	No known limit
File types allowable	No restriction (pending review)
Virus/malware scanning	Performed after upload – if a file is infected it will be quarantined and will be silently removed from view from the user(s)
Download/Upload protocols	Only http and https are supported
File retention period	Files will be purged after 40 days

C.2. Data Confidentiality

Once a user is enabled for access to this facility, they can transfer files using their internal account from within the department or from outside the department.

This facility should be used by users only in ways that align with departmental expectations of data confidentiality. This is covered through the IT induction process and the IT systems access policy.

The availability of this facility does not remove the obligation on staff to ensure that document confidentiality is maintained.

C.3. How to setup a transfer facility between two users

By default, a user has access to their home folder only. To allow transfer of files with another user, a shared folder must be established between them.

The transfer should be between an internal user and an external user – it would not be expected to establish a transfer area for two external users or two internal users.

A shared folder appears as a sub-folder in each of the two users home folders

The process to establish a shared folder includes both Service Desk tasks and Systems Administrator tasks and is outlined below:

Step	Task	Done by
1	Identify the internal user account (MIxxxyy)	Service Desk
2	Identify the external user account (EXxxxx) This will likely be advised or identified by the internal user since they would be the expected instigator of this requirement	Service Desk
3	Create SR with the user details and assign to "_ADMINISTRATORS, SYSTEM"	Service Desk
4	Perform the procedure: Inframation → Applications → MFT → Operational Procedures → Create Two-User Shared area	System Admin
5	Return the SR to "_DESK, SERVICE" advising the name of the shared folder	System Admin
6	Advise the internal user that the facility is in place and that the shared folder will be visible in each of the two users' home folders when using the web client. The internal user would be expected to liaise with the external user accordingly on files to transfer.	Service Desk

Note that the above configuration will allow both the internal user and the external user to both have update access to the shared folder, although other variations are possible (e.g. internal user having update access and the external user having read-only access).

C.4. How to setup a transfer facility between groups of users

A common scenario would be to allow regular transfer of files from an internal user or users, to multiple external users.

The process to establish a shared folder includes both Service Desk tasks and Systems Administrator tasks:

Step	Task	Done by
1	Identify the purpose or function of this folder and propose a name for it, eg "VGO" (for files to be transferred to the Valuer General's Office) Ensure that the name is appropriate for visibility to external clients	Service Desk

2	Identify the internal user accounts (MIxxxy1, MIxxxy2, etc)	Service Desk
3	Create a new File Share security group in UMC named in the format below: MFT_<name> Where <name> is the negotiated folder name above e.g. MFT_VGO If more complex requirements are identified, such as the external users being only able to download only and not upload, then multiple groups may be needed. Create these as necessary using the special requirement as a suffix on the group name: e.g. MFT_VGO_Download Populate these groups wiut	Service Desk
4	Identify the external user accounts (EXxxxx2, EXxxxx2, etc) These will likely be advised or identified by an internal user since they would be the expected instigator of this requirement Add the external users to the appropriate security group(s) created in the previous step.	Service Desk
5	Create SR with the group details and assign to "_ADMINISTRATORS, SYSTEM"	Service Desk
6	Perform the procedure: Inframation →Applications →MFT →Operational Procedures →Create Group Shared area TBA	System Admin
7	Return the SR to "_DESK, SERVICE" advising that the group folder has been provisioned and secured.	System Admin
8	Advise the internal user that the facility is in place and that the shared group folder will be visible in each of the users' home folders when using the web client. The internal user would be expected to liaise with the external users accordingly on files to transfer.	Service Desk

C.5. Application Programming Interfaces

The following programming interfaces are defined for the MFT for use by internally-developed applications leveraging the MFT.

C.5.1. Email Notification facility

Emails can be generated by placing a control file into the download folder. A scheduled task will detect the control file and generate a notification email accordingly.

The control file has to be called notify.dat and contain content with the following format:

[MFTEMAIL]

Subject = DMP Managed File Transfer.

Owners = jason.parry@dmp.wa.gov.au

Recipients = someuser@iinet.com.au,user2@google.com

From = MFT@dmp.wa.gov.au

Key = vgokey

Property	Comment
Subject	Will appear as the email's "subject".
Owners	Internal users who'll be emailed the same messages as the recipients and also any admin related messages. Comma delimited
Recipients	External users who the email will be sent to. Comma delimited.
From	Will appear in the email's "from" field.
Key	Effectively a password that will be used to provide some very basic security to the process.

Any new folders set up will require a new "key" that will need to be requested from the system admin team.

The detail for the email is a combination of:

- Information provided in notify.dat
- Information from the server based configuration file.
- A listing of the files in the download folder.

Example. Extract from server based configuration file.

[BODY]

The following files are now ready to be downloaded:

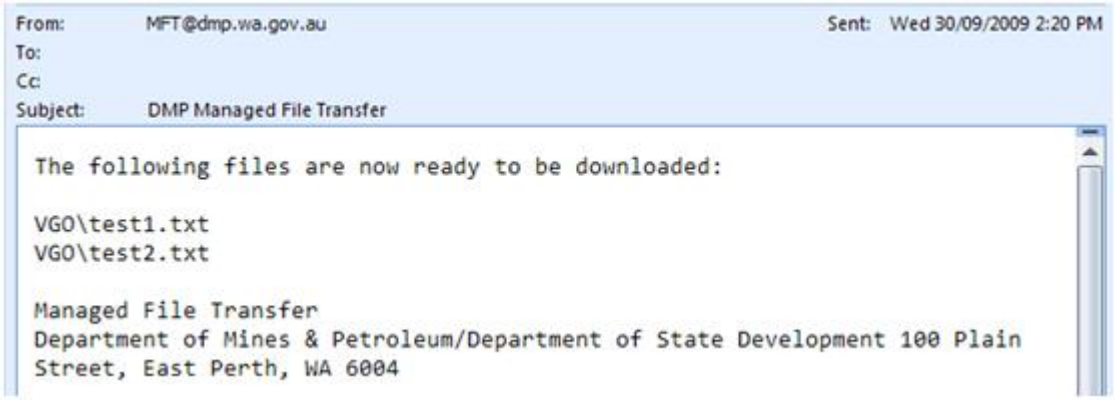
[FOOTER]

Managed File Transfer

Department of Mines & Petroleum/Department of State Development

100 Plain Street, East Perth, WA 6004

Sample email:



Bibliography

[1] Part 16 – Radiation Safety, Mines Safety & Inspection Regulations, 1995.

[2] *Mines Safety & Inspection Act, 1994*

[3] STROM, D.J.; Stansbury, P. S. Minimum detectable activity when background is counted longer than the sample. Health Physics. 63:360-361, 1992.

[4] Grantham, David. Simplified Monitoring Strategies. Australian Institute of Occupational Hygienists Inc, 2001.

Index